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ABSTRACTS

Institute and Museum of Anthropology
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PLENARY LECTURES

HUMANS ARE NOT COOPERATIVE BREEDERS BUT PRACTICE BIOCULTURAL REPRODUCTION

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Alloparental care and feeding of young is often called 'cooperative breeding' and humans are increasingly described as being a cooperative breeding species. We critically evaluate whether the human offspring care system is best grouped with that of other cooperative breeders. We find that human reproduction and offspring care are distinct from other species because alloparental behaviour is defined culturally rather than by genetic kinship alone. This system allows local flexibility in provisioning strategies and ensures that care and resources often flow between unrelated individuals. This study proposes the term "biocultural reproduction" to describe this unique human reproductive system. Human biocultural reproduction lowers the lifetime reproductive effort of individual women by 14–29% compared to expectations based upon other mammals. This efficiency could help explain lifespan extension beyond menopause. There are risks and trade-offs from the evolution of biocultural reproduction, including childhood neglect, social brain malfunction, and diseases of aging.

Key words: *alloparenting, human life history, childhood, lifetime reproductive effort, longevity*

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GLOBAL GROWTH CHARTS: NEW CONCEPTS OF GENERATING NATIONAL AND REGIONAL REFERENCES FOR HEIGHT, WEIGHT, AND BMI FROM 0–18 YEARS

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Background: The world-wide variation in human growth has long been documented. The present work was undertaken to re-analyse the between-population variance in growth, and to provide a globally applicable technique for generating growth references. Material and methods: We meta-analyzed 196 female and 197 male growth studies published since 1831 using Preece-Baines analysis and Principal Component Analysis (PCA). Maximum Likelihood Principle (MLP) for non-linear optimization was used to generate synthetic growth references for any desired population. Results: PCA revealed five components that explain 98.4% of the between-study variance in mean height, 99.2% of this variance in mean weight, and 93% (females) and 94% (males) of this variance in mean BMI. Combining PCA and MLP improves generating synthetic growth references, with average residuals for mean height of 0.92 cm when registering at 2 age groups, and 0.45 cm when registering at 5 age groups. Conclusion: PCA provides global descriptions of height, weight and BMI for the full age range (0–18 years). Combining PCA and MLP can be used for plausibility checks in growth investigations, and for generating synthetic growth references for any population that lacks autochthonous growth references, e.g. modern African populations, migrants, or ethnic minorities.

Key words: *auxology, growth studies, meta-analysis, national and regional references, synthetic growth charts, 0-18 age range*

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CRANIOMETRY OF THE BRONZE AGE STEPPE POPULATIONS OF SOUTHERN RUSSIA AND UKRAINE (WITH REFERENCE TO THE INDO-EUROPEAN PROBLEM)

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Archaeological and linguistic data suggest that Chalcolithic and Bronze Age inhabitants of the Russian and Ukrainian steppes were mostly Indo-Europeans. Which of the theories concerning the Indo-European (IE) homeland – "Kurgan", Central/Western European (CWE) or Anatolian – shows a better agreement with the cranial evidence? What can cranial data tell us about the dispersal of filial IE groups such as Indo-Aryans and Iranians? My database includes more than 250 male cranial series. Measurements were processed using canonical variate analysis and Mahalanobis distance.

Most Early and Middle Bronze Age series (all Pit-Grave and 20 of 22 Catacomb as well as Poltavka and Potapovka) are closer to the pooled local Chalcolithic (Sredni Stog and Khvalynsk) group than to the pooled Chalcolithic and Bronze Age groups either from CWE or the Near East, indicating population continuity in the steppes but, in contrast to what most EU homeland theories predict, few migrations either to or from the steppes. Exceptions are Maikop, Kemi-Oba, Tamar-Utkul, two early Catacomb, Babino, and one Sintashta group. They are closer to the pooled Near Eastern series than to the steppe Chalcolithic. Three early Catacomb groups and Babino deviate also toward the pooled CWE series.

A more detailed analysis reveals CWE parallels to certain Pit-Grave and Catacomb series. An especially close analogy is the Ostorf group, northern Germany, representing the Tiefstichkeramik variant of the Funnel Beaker Culture, which may be proto-EU. Apart from steppe parallels, this group has a geographically remote parallel in Central Asia – the Bronze Age Okunev group from Aimyrlyg, Tuva, which also resembles certain Pit-Grave and Catacomb people. This might evidence a long-distance eastward migration of Indo-Iranians along the steppes. The Aimyrlyg skeletons, like the Xinjiang mummies, possibly mark the easternmost reaches of that migration. Among the later (Early Iron Age) people, the Aimyrlyg population is very similar to European steppe Scythians, supporting the archaeological theory of their Central Asian origin. If this theory is correct, then Scythians may have acquired their Iranian language not from their predecessors in the steppes – the Timber-Grave people – but from an early group of Iranian migrants from Europe to Central Asia.

Key words: I*ndo-Europeans, indo-european homeland, indo-european migrations, Indo-Iranians, Aryans, Iranians, Scythians, physical anthropology, craniometry*

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GENETICS, GENOMICS AND METABOLOMICS OF HUMAN BODY COMPOSITION

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A chronic degenerative disease is a disease in which irreversible degenerative changes occur in the affected anatomical structure(s) and/or physiological function(s) and which progressively deteriorate over time. This disease may affect virtually any organs' system and function, including body composition, which will be in the focus of the present talk. Basically, body composition components include lean, fat and bone body mass. All three components are highly important for normal physiology and metabolism, and deviations from normal values are often associated with various pathological conditions. They include age related loss of muscle and bone mass (sarcopenia and osteoporosis respectively). However, despite extremely high incidence of both these conditions in the developed countries, often considered as new epidemics, and well established major contribution of the genetic factors, identification of the specific genetic polymorphisms is far from the comple-

tion. Huge effort is now invested in study of various candidate genes and potential specific polymorphisms selected from functional genomic data-bases and implementing bioinformatics tools. Numerous whole genome linkage and currently association studies identifying hundreds of new suggestive polymorphisms and dozens of new genes are also waiting for approval from the same sources of functional genomics. These results if confirmed could be of considerable basic scientific and clinical significance, in particular for the personalized medicine. The present talk will illustrate this status of affairs in our research, focused on bone strength/fragility and sarcopenia related phenotypes. In particular, this presentation will show the main results of our research implementing modern "omics" methods including whole genome and metabolome studies to identify specific genetic factors and endogenous molecules associated with muscle mass and sarcopenia related phenotypes in general population. I will present some selected results of the GWAS and functional genomics analysis of the muscle mass variation obtained in largest up-to-date international consortium.

Key words: *muscle mass, BMD, GWAS, candidate genes, association analysis*

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EPIDEMIOLOGICAL AND NUTRITION TRANSITION: THE DOUBLE BURDEN OF MALNUTRITION

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The theory of the epidemiological transition focuses on the complex changes in patterns of nutrition, health and disease and on the interactions between these patterns and their demographical, economical and sociological determinants and consequences. The theory was first put forward by Abdel R. Omran based on his analyses and comparisons of mortality patterns.

The Epidemiological Transition is obviously linked to demographic and nutrition transitions. As far as nutrition is concerned changes in dietary and physical activity patterns are partly responsible for the secular trend in average stature and alterations in body composition. However many modern societies have a diet high in saturated fat, sugar, and refined foods and low in fibre (this diet is often referred to as the "Western diet") and this diet is associated with high levels of pre-obesity and obesity as well as increased risk of chronic and degenerative diseases e.g. diabetes.

Many countries are suffering from both undernutrition as well as overnutrition (i.e. the double burden of malnutrition).

This paper reviews these concepts and considers how aid programmes can impact on these transitions.

Key words: *Epidemiological Transition, demography, malnutrition, undernutrition, overnutrition*

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MITOCHONDRIAL PSEUDOGENES, GENE FLOW AMONG AFRICAN HOMININS AND HOMO HEIDELBERGENSIS

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Mitochondrial pseudogenes or nuclear DNA sequences of mitochondrial origin (numts) represent the fossils of vanished mtDNA molecules. Recent numt sequences have been inserted into the human nuclear genome after the reproductive separation of the hominin and chimpanzee lineages. In 2010 I characterized a 5841-bp numt on the human chromosome 1p36.33, called mtAncestor-1, and made a conclusion that it is likely to be a molecular relic of the mtDNA of Homo heidelbergensis. MtAncestor-1 was transferred into the nuclear genome of a common ancestor of Neanderthals and modern humans approximately 620,000 (440,000–820,000) years ago. In 2010 and 2014 the mtDNA sequences were published from the hominin remains found in Denisova Cave (Siberia, Russia) and Sima de los Huesos (SH) Cave (northern Spain). Phylogenetic analysis placed both sequences in the same group as mtAncestor-1 with a strong statistical support. This group diverged 840,000 (610,000–1,100,000) years ago from another cluster composing of the modern human and Neanderthal mtDNA sequences. The subsequent divergence of the human and Neanderthal mtDNAs starting 450,000 (320,000–600,000) years ago as well as the evolutionary radiation of the heidelbergensis-like (mtAncestor-1, Denisova and SH) mtDNAs approximately 570,000 (390,000–790,000) years ago demonstrated a deep division of mtDNA lineages that existed among African hominins in the Lower and Middle Pleistocene. The transposition of the heidelbergensis-like mtDNA to the modern human and Neanderthal nuclear genomes provided for the first time the genetic evidence of gene flow from one African hominin group to another. This mtDNA illustrates the evolutionary connections between the African H. heidelbergensis, the Denisova and SH hominins of Eurasia, and the ancestral African population of modern humans and Neanderthals. Assuming that the SH hominins belonged to the Neanderthal lineage, it is plausible to suggest the broad distribution of the heidelbergensis-like mtDNA outside Africa among the Eurasian hominins, including the daughter lineages of H. heidelbergensis and the primitive forms of Neanderthals. Hence, this type of mtDNA cannot serve as an evolutionary marker identifying new hominins in Eurasia in the absence of their remains. Instead, the ancient genome data should be considered in conjunction with paleoanthropological record.

Key words: *mitochondrial pseudogenes, mtAncestor-1, Homo heidelbergensis, mtDNA, gene flow*

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Section AGEING and SENESCENCE

FINE MOTOR SKILLS OF A HAND IN POLISH AND CZECH FEMALE SENIORS LIVING DIVERSIFIED LIFESTYLE

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Involution as physiological and multi aspect changes in human body, can worsen the functioning of the elderly. Those changes concern not only the deterioration of motor performance, but influence also other body parts and by that they may cause self-care problems. Weakening of hand performance may be a result of a sarcopenia, the decline of strength and endurance or changes in the peripheral nervous system, such as a reduction in nerve conduction velocity, sensory perception or excitation coupling and contraction of motor units. Involution changes also cause minor disturbances of movement, handling and the eye-hand coordination. These factors may affect elder people daily activities, self-care, and thus result in considerable independence loss. The aim of this study was to analyze the involutional changes in the field of precise motor skills of a hand in older women living in different environmental conditions. There were 486 women included in the study, aged over 60 years recruited in Poland and Czech Republic. Research in Poland was part of the research project # N N404 MNiSzW 075337 at the Academy of Physical Education in Wroclaw, study in the Czech Republic was a part of the research project MSM 6198959221 at University in Olomouc. Both projects were approved by the Ethics Committee for Scientific Research. The measurement was conducted, using the Vienna test system. Aim, hands shaking, precision and speed of movements of arms and hands, dexterity of hands and fingers, the speed of the wrist and fingers were investigated The best results in coordination and movement of hands has been observed in women from Universities of the Third Age in Poland. It is very probable that it is effect of physical activity programs realised by these institutions. The study confirmed involutional changes in the analyzed precise motor movements of the upper limbs in all groups of older women. These changes were the greatest in the group of seniors presenting non active lifestyle, which indicates the important role of prevention programs in gerontology.

Key words: *fine motor skills, involution, seniors, Vienna test system*

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VARIABILITY OF BODY CONTENT PARAMETERS AS AN INDICATOR OF BIOLOGICAL AGE IN HUMANS: INTRA- AND INTER-GROUP ASPECTS

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Biological age assessment is a commonly used method for investigation of ageing processes in contemporary populations. In our study, we have used the method suggested by Gorelkin A.G. and Pinkhasov B.B. (2008) based on parameters of the stature, with the help of which, using the multiple regression equation, individual determination of the biological age and ageing rates in men and women can be performed. Anthropometric examination (total body sizes and body mass components) of 423 people (239 men and 184 women) at the age from 52 to 104 years old has been carried out in the three cities (Moscow, Barnaul, Tiraspol) with different ecological and socioeconomic conditions. Moscow is a megalopolis with population density maximal for Russia (more than 11.5 mln people). Barnaul is an administrative and scientific (research, medical, educational) center of Altai Region, one of the largest Siberian cities (633,000 people). Tiraspol is a capital of Trans-Dniester Moldavian Republic (in the south-east of Europe) with the population about 156,000 people. When biological age parameters (BA) were compared with the calendar age (CA), groups with slowed (BA < CA – 7 years), medium (BA = CA ± 7) and accelerated (BA > CA + 7) ageing rates have been detected in the examined subjects. In women and men with the slowed ageing rates, lower values of body mass index (BMI), decreased amount of total body mass and higher level of specific metabolism (kcal/m²) have been seen. Fat accumulation in the area of hips is more characteristic for women (based on the ratio of waist/hips circumferences), and for men – on the trunk. All long-livers (36 women) appeared in the group with slowed ageing rates in accordance with their stature and based on biological age. In the group with accelerated ageing rates, disharmonic variants of fat topography have been observed: for women – android, for men – gynoid. Regional differences in the distribution of prevalence of different versions of ageing rates have been revealed: in Moscow, a slowed variant of development of involution age-specific changes is the most common (both in men and women). The study has been performed at financial support of the Russian Foundation for Basic Research, grant #12-06-00265.

Key words: *stature, body composition, biological age, ageing rates, long-livers*

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ALLOSTATIC LOAD AND FRAILTY MEASURES AMONG POLISH URBAN AND RURAL 55+ SUBJECTS

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During life span human body is exposed to numerous stressors, which force changes in internal environment, in order to adapt to present conditions. Allostatic load concept was created to measure the cumulative effect of those stressors on the body. The aim of the study was to compare allostatic load (AL) and indicators of frailty between urban and rural elderly from Greater Poland province. In all 216 female and male individuals aged ≥55 years were enrolled into the study. To determine AL following variables were measured: WHR, diastolic and systolic blood pressure, ratio of total to LDL cholesterol, HDL cholesterol, glycated hemoglobin, serum dihydroepiandosterone-sulfate, overnight urinary cortisol, adrenaline and noradrenaline. Measures

of frailty included time to walk 15 feet and maximal grip strength. Results were analyzed and compared between eight groups according to: place of residence, gender and age subgroups. In general, rural elderly were characterized by higher AL values compared to their urban peers, and males had greater AL values compared to females. Significant gender-related differences were noted among rural individuals (55–69 years: 3.43 males vs 2.18 females; ≥70 years: 2.88 males vs 2.52 females). It was observed that younger urban and rural females had lower AL values compared to their older peers, opposite relation was noted in case of male participants. It was noted that rural females in both age subgroups had significantly stronger hand grip then urban peers. However, rural females needed more time to walk 15 feet compared to urban females. No age- or place of residence-differences in grip strength and time to walk 15 feet were found in case of males. To conclude, conditions of life and exposure to external stressors seemed to vary in a great extent between females and males from rural area, but not urban area. Differences in physical performance due to the place of residence were pronounced only in studied females.

Key words: *allostatic load, frailty, Polish elderly, urban, rural*

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EVALUATION OF PHYSICAL FITNESS BY USING SENIOR FITNESS TEST AND THE ANALYSIS OF BODY COMPOSITION IN SENIOR WOMEN OF U3V

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Optimal physical fitness is an important factor which limits the progression of senior fragility and contributes to the prevention of falls. Body composition, together with the optimal growth of muscle strength and bone density, contribute to the prophylaxis of senior fragility and accident prevention for seniors. The research group consisted of senior women attending University of the Third Age at the Faculty of Physical Culture of Palacky University in Olomouc. The research sample was divided into groups according to age (≤ 60 years; > 60 years). Physical fitness was assessed by a set of “Senior Fitness Test”, which includes six tests: chair and stand test, arm curl test, step test, chair sit and reach test, back scratch test and walk test. Muscle strength was evaluated in the flexors of the arm, forearm and hand by digital pinch grip (MIE Medical Research). Body composition was determined according to the method of bioelectrical impedance by InBody 720. Out of the characteristics of body composition, the health indicators of obesity will primarily be used for evaluation of the health risks – Body Fat Mass (kg), Body Fat Mass Index (kg/m^2), Fat Free Mass (kg), Fat Free Mass Index (kg/m^2), Skeletal Muscle Mass (kg), Body Cell Mass (kg) and the amount of visceral fat (cm^2) indicative of the risk of abdominal obesity. Bone density was determined at the heel and wrist area by local densitometer (EXA 3000). Visceral fat in the younger group of women was on average lower than in the older women, but both groups exceeded the value of risk (100 cm^2). Values in amount of Body Fat and Fat Free Mass between the groups did not differ significantly. In Senior Fitness Test, both groups of women achieved similar results, the difference was significant only in step test (better results in the older group), and in walk test (better results in the younger one).

Key words: *senior population over 60 years, body fat mass, fat free mass, senior fitness test, bone mineral density, maximum muscle strength, risk of falls*

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CHANGES OF THE GENERAL BONE STATUS IN THE MENOPAUSE TRANSITION

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The purpose of the research was to study the relationship between the menopausal status (estimated by the reproductive and menstrual history as well as the level of female sex hormones) and the general bone status (characterized by bone structure and bone mass) in Hungarian women. A random sample of 2602 Hungarian women (aged 40–65 years) was to be enrolled in the study between 2011 and 2013. By considering the reproductive and menstrual history subjects were divided into premenopausal, early perimenopausal, late perimenopausal and postmenopausal subgroups. In a subsample of 150 subjects salivary estrogen and progesterone levels were determined by 17 beta-Estradiol Saliva Elisa and Progesterone ELISA immunoassays. Bone mass was estimated by Drinkwater-Ross four-component method. The bone SOS and BUA bone structural parameters were assessed by using the DTU-one osteometer. Hypotheses were tested at the 5% level of random error. By comparing the menopausal status estimation methods in the studied subsample, the reproductive and menstrual history was found to be a more reliable estimator of the menopausal status than the sex hormone levels (that are having considerable daily fluctuation also in a normal menstrual cycle) determination. Former epidemiological studies suggest that the menopause transition is associated with significant changes in bone structure. Our results evidenced these significant changes in body structure by reproductive ageing in women, but an important shift between the changes in bone mass and the bone structural parameters (SOS and BUA) was found. This could imply that (1) bone system changes not only in its absolute mass, but also in its structure in the perimenopausal period, and (2) the onset of these bone structural changes in the skeletal system and the intensity of these changes differ in the menopause transition. In general, the earlier onset of menopause the more pronounced changes were found in these trends of bone structure by reproductive ageing. The study was supported by the Hungarian National Foundation for Science (OTKA grant K83966).

Key words: *menopause, body structure, bone mass; Hungarian women*

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PHYSIOLOGICAL VARIATION ASSOCIATED WITH FRAILTY AMONG OLDER RESIDENTS OF HIGHER ALTITUDE VILLAGES OF THE SELŠKA VALLEY

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Frailty is the multi-system dysregulation following multiple life stressors that is associated with age and increases an individual's vulnerability to negative health effects (Fried et al 2001). One of the most critical questions frailty research seeks to answer is to what extent biocultural variables predict frailty. In the model employed in this paper, endogenous variables that individuals cannot control, such as age and sex, affect exogenous variables that are a result of individuals' lifestyles (Fried et al., 2001). These variables then affect frailty, as assessed by a five-factor frailty index developed by Fried et al. (2001) and Walston (2005). Previous research that also employed this index studied mostly North American populations and found associations between education level, age, sex, prevalence of certain diseases and levels of frailty (Fried et al., 2001, Walston, 2005). This paper broadens the range of variables studied, and expands the demographic and cultural scope of frailty research by applying the frailty index to a geographically isolated Slovenian population. Data were obtained from 40 participants aged 55 years and older during fieldwork in

2008 and 2009 in the Selska Valley, Slovenia. Of participants, 26 were women (ages 59–86) and 14 men (ages 57–82). Self-report data and physical assessments were recorded for each individual. We used linear regression to explore associations between frailty and these variables. Significant associations (p=0.05) were found between frailty and age, being female, height, length of residence in the village, self-reports of negative health effects including poor overall health, feeling tired, and negative future health expectations. When effects of age and sex were controlled, significant associations were again found between frailty and multiple self-reports of poor health and painful or reduced activity level. In conclusion, this paper explores possible interactions of lifestyle factors and frailty across cultures and calls for further cross-cultural frailty research.

Key words: *physiological variation, frailty, old people, Selška valley, Slovenia*

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REPRODUCTIVE HISTORY IN RELATION TO FATNESS IN THE MENOPAUSE TRANSITION

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The occurrence and the timing of the reproduction-related events, as menarche and menopause, as well as the characteristics of menstrual cycles and reproductive life, as gestations, lactation, child-caring behaviour, etc. are mainly controlled by the neuroendocrine system. The progressive and regressive changes of the neuroendocrine system through the female life cycle contribute not only to the age-changes of the reproductive system and reproductive behaviour but also to considerable changes of the female body structure. The importance of studying the relationship between the reproductive variables (age at menopause, characteristics of menstrual cycles, fertility) is increasing nowadays, since (1) many diseases (e.g., obesity, cardiovascular disorders, breast, ovarian and uterine cancers, etc.) seem to be related to the characteristics of reproductive life and (2) the increasing knowledge about this complex relationship could help to improve the effectiveness of the health prevention programs. The main purpose of the present analysis was to analyze (1) the relationship among some indicators of reproductive history in women (aged 40–65 ys), and (2) the reproductive variables in relation to the characteristics of fatness indicators (fat mass and its distribution) in the menopause transition. Data on the age at menarche and menopause, the pattern and regularity of menstrual cycles before and during menopause, the number and timing of pregnancies and their outcomes, the incidence of breast feeding, the regularity of menstruation, gynaecological or obstetric problems and contraceptive usage were collected by questionnaires. Salivary progesterone and estrogen (as 17beta-estradiol) levels were assayed using IBL ELISA kits. Subjects were divided into premenopausal, early and late perimenopausal as well as postmenopausal subgroups on the basis of the menstrual cycle characteristics and sexual hormone levels. The main results of the present analysis of the relationship between the reproductive factors and fatness indicators during the menopause transition revealed that (1) age at menarche did not show any association with subsequent fatness, nor did age at menopause; and (2) parity, menopausal status and the age at menopause were associated with the fatness indicators. The study was supported by the Hungarian National Foundation for Science (OTKA grant K83966).

Key word: *menopause, menarche, body fatness, Hungarian women*

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Section APPLIED ANTHROPOLOGY

CHARACTERISTICS OF THE SPATIAL POSITION OF THE TORSO, PELVIS AND FOOT IN THE MALE ELITE ATHLETES OF DIFFERENT SPORTS

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Characteristics of the musculoskeletal system in 231 elite male athletes from 11 Olympic sports, age of 19–36 were investigated. The purpose of research is to study type-specific traits of the spatial position of torso, pelvis and foot in elite athletes men specializing in different kinds of sport with the use of modern quantitative methods. The methods included computer optical topography (1994, Novosibirsk). Disorders of orientation and shape of the body sagittal, front and horizontal planes, the frequency of local deviations in posture from the norm were determined. Characteristics of the position and arch of the foot were determined by a computer complex "Diasled-Scan". The type-specific risks of incorrect posture and foot related to sports specialization were identified. It was shown that the deviation of the spatial orientation and shape of the body, the position of the foot setting were correlated under the intense muscular activity; they have an influence on the increase of the evolutionarily formed functional asymmetry in humans, aggravated by strenuous physical activity. Main motor stereotype, in a long-accented training process, forms a specific muscle profile with the imbalance of the paired torso muscle groups, and the agonists-antagonists muscles of the lower limbs and trunk. Most general and essential posture indicators in the total subpopulation of athletes are the round or round-shouldered back, a left-side curvature of the spine in chest department and a right-hand twisting of a trunk towards pelvis. Common positions of violations are supplemented with the type-specific changes, particularly in sports, both "symmetric", and "asymmetric" in terms of biomechanics of the competitive exercise: archery, cross-country skiing, biathlon, curling. Positional settings stop athletes characterized mainly by valgus-varus of the left-right asymmetry from a greater support on the left foot that is a direct projection of the left-hand shift of the spinal processes with right-to-torso twisting.

Key words: *musculoskeletal system, posture, foot, elite athletes*

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THE CHALLENGES OF THE EXCAVATION PROCESS OF WELLS USED AS BURIAL FEATURES IN CYPRUS. DEALING WITH THE RECOVERY OF HUMAN REMAINS

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The principal objective of this paper is to demonstrate the challenges of locating, excavating and recovering human remains from wells, one of the most common burial features that the Committee on Missing Persons in Cyprus (CMP) is dealing with. The frequency of burials in wells can be explained by the little amount of time and effort needed in burying the bodies since they already exist and are not distinguishable from the surrounding environment. For our purpose, wells are divided in two main categories, those that are open and the filled ones. While the open wells are visible and easy to find, special methods need to be applied in order to locate the filled ones. In both situations, the scientists have to deal with the depth of the wells. That is

why an access ramp is constructed by the excavator to reach the undefined level where the human remains, which are situated in the well, are located. During the removal of the deposit of the wells different challenges, either caused by nature or humans, can be encountered. For example, during the years these abandoned wells were used as “trash pits” (garbage, dead animals, discarded materials) or were altered (e.g., collapsed, water existence) by natural forces. The same reasons can be present during the exhumation process. Once these difficulties are confronted, with the use of several techniques the scientists have to concentrate on the exhumation process, which is mainly followed manually. The procedure depends primarily on the type of burial (single or multiple/commingled), the existence of water or not, whether it was disturbed, and the decomposition of human remains inside the well.

Key words: *forensic anthropology, wells, Cyprus, CMP, human remains, excavation, exhumation*

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COMPARATIVE ANALYZIS OF ANTHROPOMETRIC INDICES OF ATHLETES SPECIALIZING IN SHORT-TRACK AND MOSCOW SCHOOLCHILDREN AT THE AGE FROM 7 TO 16 YEARS

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The aim of the paper is to study and compare variability of individual anthropometric indices in short-track athletes with the control group of Moscow schoolchildren from 7 to 16 years of age. Anthropometric measurements were conducted in conformity with classical methods, accepted at the Institute and Museum of Anthropology, Lomonosov Moscow State University.

Conducted research has allowed to establish that the basic differences between athletes and schoolchildren of both gender groups have been observed at the age of 7–12. Schoolchildren have conceded athletes in all measured parameters. The 13–16-year-old schoolchildren are significantly smaller in all circumferences, but exceed in hand grip strength in both gender groups.

The obtained anthropometric characteristics might be used in sport selection as well as for conducting a medico-biological monitoring.

Key words: *anthropometric indices, short-track athletes, Moscow schoolchildren*

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T/A POLYMORPHISM OF THE FTO GENE IS ASSOCIATED WITH THE PREDISPOSITION TO FAT ACCUMULATION IN THE KALMYKIAN MALES

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The problem of human fatness is one of the most urgent in the modern world. Studies in the field of anthropogenetics revealed some genetic determinants of increased fat accumulation and, as a consequence, of obesity development. The T/A polymorphism (rs9939609) in the fat mass and obesity associated (FTO)

gene, is a strong candidate to explain how the disease modifier polymorphisms may contribute to a lower risk for obesity among trained individuals (Kilpelainen et al., 2011). It has been shown that adults who are homozygous for the A-allele weigh on average 1.5 to 3 kg more than those homozygous for the T allele. This finding has now been replicated in multiple obese cohorts (Fawcett and Barroso, 2010).The aim of the study was to examine possible relationships between T/A polymorphism of FTO with fat accumulation among 101 Kalmykian males (46 wrestlers aged from 14 to 26 years and 52 sedentary controls aged from 17 to 28 years). The program included standard anthropometric measurements (Bunak, 1941). For molecular genetic analysis buccal smears were collected. Genome DNA was extracted with the technique of alkaline extraction. Genotypes were determined with the minisequencing technique followed by MALDI-TOF detection (Ross et al., 1998). Statistical analysis, performed with the software «Statistica 8.0», included descriptive statistics, normalization procedure, one-way ANOVA with Scheffe's test for multiple comparisons. Statistical analysis has revealed the tendency to significant difference in genotype frequencies between wrestlers (FTO*TT 52.5% FTO*AT 32.5% FTO*AA 15.0%) and sedentary controls (FTO*TT 48.9% FTO*AT 32.5% FTO*AA 18.6%), $\chi^2 = 5.52$, p=.06 There is a certain increase of T-allele frequency in the wrestlers' group (69% vs 65%). In general, the athletes demonstrate lower fat accumulation matching with the controls. ANOVA results revealed a lot of associations between FTO genotype and anthropometrical characteristics, describing fat accumulation both in the wrestlers' group (weight, fat mass, chest, waist and hips circumferences, trunk and leg skinfold thicknesses) and in the sedentary controls (trunk skinfold thickness). The carriers of two mutant alleles (AA genotype) demonstrate increased parameters of fat accumulation in both groups. Thus, the presence of two rare alleles of the FTO gene polymorphic system in the genotypes of the investigated Kalmykian males could be considered as a risk-factor of increased fat accumulation. This research is supported by the RFBR grants # 13-06-00702.

Key words: *FTO gene, fat accumulation, wrestlers, Kalmyk males*

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ANTHROPOMETRIC NUTRITIONAL ASSESSMENT OF EGYPTIAN CHILDREN WITH AUTISM

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Autism is the fastest rising developmental disorder in the world today. Studies denote aberrations in conduct during meals, selectivity of food as well as problems in timing of meals. The aim of this study is to assess the nutritional status of children suffering from autism using anthropometric criteria. 100 Egyptian children diagnosed with autism of the age range 3-10 years and of whom 71 males and 29 females were studied. Body weight, height, body mass index, mid-upper arm circumference and triceps skinfold thickness had been assessed in view of the relevant measurements, by age and sex, of normal healthy Egyptian children. The mean Z score of all measurements attempted, calculated BMI and its standard deviations as well as the range are presented. Using single sample t-test, it was found that all measurements are significantly higher than normal with the exception of body height and mid-upper arm circumference. Probably the increase in fat component in our autistic children is due to increased carbohydrate and fat intake as well as sedentary life style, thus suggesting introduction of a feeding program for such children to overcome the unfavorable consequences of the disease.

Key words: *autism, anthropometry, nutrition, children, Egypt*

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ACE, FTO AND VDR POLYMORPHISMS ARE ASSOCIATED WITH MORPHOLOGICAL CHARACTERISTICS OF THE ELITE ROCK-CLIMBERS

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The aim of the study was to examine possible relationships between I/D polymorphism of ACE, T/A polymorphism of FTO and G/A polymorphism of VDR genes with selected anthropometrical characteristics among 12 (6 males and 6 females) elite rock-climbers, aged from 20 to 30 years. Polymorphisms of these genes are associated with physical capacities (ACE), increased risk of fat accumulation (FTO) and decreased bone mineral density (VDR). Detailed anthropological characteristics of this investigated group are presented in our previous article (Gaydamakina et al., 2013). The program included standard anthropometric measurements (Bunak, 1941). For molecular genetic analysis buccal smears were collected. Genome DNA was extracted with the technique of alkaline extraction. Genotypes were determined with the minisequencing technique followed by MALDI-TOF detection (Ross et al., 1998). Statistical analysis was performed with the software «Statistica 8.0». Results: the distribution of the genotype frequencies of all examined genes are not in accordance with the Hardy–Weinberg equilibrium. Each person in the investigated sample carries at least one insertion (I) allele of the ACE gene, which could reveal increased aerobic capacities of the elite rock-climbers. There are no AA genotype carriers of the FTO gene among the investigated athletes. Thus, elite rock-climbers do not have genetically determined risk of an increased fat accumulation. Previously it was shown that peak mineral density is decreasing in the rock-climbers compared with other athletes (Sherk et al., 2010). In the total sample only two persons have GG genotype of the VDR gene, which determines normal bone mineral density. Most of the participants (83%) carry at least one mutant (A) allele, which determines a decreased bone mineral density. The investigation of three molecular-genetic makers ACE, FTO and VDR among the elite rock-climbers has shown the following tendencies: the occurrence of I-allele of the ACE gene, T-allele of the FTO gene and A-allele of the VDR gene. Our results correspond with the investigations by other authors (Djarova et al., 2013; Sherk et al., 2010) and with our previous study of morphological characteristics of the elite rock-climbers (Gaydamakina et al., 2013). This research is supported by the RFBR grants #13-06-00702.

Key words: *ACE, VDR, FTO, elite climbers, anthropology*

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THE ANTHROPOLOGICAL STORY OF VUČEDOL CULTURE (EARLY BRONZE AGE, VUČEDOL, EAST CROATIA)

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Vučedol is a culture's eponymous settlement of the first half of the third millennium Before Christ (BC). The aim of this study was to complete the knowledge about life of Vučedol culture inhabitants with the help of biological anthropology, the wide unknown field which is still there after decades of archaeological excavation and research. The evidences are provided by well preserved skeleton remains of a few individuals, seven children and fourteen adult persons. From single to multiple grave funerary practices, through classic anthropological analysis of sex and age at death to usage of different forensic methods, unique details were revealed. Special attention has been given to musculoskeletal stress markers, possible conditions and a manner of life, its rhythm and difficulties, and pathological changes which all left their traces on bone remains. We were following the asymptote of the Vučedol inhabitants life and death.

Key words: *anthropological analysis, musculoskeletal stress markers, pathological changes, Vučedol culture, Early Bronze Age*

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WHEN BALISTICS MEETS ANTHROPOLOGY: A CASE STUDY FROM THE MEDIEVAL ARCHAEOLOGICAL SITE OF OUR LADY OF MOUNTAIN CHURCH IN LOBOR (CROATIA)

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During the summer archaeological excavation in 2012, on the site of Our Lady of the Mountain church in Lobor, the grave number 888 was revealed, with skeletal remains of a young male person. The very position of the grave in a gothic church, along the apsidal area, accentuates the status of this person in the society. The apse as a remain of the gothic church elements is part of multi-stratified layers, maybe of a vertical complex where it is possible to separate structures from the 3rd to the 17th century, with the church Our Lady of the Mountain in Lobor as the last layer. It was a primary burial, with a position of the grave following the church's East-West orientation. The anthropological analysis was performed: determination of sex and age at death, body height, description of pathological conditions and eventual musculo-skeletal stress markers. On the skeletal remains circular defects were detected, in forms of a penetrating trauma due to a spherical or spheroid body or object activity. These fragments of uneven dimensions were embedded in the bones: right tibial bone, left and right femoral bone. With application of a scanning electron microscopy (Scanning Electron Microscopy / Energy Dispersive Spectroscopy method, SEM/EDX) and X-ray fluorescence spectroscopy (Micro X-ray fluorescence method, μXRF) a chemical analysis of the elements, together with morphological 2D and 3D characterization of samples were obtained.

Key words: *anthropological analysis, skeletal remains, balistics, SEM/EXD method, μXRF method, Lobor, Croatia*

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CORPORAL IMAGE SATISFACTION IN RELATION TO BODY COMPOSITION IN A YOUNG POPULATION FROM THE BASQUE COUNTRY (SPAIN)

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The aim of this study was to evaluate body composition variations among different states of body image satisfaction and dissatisfaction. The sample was composed of 932 individuals from the Basque Country, Spain (306 men, 626 women aged 18–30). Williamson silhouettes collection (2000) was used to assess satisfaction degree. Four anthropometric measures (height, arm, waist and calf circumferences) and two bioelectrical measurements (resistance and reactance; 50 kHz) were taken. Specific Bioelectrical Impedance Vector Analysis (spBIVA) was used to evaluate body composition. Bioelectrical values were projected on the specific tolerance ellipses from an Italo-Spanish reference population. Comparison between groups was performed using Hotelling's T2 and Student's t-tests. In men, the specific bioelectrical vector mean of the group with moderate dissatisfaction by excess was situated in the right quadrant of the ellipses (indicative of low cell mass) and toward the upper pole (indicative of high FM%). There were no significant differences in body composition between satisfaction and dissatisfaction by defect, and these groups are located near the median value of the ellipsis. In women, the specific vectors of groups with severe and moderate dissatisfaction by excess were in the left quadrant (indicative of high cell mass) and toward the upper pole. The group corresponding to body image satisfaction was in the lower left quadrant, which indicates a tendency to low FM%. The group with a slight dissatisfaction by defect was characterized by a smaller phase angle, indicative of less cell mass. There is a trend toward increasing FM% with increasing dissatisfaction by excess. Men and women differ in body composition characteristics associated to their body image satisfaction, women being more satisfied with a lower FM%. Body image dissatisfaction by excess tends to be related to FM% excess in men, while in women it seems to be more related to cell mass excess.

Keywords: *Specific BIVA; Body Composition; Body Image Satisfaction; Fat Mass Percentage*

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VARIATION IN FREQUENCY DISTRIBUTION OF PONTICULUS POSTICUS AMONG MODERN HUMANS: GENERAL OBSERVATIONS

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Ponticulus posticus is a non-metric feature located on the first cervical vertebra posterior to the lateral masses (other names: Kimmerle's anomaly, dorsal ponticle of the atlas). It is found in humans with a frequency of approximately 25% and is more common among non-human primates. The feature has attracted some attention, mainly because the presence of ponticulus posticus was thought to have an adverse effect on blood flow through the vertebral artery. Most of previous works focused on estimating frequencies of the feature within a study population, and little is known about factors affecting its variation in humans. We went through literature on this topic and analyzed frequency distribution of ponticulus posticus in modern humans. In addition we used our own data on 449 atlas vertebrae from 3 Russian and 3 North American osteological series. According to the results, complete ponticulus posticus is more common in males than in females and this pattern is repeatedly seen in most of the samples studied. As we can judge from available data, groups of African ancestry have higher frequencies of the feature compared to Caucasians, this is especially true

of female groups. Asian populations show the lowest frequencies. In the Caucasian groups that we studied ponticulus posticus is positively associated with cranial shift at cervico-thoracic border (χ^2-test, $p<0.05$), and negatively – with lumbalization of S1 ($p<0.01$). In summary, if the frequency of ponticulus posticus is used in inter-group comparisons it should be analyzed separately for each sex. The feature shows mild racial differences. It is somehow associated with cranial shift in spine morphology described by Khüne (1932), the nature of this association is a matter of future studies.

Key words: *ponticulus posticus, human anatomy, non-metric feature, intra-species variability*

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INHERITANCE OF DERMATOGLYPHIC ASYMMETRY AND DIVERSITY TRAITS IN TWINS BASED ON FACTOR: VARIANCE DECOMPOSITION ANALYSIS

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Background: It is well known that twin data have played a central role to sort out genetic from environmental variation. The increased dermatoglyphic asymmetry corresponds to a higher inter pair variability in a number of behavioral tests have prominent from earlier twin studies. Relatively few studies have attempted towards the extent and relative contributions of genetic and environmental effects on twin pedigrees through genetic model fitting statistical procedures. Aim: Dermatoglyphic asymmetry and diversity traits from a large number of twins were analyzed based on principal factors to evaluate genetic effects and common familial environmental influences by the use of maximum likelihood based Variance decomposition analysis. Sample: Data consists of monozygotic (MZ) twins of two sexes (102 male pairs and 138 female pairs) and 120 pairs of dizygotic (DZ) female twins. Results: All asymmetry (DA and FA) and diversity (Div) traits were clearly separated into factors and are perfectly corroborated with earlier studies (Micle and Kobyliansky, 1986, 1991, Karmakar et al., 2001) in different ethnic populations, which indicate a common biological validity perhaps exists of the underlying component structures of dermatoglyphic characters. Heritability results of twins clearly showed that DA_F2 is inherited mostly in dominant type (28.0%) and FA_F1 is additive (60.7%), but no significant difference in sexes were observed for these factors. Inheritance is also very prominent in diversity Factor 10, which is exactly corroborated with our previous findings (Karmakar et al., 2006). The present results are similar with the earlier results of finger ridge count diversity in twins (Holt, 1960), which suggested, finger ridge count diversity is under genetic control. Conclusion: The relationship between MZ and DZ twins is due to common genes that affect dermatoglyphic asymmetry and diversity traits (factors), suggests is under genetic control of which DA is inherited mostly in dominant type and FA is additive.

Key words: *dermatoglyphic asymmetry and diversity, segregation analysis, variance decomposition analysis, twins*

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MODEL CHARACTERISTICS OF ATHLETES IN WATER POLO AND HANDBALL

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Game activity of athletes is characterized by richness of the contents and a variety of actions. In water polo teams three game roles are distinguished: center forwards, mobile forwards and defenders. In handball there are two main game roles: players specializing on throws from far distances (central) and those who ends the “fast breaks” (extreme). The aim of the paper is to reveal model characteristics of the athletes depending on their game roles. Anthopometrical, bioergometrical and psychophysiological indicators were studied in 50 male water polo players, 20–25 years of age. Center forwards and defenders possess more massive body build, while mobile forwards have more gracile structure. Factor analysis isolated five factors, the 1st having the greatest loadings in total, length and girths traits. Longitudinal study of 46 boys, of 10–16 years of age, engaged in handball for 7 years, has been conducted. Players of the central zone possess macrosomatic type (MAS) at 10–13 years (74–82%), and at the age of 14–16 years they have mesosomatic type (MES) (43–62%). Extreme players represent three types: MAS, MES and micromesosomatic (MIMES) at the age of 10–13 years, with almost equal proportion of these somatotypes. At the 14–16-years period players of MIMES (53.8–-85%) and MES type (15.4–46%) prevails, thus showing their instability in the pubertal period. It may be concluded that at the very first stage of training in handball it is possible to differentiate young athletes of macrosomatic type as the future players of the central line, and those of micromesosomatic type as extreme players. Thus, the morphological component should take a leading position in the system of training of players.

Key words: *sports anthropology, game role of athletes, model characteristics, body types*

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SENSATION SEEKING AND HEALTH-PROTECTING AND REPRODUCTIVE STRATEGIES

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Sensation seeking (Zuckerman, 1971) can be seen as personality trait representing the psychological basis of adaptation strategies, formed in evolution. Higher sensation seeking (SS) is associated with reproductive behavior (Farthing, 2005; Cooping et al., 2013). SS correlates with status and reputation, higher SS is associated with short-term relationship (Egorova et al., 2013). The study sample was 280 students, 18-20 years of age. The following characteristics are assessed: sensation seeking (thrill and adventure seeking, experience seeking, disinhibition, boredom susceptibility, intelligence seeking, novelty avoidance) psychological well-being (Ryff, 1989) and health protecting behavior (leisure time, drinking and smoking). Higher level of SS was found in the male sample. This allows us to consider SS as the trait contributing to reproductive behavior. Men with higher levels of SS tend to be more preferred partners. SS is negatively associated with a preference for sports as leisure time, regardless of gender. “Intelligence seeking”, “novelty avoidance” are positively correlated with a tendency to consume high spirits and with smoking. Psychological well-being scales traits, such as “positive relations with others” and “personal growth”, have negative correlations with the “general sensation seeking”, “experience seeking” and “thrill and adventure seeking”. These results suggest that high SS acts in the opposite manner to different adaptive strategies. High SS leads to a focus on short-term relationship and simultaneously to low health-protecting behavior. This situation can be regarded as a preference for the

traditional strategy of adaptation in terms of evolutionary psychology. Low SS on the contrary would lead to a preference strategy aimed at preserving themselves and at long-term relationship. The study was supported by Program of Strategic development of Perm state humanitarian-pedagogical university, project No. 26-F.

Key words: *sensation seeking, health-protecting behavior, reproductive strategies*

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INTERDAILY VARIATIONS OF BODY COMPOSITION PARAMETERS IN YOUNG WOMEN

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The objective of the study is to determine the size of the changes of the selected body composition parameters during one week. The research was executed with a group of 40 women with the average age of 21.29±1.45 years. The measured parameters were: total body weight (BW), body fat representation (BF) and total body water (TBW). The monitored parameters were measured using the Tanita BC 418 MA tetrapolar bioimpedance scale. The measurements took place during one week (Monday – Friday). The error of the device was expressed with the typical error of measurement (TE) by Hopkins from three repeated measurements in one day (Monday). Only one measurement was taken on the remaining days. To evaluate the size of changes during the week, we used the ANOVA repeated measures. The practical significance was verified using Eta-squared. To express the size of the error of measurement in the weekly analysis, we used typical error of measurements (TE). The TE values expressing the accuracy of the device measurements were the following: BW 0.06 kg, BF representation 0.22 kg and 0.39%, TBW representation 0.17 kg and 0.29%. The differences found between the mean values of the monitored parameters during the week ranged from 0.00 – 0.15 kg in BW, 0.03 – 0.29 kg and 0.01 – 0.48% in BF, 0.00 – 0.21 kg and 0.00 – 0.35% in TBW. The practical significance was not established despite the fact that statistically significant differences were determined. The changes in the monitored body composition parameters during the week were very small, which was confirmed by the low practical significance values. When interpreting the results of repeated measurements, the values exceeding the level of the TE weekly analysis are considered to be a change. In BW, the value was 0.33 kg, in BF 0.41 kg and 0.70% and in TBW 0.41 kg and 0.51%.

Key words: *body weight, body fat, total body water, typical error of measurement, statistical significance, practical significance*

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CHARACTERISTICS OF PHYSICAL GROWTH AND DEVELOPMENT IN MONGOLIAN MALE ATHLETES

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Sports training is the process which requires years of hard work and can not accomplish its main goal without considering human growth and body development characteristics, level of physical preparation. Anthropometric and morphologic examination of Mongolian athletes has not been conducted. Therefore, the results are of great value to theory and practice of sports science. Anthropometric examination and data collecting have been carried out at Sport Center of Mongolian Olympic team of the city Ulaanbaatar.

The study comprised 581 athletes aged 17–25 years. Each athlete has been involved in 45 measurements and 20-questions survey. As a result of this study we come to the conclusion that sports activity strongly influences on physical growth and development. Training for different kinds of sports is different. The basketball players and field athletes (runners) were the tallest (average height 179 cm). Wrestlers were the shortest in height (average 166.5 cm). Compared to people who do not go in for sport, the athletes were taller by 4.5 cm. Mean height of Mongolian male sportsman is 172.6 cm. Geographical zones from where the athletes originate also influence on physical development. Sportsmen from steppe zone have bigger body, and those from Goby desert zone are smaller but have bigger fat mass. Basing on these results, it can be suggested that marathon runners can be selected from Gobi inhabitants, wrestlers – from steppe population, and players – from mountain-taiga people.

Key words: *physical growth and development, anthropometry, physical training, athletes*

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MORPHOFUNCTIONAL CHARACTERISTICS OF MALE ADOLESCENTS FROM REPUBLIC ALTAI, PRACTICING SAMBO WRESTLING

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The purpose of this research is to determine and compare morphofunctional characteristics and body traits of male juvenile sambo wrestlers, who live in the southern and northern areas of Republic Altai, Russia. The sample included 65 males, practicing sambo wrestling on a regular basis. The research protocol included anthropometric examinations (height, weight, and chest circumference) using a standard anthropometric measurement methods. Collected data of somatic characteristics were converted into Quetelet Index for BMI; the somatotypes were identified by using Chernorutskiy's classification. Evaluation of constitutional type was based on the ratio of height, weight, and thoracic circumference. Sambo athletes from the northern part of Republic Altai are taller and have more body mass and larger chest circumference in comparison to those from the southern part of Republic Altai. The height of athletes from the north is 6.1 cm higher than of those from the south (174.4±1.66 cm vs 168.3±1.12 cm, $p<0,001$). Body mass of sambo athletes from the north is 6.2 kg bigger than of those from the south (67.8±1.97 kg vs 61.6±1.12 kg, $p<0.05$). The chest circumference of athletes from the north is 3.7 cm larger (88.5±1.33 cm vs 82.4±0.98 cm). Values of Pignet Index show that the participants from the north have predominantly hypersthenic body type, while normosthenic and "average" body type is mostly represented among sportsmen from the south ($p<0.05$) Thus, the sambo athletes from the north are characterized by significantly higher anthropometric features – height, weight, and chest circumference. Northern participants have predominantly hypersthenic body type while asthenic and normosthenic types are more often observed among the participants from the southern area.

Key words: *Republic Altai, male sambo athletes, somatotypes, anthropometry, Quetelet Index, Pignet Index*

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STRESSING OUT IN TRANSITION – THE CASE OF UPPER SECONDARY SCHOOL STUDENTS FROM ZAGREB, CROATIA

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This anthropological account explores manifestations of psychosocial stress in youth as a response to cultural changes in the transitional (postsocialist and postconflict and now the European Union) context of contemporary Croatia. For youth a successful transition to independent adulthood requires competences in dealing with various agespecific developmental tasks, each of which might represent a specific stressor. Youth maturation and social integration are even more uncertain and stressful in the transitional society that itself is undergoing drastic and multiple transformations of institutions, cultural values and norms. Analytical approaches based on the cultural consensus and cultural consonance theories are used to assess the associations of various cultural domains of everyday life to the stress outcome measurements of salivary biomarkers. Saliva is useful for population studies of psychosocial stress because it allows noninvasive collection of samples in nonclinical settings. Two salivary biomarkers of stress physiology are selected for laboratory testing: cortisol (the central hormone in the physiology of stress, a biomarker of the hypothalamicpituitaryadrenal axis) and alphaamylase (a surrogate marker of the sympathetic nervous system activity that parallels stressrelated increase in norepinephrine). The results are presented from a recent pilot study using cultural consensus and cultural consonance analyses on salivary cortisol and alpha amylase levels in the group of the upper secondary school students from Zagreb, Croatia. This pilot study illustrates the usefulness of complementing recent developments in cognitive and cultural anthropology with research in biological anthropology.

Key words: *stress, salivary biomarkers, youth, cultural consensus and cultural consonance*

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MORPHOGENETIC CHARACTERISTICS OF HIGHLY QUALIFIED WOMEN FREESTYLE WRESTLERS

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The fingerprint dermatoglyphics of 75 top Russian female freestyle wrestlers of three conditional weight categories (light, medium and heavy) was studied with the use of hardware-software complex “Malachite”. The athletes’ age ranged from 20 to 33 years. It is established that for the whole sample (irrespective of weight categories) the typical phenotypes are LW and ALW. For the wrestlers of a light weight category in 48% of cases the occurrence of the pattern arch (A) was observed and in 32% – the pattern whorl (W). There are also athletes of this weight category with the phenotype of ALW. The prevailing patterns in athletes of a middle weight category are the loop (L – 62%), the whorl (W – 24%) and a complex pattern (S – 12%). They are relating primarily to the phenotype of LW. For athletes of a heavy weight category, the typical patterns are: the loop (L-74%), the whorl (W – 14.4%) and complex pattern (S – 7.8%). The main phenotype is LW. The obtained results may be used for the selection of the most prospective athletes in women’s freestyle wrestling.

Key words: *morphogenetic traits, female freestyle wrestlers, fingerprint dermatoglyphics*

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NEW COMPUTER PROGRAM "FACE-ON-FACE" AS A NEW PRACTICAL ANTHROPOLOGICAL VIRTUAL INSTRUMENT

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The program Face-on-Face was developed for optimization of creating of composite portraits (CP) (of the face and body) according to F. Galton by means of new digital images. Composite portrait is a kind of cognitive tool that allows visualizing the integrated variability of morphological characteristics of the human face – in sex, age, race (ethno-territorial) aspects. An algorithm of creating portraits consists of the following: first, the average interpupillary distance for the entire sample (in pixels) is calculated, then all of the individual images are restricted (reduced or increased, respectively) to found the average interpupillary distance and simultaneously stretch or shorten in height, reaching the average distance between an oral point and a horizontal line passing through the pupils. These transformed images are sequentially superimposed on each other. Color of a pixel at each point is the average of all pixels of the points with all the images. The sequence of the overlay does not affect the final image. Due to the transformation of each image into a mathematical model the combining process is fast enough. Therefore, CP could be created for 10–15 minutes depending on the image resolution. A tool "ruler" allows to take measurements relying on the bar existing in the frame scale. The distance in pixels is converted to millimeters. Tool "symmetry" allows to slice an image of the face (or of the body) by sagittal line and then to "glue" the halves – left with left, right with right. The experience of creating of CP relying on three points in the three classic standards – "full face", "3/4", and "profile", yielded unique CPs of Russian Altai children, some of the peoples of northern Eurasia, Negroid of East Africa, etc. We received an interesting result of CP generated with 27 base points. The developed model can be used by researchers, museum staff, forensic experts and other specialists.

Key words: *anthropological photography, composite portrait, computer software, appearance features, visualization*

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IDENTIFICATION FROM HUMAN BITE MARKS: AN EXPERIMENTAL STUDY

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Identification from human bite marks is one of the major issues which forensic sciences - forensic anthropology and forensic dentistry - are interested in. According to the American Board of Forensic Odontology (ABFO), standard studies include: tooth structure of suspects, collecting information if there is any possibility to reach DNA, taking photo of bite marks, creation of dental model of the suspect and applying methods for the bite marks analysis. The purpose of the present experimental study is to investigate the bite marks on various materials created by adult volunteers, stating if the elimination or the prevision of suspects can be made or not. A total of 20 adult volunteers (10 from each sex, aged between 20–45 years) were asked to bite styrofoam, apple, cucumber, cheddar cheese, transparency, and their upper arm (biceps). According to the ABFO standards, the photographs were taken showing the intraoral structure and bite marks from various materials, and the dental plaster models were created and scanned. Transparent coating was applied using Adobe Photoshop CS4 Extended software, and comparisons were made. According to the results, comparison between transparent coatings obtained from dental plaster models and bite mark materials of styrofoam (75% of accuracy/true match on the both upper and lower jaws), cheddar

cheese (85% of accuracy/true match on the upper jaw) and the upper arm (65% of accuracy/true match on the upper jaw and 70% of accuracy/true match on the lower jaw) bite marks are much more accurate than the bites marks on apple, cucumber and acetate material. We are in the opinion that experimental studies on bite marks have an important contribution to the forensic sciences and crime investigations, and future studies are needed.

Key words: *forensic anthropology, forensic dentistry, bite marks, Turkey*

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RELATIONSHIP BETWEEN OBESITY AND ARTERIAL STIFFNESS IN CHILDHOOD WITH FATHER'S SMOKING DURING PREGNANCY

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Studies about children health have historically considered aspects related to mothers' health and mothers' behaviors as determinants of optimal fetal development and subsequent health of children, however, there is little information about the influence of the fathers behaviors. The aim of this study is to analyze the relationship between father's smoking during pregnancy with obesity and arterial stiffness in children. The sample consisted of 300 children (8 to 12 years old) and their fathers and mothers. Data were collected in public schools in the Community of Madrid. Following the collection of data from children their families were interviewed about the smoking patterns of both fathers and mothers during pregnancy. At the beginning of the pregnancy 16.7% of smoking mothers stopped smoking. Women who maintained smoking during pregnancy significantly decreased the number of cigarettes/day (14.23 cigarettes/day before pregnancy and 7.07 cigarettes/day during pregnancy). However, the percentage of fathers who stopped smoking was very small (5.3%). Fathers' smoking during pregnancy was associated with higher body mass index ($p = 0.031$), greater waist circumference ($p = 0.012$) and higher waist/ height index (0.001) in daughters but not necessarily in sons. Likewise the number of cigarettes consumed per day by the father during pregnancy affects the pulse wave velocity (PWV), an indicator of arterial wall stiffness ($p = 0.028$). Daughters of non-smoking mothers during pregnancy but who were exposed during fetal life to paternal smoking, presented highest values of visceral obesity and arterial stiffness (PWV) in childhood. The results obtained in this study highlight the importance of fathers' behavior on the health of children.

Key words: *father's smoking, obesity, arterial stiffness, children*

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FILIPPOVKA: SKULLS AND FACES. NOMADS OF THE SOUTH URALS IN THE EARLY IRON AGE ACCORDING TO ANTHROPOLOGICAL RECONSTRUCTIONS

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Early Iron Age is one of the spectacular periods in the ancient history of the Eurasian Steppe. Just in the center of the nomadic world, there is Filippovka kurgan cemetery, situated between Volga and Ural Rivers. Twenty-five kurgans are located on the left bank of the Ural River, 100 km to the west of the city of Orenburg.

As a result of the 1986–1990 excavations, the expedition of the Institute of History, Language and Literature, Ufa Scientific Centre, RAS, under the guidance of A.Kh. Pshenichnyuk, investigated burial complexes of the nomadic elite accompanied by unique sculptures of the gold-plated deer and other pieces of jewelry. The excavations also gave craniological material consisted of five skulls (including 3 male and 2 female skulls) of varying integrity. Craniometric investigations along with morphological and total analyses of the male skulls from Filippovka showed a mixed origin of their anthropological type. The male skulls are characterized with large size, brachycrania, well-developed macrorelief, high face, slightly weakened profiling at the level of the orbit and small or medium projection of nasal bones above the facial plane. This combination of craniological features observed in paleoanthropological materials of the 5th and 4th centuries AD from the East European steppe region has been determined as “eastern Europoid type”. Two male skulls and one female skull from Filippovka formed the craniological basis for plastic facial reconstructions. Typologically, the basis for the racial type of the buried men from Kurgans 5 and 12 of the Filippovka kurgan cemetery is represented by a complex of Protoeuropoid traits with a slight addition of Mongoloid peculiar features in the facial architecture. Weakened profiling of the facial skeleton at the horizontal level can be explained by preservation of the archaic features in the Protoeuropoid-type morphological complex. The female skull from Kurgan 12 is characterized with a more pronounced Mongoloid appearance that is reflected in the facial reconstruction sculpture. In the process of restoring the appearance, M.M.Gerasimov’s method was employed with further modifications proposed by G.V. Lebedinskaya and S.A. Nikitin.

Key words: *Nomads of the South Urals, Filippovka, craniology, plastic facial anthropological reconstruction*

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ESTIMATION OF WATER SECTORS IN HUMAN ORGANISM BY BIOIMPEDANCE METHOD

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Diagnostic possibilities of a method of multifrequency segmentary bioimpedance analysis were studied in 125 practically health patients. It is shown that in the age range from 25 till 75 years and BMI (Body Mass Index) in the range from < 20 kg/m2 up to >35 kg/m2 the decrease in impedance parameters occurs, more significant at arms and legs regions. Ranges of normal bioimpedance values are established at low frequency (LF) and high frequency (HF) for body regions at various BMI values and for different age groups. The degree of correlation of the revealed changes of impedance values at LF and HF varies for different body parts and is most ly expressed on upper extremities. As the degree of changes of impedance parameters varies, their analysis for separate body regions is necessary. The suggested values can be used as references for individual and estimation of human body mass parameters in adults.

Key words: *organism, water balance, anthropometry, bioimpedance analysis*

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HEALTH PROTECTING BEHAVIORS AND MORBIDITY IN STUDENTS

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The factors, which can influence the health status and the quality of life, were studied, and the analysis of the morbidity of the students was held. MOS-SF 36 Questionnaire, and the questionnaire for estimating living conditions and self-evaluated health status were used, as well as the data of applications to the polyclinics. 343 students of the average age 19.6±0.1 years were examined. In the morbidity structure the leading diseases among males are those of respiratory system (J00-J99), eye/adnexal (H00-H59), nervous system (G00-G99), and among females - diseases of respiratory system, genitourinary system (N00-N99), and eye diseases. Analysis of the lifestyle showed significant differences between duration of sleep and the diseases of respiratory system. They were noticed in the 13% of the interviewed students with average duration of sleep not more than 6 hours, and in 6% of those with average duration of sleep 7-9 hours a day. The same tendency was found for the diseases of nervous system, and allergic diseases. Allergic diseases were recorded among 30% of smokers and 13% of non-smokers. The scores on the “general health perceptions” and “physical role functioning” scales were reliable at the presence of diseases of respiratory system, nervous system, and allergic diseases. Among those having a low incidence rate of upper respiratory tract infections there were 60% of active athletes, and among those having a high incidence rate - 48% of athletes. Persons with the high level of physical activity have higher scores of “physical role functioning”, “vitality” and “general health perceptions” according to the MOS-SF 36 Questionnaire. Supported by 026-F grant of the Perm State Pedagogical University.

Key words: *students, morbidity, quality of life, health evaluation*

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PALEOPATHOLOGIC CHARACTERISTICS OF ANTHROPOLOGICAL DATA DATING FROM THE MIDDLE AGE PERIOD FROM THE BURIAL GROUND STARITSA

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This paper is devoted to the study of bone material dating back to the Golden Horde from the burial mound in the neighborhoods of Staritsa village in Chernoyarsky rural area of the Astrakhan region. The Staritsa burial ground is unique in some way as it represents a projection of one period in the region’s history. The complex became operating at Yamna culture period when the first burial grounds cemeteries serving as generic crypts appeared. The present paleoanthropological research examined bones of twenty-six people: 12 female, 9 male, and 4 immature individual skeletons. Despite the fact that the studied Staritsa burial ground was chosen at random, its examination provides an opportunity to expand our understanding of the population inhabiting the Volga Delta and the Lower Volga region in the Golden Horde period. This is especially important due to the fact that our understanding of the lifestyle and physical conditions of the people of that period is mainly based on the study of mass burial grounds of the settled populations such as the Golden Horde cities of Khan-Tube, Selitrennoe and Krasnoyarskoe. The study revealed that men were the most active part of the population; it follows from the observed increased number of low temperature makers. The studied group of nomads is characterized by widespread dentition pathologies. Low frequency of caries, high occurrence of periodontal disease, tartar and intravital tooth loss are also common for nomadic groups from the barrows in the Early Iron Age burials. There is also a striking feature of the studied material. Unlike the synchronous complexes and nomadic series of the Early Iron Age, in medieval populations of the Staritsa burial ground no injuries resulting from violent actions either on the bones of the cranial vault, of the facial part, or on the bones of the postcranial skeleton were found.

Key words: *paleopathology, Golden Horde, kurgan burials, traumatic injuries, cranial deformation*

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HOW ETHNOGRAPHY MAY INSTRUCT BIOCULTURAL RESEARCH?

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Conducting biocultural research in anthropology remains to be one of biggest challenges in our discipline. To implement a biocultural synthesis in anthropology it is necessary to select an appropriate theoretical framework for understanding culture that is both ethnographically valid and adequate for operationalization in complex biocultural models. The solution to connecting the culture as an aggregate and collective phenomenon with individual beliefs, behaviour and health outcomes became more feasible with the theoretical and methodological breakthroughs in cognitive anthropology, and in particular, after the development of the theory of cultural consensus. By using the example of the recent pilot study conducted within the framework of the project "Modernity stress, youth and migration" we demonstrate how ethnographic research may be used to direct, optimize and complement the quantitative research based on the integration of demographic, psychological and biomedical data (including anthropometric, physiologic and salivary biomarkers). In this project individual subjective and objective stress outcomes are researched in relation to culture changes associated with modernity in the postsocialist transitional society. We demonstrate the analytical usefulness of using interviewing and freelisting as ethnographic techniques for defining variables of interest in domains of everyday life of Croatian youth and the results of the cultural consensus analyses in various everyday life-domains such as education, employment, family, material goods, leisure time, social support and participation, premigratory potential.

Key words: *biocultural synthesis, ethnography of stress, cognitive anthropology, youth, Croatia*

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MOTOR SKILLS IN PRESCHOOL CHILDREN

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The purpose of the research is to determine a development of motor skills of 6-7 year old children who attend elementary schools. The participants were divided into an experimental group with 22 children (12 males and 10 females) and a control group with 21 children (10 males and 11 females). None of the participants has any restriction for physical education classes. In the experimental group, the physical education classes were conducted by the instructor using methods and techniques of an advanced motor skill training. In the control group the physical education classes were conducted by an elementary school teacher. Methods of research included an evaluation of motor skills which were measured by a calculation of the gross and fine motor skills consistency. The results of the study show that the level of fine motor skills in the experimental and control groups differs. The corresponding indicator is 81% among 6 year old children and 89% among 7 year old children in the experimental group. In the control group the average indicator of fine motor skills is not above 65% among 6 year old children and 75% among 7 year old children. It may be concluded that the level of gross and fine motor skills in the control group is lower than in the experimental one, and physical exercises without stimulating the physiological functions and without training are not effective.

Key words: *motor skills, fine and gross motor skills, preschool children*

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THE RELATIONSHIP BETWEEN BODY COMPOSITION AND NEIGHBORHOOD WALKABILITY IN OBESE AND OVERWEIGHT WOMEN

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A neighborhood environment allows defining typical features for physically active or inactive lifestyle. An accelerated pace of life and higher availability of an unhealthy lifestyle increase obesity rates. An analysis of body composition can be used as a predictor for assessment of current somatic conditions. The aim of the study was to determine the dependence of selected body composition parameters on neighborhood walkability in 167 women aged 20-60 years attending weight-loss program, so called STOB-courses. A multifrequency bioimpedance analysis InBody 720 was used to determine body composition of respondents. Further, ANEWS questionnaire was used to determine the level of neighborhood walkability. We divided the sample into two age groups (<40 years; ≥ 40 years) and into partial subgroups according to the neighborhood "level of walkability" (lower and higher level). Based on the assessment of body composition, it can be assumed that more walkable neighborhood opportunities positively affect body composition. Body composition in older women is positively influenced if they lived in high walkable areas. In younger women we found only one indicator of body composition (body fat mass) influenced by neighborhood walkability. The relationship between health indicators of body composition and residential infrastructure might be useful in the strategies aimed at maintaining and developing a healthy lifestyle within the community.

Key words: *questionnaire ANEWS, environmental conditions, bioimpedance analysis, InBody 720, weight-loss program*

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SENSATION SEEKING AND ANTHROPOMETRY OF SUCCESSFUL FEMALE WRESTLERS

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In this study a hypothesis was tested about increased level of masculinity in successful female wrestlers. We were looking for significant behavioral and morphological differences between female wrestlers of high achievements compared to the control group of females from the same population. This study is conducted in line with our main project of general evolutionary processes in different test samples from modern populations (Butovskaya et al., 2009, 2010, 2011; Prosikova et al., 2013). The goal of this research was to compare female wrestlers (100 individuals) with a control group (200 individuals) on risk-taking, and to analyze the association between risk-taking and morphological parameters. Zuckerman sensation seeking scale was applied (Zuckerman, 2007). It was found that successful female wrestles scored significantly lower on all four sensation seeking subscales. These differences were in the same direction as those earlier revealed for male wrestlers. At the same time, female wrestlers were more masculine by their face proportions, body circumferences, as well as 2D:4D ratios on both hands. Supported by RFBR, grant N. 13-06-00393.

Key words: *female wrestlers, risk-taking, masculinity, 2D:4D ratio, face proportions*

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HERITABILITY OF PHYSICAL ACTIVITY, DIETARY HABITS AND SLEEP PATTERNS IN A FAMILY-BASED SAMPLE OF SPANISH ROMA INDIVIDUALS

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The influence of genetic factors on the variation of self-reported physical in/activity, dietary habits and sleep patterns was evaluated in 50 large and extended pedigrees, including 372 Roma individuals (147 males and 225 females) living in the Greater Bilbao (Spain). Information characterizing environmental variables (physical in/activity, dietary habits and sleep patterns) was obtained by personal interview using a standardized questionnaire. Univariate quantitative genetic analyses were conducted employing the SOLAR computer program.After accounting for significant covariates effects, heritability estimates were, in general, significant ($p< 0.01$), with moderate values ranging from 0.20–0.39. Practice of sports, walking activity and time spent eating the main meal of the day were the variables most influenced by additive genetic effects, showing heritability estimates of 0.39, 0.37 and 0.35, respectively. In conclusion, evidence of a slight but significant genetic contribution on variation of physical in/activity, sleep patterns and dietary habits has been found in this Spanish Roma population.

Key words: *family, heritability, genetics, environment, exercise*

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ADOLESCENCE NOW AND BEFORE: INTERACTIONS BETWEEN THE PSYCHOBIOLOGICAL AND THE SOCIO-CULTURAL FACTORS IN THE CHANGED CONDITIONS OF GROWING UP

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The research of and observations related to adolescence often lead to partly contradictory results. It may at times seem that adolescence has changed in the recent decades, and at other times that it has remained the same (Briggs, 2008). Research however indicates to the fact that particular parameters in relation to adolescence have indeed changed: e.g. adolescence lasts longer and is by far more diverse than described in the earlier theories of adolescence. The socio-cultural changes have most probably made the term “identity” – as defined by the earlier theoreticians, for instance Erik Erikson – questionable. Identity seems to be a multi-fold and complex concept, rather difficult to comprehend; hence, some authors (e.g. Cahn 1998; Briggs 2008) suggest it is necessary to tackle the idea of “subjectivism” or “subjectivation” (or “becoming subject”) more thoroughly. Since the “post-traditional” identity is more open and changeable, it seems as if an individual becomes a continued project of oneself (Thomson et al., 2004). The tension between the more narcissistic goals and those directed toward interrelation indicate to conflicts that potentially occur in more markedly individualised societies – unlike, if compared with, the situation in the earlier, more traditional societies, such as were present for a long time in technologically less developed countries (e.g. many former socialist countries of the Eastern Europe). A revision of the concept of narcissism might lead to a better understanding of growing up and development in and under changed socio-cultural conditions that strengthen the inclination towards the occurrence of more destructive and self-destructive behaviour (Waddell, 2006).

Key words: *adolescence, growth and development, psychobiological and the socio-cultural factors*

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BODY COMPOSITION IN RUSSIANS AS ASSESSED BY BIOIMPEDANCE ANALYSIS: THE POPULATION REFERENCE DATA AND SOME COMPARISONS

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819,808 Russian males and females aged 5-97 years, who represented nearly 0.6% of the total Russian population, were assessed cross-sectionally in 2010-2012 by the same type of bioimpedance meter, ABC-01 'Medas'. The measurements were done in 220 Health Centers from 52 out of 83 federal subjects of Russia. The smoothed reference centile curves for anthropometric and BIA variables, such as height, weight, BMI, body fat (BF), fat-free mass (FFM), skeletal muscle mass (SMM), body cell mass (BCM) and other (33 variables in total) were provided based on extensions of the Cole and Green LMS method realized in the software package GAMLSS. At the age interval 5-25 years, our data on median weight and height showed good agreement with the updated 2002 data on the ICRP reference man. As compared to the IOTF reference population, the BMI distributions in children were shifted towards excess weight, with the average BMI z-score +0.41 for boys (29.1% of them being overweight and 12.5% obese) and +0.19 for girls (23.3% overweight and 8.0% obese). 2.9% of male and 3.0% female children were undernourished. The age-standardized prevalence of obesity in adults according to the conventional WHO criteria was 22.5% in men, and 31.9% in women. Our data indicated an increased risk of metabolic syndrome, with the maximum in women aged 55-65 years and the likelihood of developing the disease in this group being 4-5 times higher than in the age range 18-25 years. In male adults aged 50 years and elder, the metabolic syndrome risk was 1.5-2 times less than those in the females. In contrast, the age-standardized prevalence of high disability risk in Russian males aged 50-85 years was more than twice as much as the corresponding value in the females (12.7% vs 5.4%). Generally, our data show a significant interregional variation suggesting the presence of varying health conditions and epidemiological risks.

Key words: *body composition, bioimpedance analysis, large database, Russian population, reference data*

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MASTOIDITIS: A CASE FROM LATE OTTOMAN PERIOD SKELETAL REMAINS

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Mastoiditis is an inflammation of the cells in the mastoid region of the temporal bone, and may occur nearly after two weeks of the beginning of acute otitis media. Otitis media is one of the frequently encountered complications, and can lead to deafness when it spread to the surrounding areas. Distribution of the inflammation may cause complications over large endocranial sinuses, lead to meningitis and extradural or the brain abscess, as well. Corruption of drainage of the mastoid cells is the basic pathophysiological mechanisms leading to mastoiditis. Characteristic clinical findings are auricular proptosis, retroauricular erythema and others where the most common symptoms are persistent otalgia, fever, and poor nutrition. Acute mastoiditis is a

disease more common in children. The present study identifies pathological changes in the pneumatised cells of the mastoid process based on macroscopic, light microscopic, radiological and x-ray computed tomography investigations in human skeletal remains from the Late Ottoman Empire Period in Karacaahmet Cemetery, İstanbul, Turkey. During the examinations from Karacaahmet Skeletal Collection, a mastoiditis case was diagnosed, which is so far the first known from Ottoman collections. The skull belongs to an adult female subject. It is suggested that further paleopathological investigations are needed in the incidence of the infectious ear diseases to reflect living and health conditions of ancient Anatolian populations.

Key words: Mastoiditis, infection, skull, paleopathology, Anatolia

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STATURE ESTIMATION FROM THE RADIOGRAPHS OF METATARSALS IN TURKISH POPULATION

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To determine stature is as important as the determination of sex and age when analyzing and identifying the remains of skeleton. Stature, in an approximate and widespread manner, is being determined on the femur and tibia lengths, which are the long bones that directly affect the stature. However, when long bones are not available or they are found in a very bad state of preservation that does not permit any estimation of stature, then other bones of the body are also being used for this purpose. The aim of this study is to determine stature with the help of metatarsals in Turkish population. In this study, by using the x-ray films for the metatarsals bones of 100 women and 100 men, the Bayesian regression equations have been produced for 5 metatarsal bones. The coefficients of correlation existing between the metatarsal bones and stature, together with the standard errors of these equations, have been examined at length throughout this study. The results of the studies conducted by other researchers (Byers, Akoshima and Curran, 1989) have been compared with the results of our study.

Key words: *metatarsal, stature, regression, forensic anthropology*

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SEXUAL DIMORPHISM OF MORPHOLOGICAL FEATURES IN HIGHLY QUALIFIED FREESTYLE WRESTLERS

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For the analysis of sex differences in the morphology of freestyle wrestlers data of 133 women and 88 men were used. The program included 69 absolute and relative indicators of total body size, body proportions, girths, body mass components. The degree (%) and direction of sexual differentiation of each characteristic in women athletes compared to male athletes and their variability (σ, υ) were analyzed. The direction of the gender difference was determined by the dominance of the average values (X) of the traits and their variability (σ, υ) in one sex group over the other. The coefficient of sexual dimorphism (CSD) by E.G. Martirosov (1976) and S. Bailey (1981) was determined for each individual trait. While the prevalence in men was designated by the sign "+", the predominance of values characteristic for women had the sign "-".

The results are as follows: 1. According to the calculated CSDs, men in 53 measurements substantially exceed women athletes, mostly in lengths dimensions and diameters. At the same time they are inferior in indicators of subcutaneous fat and the circumferences of the hips and buttocks. 2. The analysis of the CSDs for body mass components shows the large values of indicators of fat mass in women's bodies and, vice versa, active cell, bone and skeletal muscle mass in men, which is confirmed by the results of bioimpedance examination.

Key words: *freestyle wrestlers, body dimensions, body mass components, coefficient of sexual dimorphism*

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BIOLOGICAL BASIS OF MODERN HIGH PERFORMANCE SPORT

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Till now development of physical and psychological abilities in athletes was mainly provided by intensification of training process aimed at reaching maximal capacity in various body systems, in particular by maintaining high work capacity by means of doping accompanied by the out-of-limit expenditures of vitally important reserves of the organism. The difficult situation that we currently observe in sport science is formed by more and more evident contradictions between the already existing and the required knowledge about human organism on the one hand, and ways of achieving sport goals in young and adult athletes by means of physical work capacity stimulation pushing the limits of human capacities, on the other hand. This situation can be solved on the base of setting a new task in sport scientific researches. This task should be focused on "creating conditions for realization of near-maximal natural capacities of a human organism", rather than on "achieving a top result". The problem is to determine interdependency of joint development of the cellular, organismic, and social levels organized in a hierarchy. We think simulation modeling based on the informational approach to be a key method permitting to reveal time aspects of the evolution of joint work at those levels, provided mathematical means are adequate to biological laws. In this context special attention should be paid to the use of molecular computers, development of special complexes fitted with an interface for on-line control of processes, which take place in the athlete's organism at the cellular level. Hybrid systems of artificial intelligence permit to create models of voluntary movements control in athletes. The priorities of forming sport culture of an athlete can shift in three directions even today: firstly, enhancing nature-consistent character of pedagogical influence, that means bringing to conformity the content of physical and sport activity with natural laws of age development of motor functions of athletes; secondly, mastering high technologies of sport training from first steps to harmonious sport perfection of humans; thirdly, maximal approximation of the content and form of realization of sport training to those being individually acceptable for each athlete.

Key words: *sport, top athlete, models, sport training*

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THE EFFECT OF COURSES IN WEIGHT REDUCTION TO THE SELECTED SOMATIC CHARACTERISTICS

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Accelerated pace of life and consumerism leads to increase in obesity. Key element in programs to reduce overweight and obesity is the regular physical activity (PA) by means of healthy lifestyle. Appropriate PA that is accessible to everyone, regardless of age and gender, is walking, which can be simply assessed by pedometers. The aim of our work was to analyse the effect of courses in weight reduction to the selected body composition (BC) parameters in the obese and overweight women with various age and the level of PA. 124 women with existing sedentary lifestyle, which were differentiated by age (< 40 years: and ≥ 40 years) participated in the study. We divided the monitored sample into sub-groups according to the level of their PA. To determine the average daily number of footsteps during the PA the Yamax pedometer was used. InBody 720 device using the Direct Multi-frequency Bioelectrical Impedance Analysis Method (DSM-BIA Method) was used to measure and analyse the BC. Based on the monitoring of the PA and BC health risk indicators, the effect of the exercise program, which included cognitive behavioural therapy, showed decline in the body mass index (BMI) and body fat expressed in percentages (PBF) and in the decrease of the visceral fat area (VFA). The amount of fat-free mass (FFM) remained the same. Following the three months therapy we observed in women with a higher level of PA shift to the overweight group. Therapy contributed to a reduction in PBF from 2.4% to 3.9% even though the women's groups were still classified as obese (> 35%). Research studies have shown positive relationship between the increase in PA and changes in health risk indicators. Observance of the recommended number of 10,000 footsteps per day primarily prevents the increase in body fat mass (BFM) and maintains FFM.

Key words: *body composition health risk indicators, obesity, walking, healthy lifestyle, weight loss program*

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MODERN TENDENCIES IN THE PHENOTYPE CHANGES OF HIGH-QUALIFIED ATHLETES

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Existing range of phenotypic diversity is considered as a result of human adaptation to complex civilization processes (V.A. Geodakjan etc.). Dynamics of modern population shifts is characterized with such trends as asthenization and juvenilization of body structure by increasing the duration of the growth processes and biological maturation. At the same time an increase in the sensitivity of the nervous system occurs, the growth of intellectual abilities with the expansion of human cognitive skills is observed, creativity manifestation of consciousness is shown (L.A.Rudkevich et al.). Our long-term cohort study of highly qualified swimmers showed significant differences between the winners in their age groups and elite athletes (T.S.Timakova). Comparative analysis between young athletes and elite swimmers showed that body structure of the elite swimmers has a trend to greater leptosomy, as well as higher electrodermal sensitivity and hypersensitivity toward vibratactile stimulation. Greater complications in the somatotype are accompanied with more signs of heteromorphism by lengthening the period of biological maturation in general. Our retrospective analyses of the three years observation data of elite racing skiers is of particular interest. Data processing was carried with the method of factor – typological description of the athletes. The analysis included anthropological char-

acteristics, the results of functional testing till total exhaustion, as well as 16-PF questionnaire of R.Cattell. Results of the study revealed the advantages of athletes with more complex somatotype characteristics, which manifest a tendency towards wonderful activity economization of energy supply. A comparison of the selected groups of athletes of different classes of professional success with the structural features of their personality showed the advantages of those with severe manifestations of reflection and action mechanism of the unconscious (intuition and fast-action).

Key words: *high-qualified athletes, factor-typological description, different classes of professional success, more complicated somatotype*

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OVERWEIGHT AND OBESITY AS RISK FACTORS FOR FALLEN ARCHES

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Overweight and obesity are associated with structural and functional limitations, mainly in terms of fallen arches or other foot deformities. Static flat foot of the adults might appear at each age if an unbalance occurs in the rate of the applied load to load bearing capacity of the foot, for a long time. The most common external factor is an excessive body weight. The main aim of this study was to confirm that the foot arch significantly falls with increasing BMI values. The measurements were performed in a sample, which consisted of 139 adult women of average age 56.67±4.80 years. Body mass index (BMI [kg/m^2]) was calculated for each person. We measured the foot dimensions in the widest and narrowest place of a plantogram to calculate the Chippaux-Smirak index (CSI). CSI values from 0% to 45% indicate normal healthy feet, over 45% – flat feet. Footprints were taken from both feet by the standard static plantography method. Data was statistically analyzed with the non-parametric tests (Spearman correlation coefficient (r) and Kruskal-Wallis test (H)) with calculating of the effect size (η^2).On the base of the increasing average CSI values in BMI categories (normal weight: n = 52, sin. = 37.27%, dex. = 35.82%; overweight: n = 51, sin. = 41.18%, dex. = 42.48; obesity: n = 36, sin. = 45.92 %, dex. = 44.94%), we showed a significant increase of the CSI values (sin. H = 27.17, $p < 0.01$,$\eta^2 = 0.2$;dex. H = 24.32, $p < 0.01$, $\eta^2 = 0.18$). CSI values showed medium positive linear relation with BMI values (sin. r = 0.42; dex. r = 0.40; $p < 0.05$), which confirmed that a foot arch significantly falls with increasing BMI values. Overweight and obesity have significant impact on the fall of the foot arch.

Key words: *flat foot, BMI, excessive body weight*

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MODERN RUSSIAN FACIAL RECONSTRUCTION SCHOOL

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Mikhail Gerasimov was the first who invented scientifically substantiated method of individual facial reconstruction based on subjacent cranial structures analysis. Nowadays, the Laboratory of Anthropological Reconstruction of Russian Academy of Science is proceeding with his research concerning the problem of correspondence between facial structures and cranial elements. A large database containing information on facial soft tissues thickness of different ethnic groups (Mongoloids and Caucasians) has been created. The craniofacial correspondence program was also created, being an algorithm of transition from cranium dimensions and characteristics determined to corresponding facial dimensions and characteristics. A system of regression equations has been produced to calculate such characteristics as ear height and physiognomic facial height, nose and mouth width. Regression equations are also used to estimate such characteristics as nasal labial fold width and eye fissure dimensions. High correlation coefficient rates between mouth and dental arch width, orbit and eye fissure dimensions, nose width and juga alveolaria are demonstrated both for Mongoloids and Caucasians. Anthropological reconstruction today is successfully used in many fields of research, particularly in the historical persons' identification. For example, craniofacial reconstruction was used to identify the skull found in Ermolov's crypt. Alexey Ermolov was a Russian military leader, who took part in many great wars. According to historical records, the crypt contained the remains of A.P. Ermolov, his father and his son. Unfortunately, only one skull was found there. Another case was the identification of the skull found in Novoierusalimsky monastery, which presumably belonged to Arkadiy Suvorov, the son of the famous commander Alexander Suvorov. The method of craniofacial reconstruction is used to visualize anthropological data. A number of sculptural portraits of the ancient city of Palmira inhabitants was produced and matched to sepulchral images. The Laboratory also completed a number of early hominids' reconstructions, such as Australopithecus afarensis, Homo habilis OH24, Homo rudolfensis 1470. The above-mentioned method is widely used in forensic science (undefined remains identification). Special procedures have been worked out to reconstruct the appearance basing on mummified materials. The method makes it possible not only to reproduce main facial features, but to make a precise facial reconstruction, showing persons' individual characteristics.

Key words: *facial reconstruction, craniofacial identification, forensic science*

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THE AURICLE AS AN OBJECT OF MEDICAL-ANTHROPOLOGICAL RECONSTRUCTION AND IDENTIFICATION OF PERSONALITY

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Up to the present, very few studies have been devoted to the investigation of the auricle as an object of medical-anthropological reconstruction and identification of personality. The objective of our study was to investigate intra-group, racial, secular and constitutional variability of sizes of the auricle and to establish biometrical criteria for quantitative assessment. 284 women and 173 men of Russian nationality at the age from 20 to 25 years old were examined. The program included 6 measurements of the auricle (4 supplementary indicators were calculated) along with somatic and cephalometric characteristics (more than 30 dimensions of the head and body). Using standardized photos of the auricle, with the help of special software "Database for auricle parameters registration", values of 12 additional parameters were received for each person, with 9 calculated indicators based on these parameters. Elements of the auricle were described using R.A. Reiss' method: a form of the auricle was evaluated, forms of the contours of tragus and antitragus were determined, and the type of adherence of the ear lobule to the cheek was assessed. For the first time in Russian anthropology, secular changes in the auricle sizes have been analyzed. For the comparison, archival materials of the Department of Medical Forensic Identification were used: namely, the results of measurement of auricle sizes of 231 men and 100 women in Ryazan province (Vorobyov, 1901). For the past 100 years an increase in all sizes of the external ear has been observed in both sexes. Literary data on general sizes of the auricle (length and width of the ear, physiognomic index) in the representatives of three big races were analyzed and borders of variability of these parameters were detected. For sex determination based on the complex of auricle sizes, linear equations of discriminant functions were developed (classification precision 85%). The following parameters appeared to have the highest significance level at sex determination: the length of cartilaginous part of the ear, the length and width of the ear, the length of base and real height of the ear, the length of the ear lobule. The results of factor analysis stable trends of combined variability of sizes of the body, head and auricle: the most informative one was the variability of sizes of the auricle on the scale of micro/ macrocephaly and micro/ macrosomia. The second vector (in terms of its significance) was a scale of lepto/ brachycephalia: brachycephalic people are characterized with relatively small auricles. Multiple regression equations for the prediction of auricle sizes on some somatic and cephalometric parameters were elaborated. Five categories in the variability of auricle sizes were chosen: very small, small, medium, big, very big. This will allow avoiding subjective assessments at description of the auricle and can be used in human morphology, medical forensic examination and criminalistics.

Key words: *sizes and form of the auricle, methods of multivariate statistics, medical-anthropological reconstruction*

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Section GROWTH and DEVELOPMENT

EVALUATION OF FOOT ANTHROPOMETRY AND SECULAR CHANGES IN TURKISH CHILDREN AND ADOLESCENTS

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Evaluation of foot development is important for growth and development as well ergonomics studies. The purpose of the present paper is to investigate age and sex dependent foot anthropometry and secular changes in Turkish children and adolescents. A cross-sectional survey was conducted on 1427 (709 boys and 718 girls) healthy school children aged between 6–17 years from Ankara. Height, foot length and foot breadth were measured according to the standard anthropometric protocols and foot index was calculated. To reveal secular changes on foot growth, the data were compared with Bostancı's study of 1950, which included 1679 healthy school children from Ankara. The results show rapid increment in foot length at 11-13-year-olds for the boys and 9-10-year-olds for the girls. Similar growth pattern in foot breadth was also recorded which followed by a steady increase. Although during early childhood the boys have larger foot dimensions, just before the puberty girls catch up and sexual dimorphism disappear. After the age of 13 years significant difference between the two sexes have been recorded ($p<0.01$). Positive secular increase was prominent for the foot length and breadth measurements for both sexes but this increment was greater for boys, which can be linked with the different degree of response to the improved environmental conditions. Positive secular changes documented in the present study appear to be a logical outcome of gradual social changes. As a developing country, Turkish population still tends to be diverse, and by taking into account potential social improvement, we might predict a further positive secular trend in growth.

Key words: *Foot anthropometry, secular changes, children and adolescents, Turkey*

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TERRITORIAL VARIATIONS OF THE MATURATION RATES OF HAND AND WRIST BONES IN CHILDREN AND ADOLESCENTS

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This research aims at studying the influence of ecological factors on the maturation rates of hand and wrist bones in children and adolescents. It is based on the radiographs of the left hands, collected in the course of the expeditions of the Institute and Museum of Anthropology through 1964-2013 periods in 19 ethno-territorial child groups, aged 8-17 years, with the total number of 6456 individuals. The Tanner-Whitehouse method (TW-2) was used to determine skeletal maturation. As to the European part of the former USSR the highest rates of skeletal maturation belong to the rural school children of Arkhangelsk region and Karelians of Olonetski region with the exceeding of skeletal age compared to chronological almost through the whole age interval. In the groups of Russians of the Yaroslavl region and Byelorussians the skeletal age falls behind chronological, which is stronger manifested in Byelorussian girls from longevity population (over 0.5 years). Maturation rates of hand skeleton of Chuvashs and Bashkirs are close to each other and 0.25 years lower than British standards. Significant changes of maturation rates of the hand and

wrist bones through 25 years occurred in Abkhazia. The results of skeletal age of Abkhazian children in 2004 showed significant acceleration of maturation rates in the long-lived population of the Abkhazians. The changes are more evident in the population of the Ochamchiry region as compared to Gudauta region. The differences between longevity population of Chlow with the delayed rates of physical development and the control group from Duripsh, revealed in the 1970 – 1980 study, almost disappeared. Child groups of Central Asia, Khalkha-Mongolians and Tuvinians had the slowest maturation rate of hand skeleton, 0.8 years less than British standards. Altaians and Stolypin's migrants descendants are characterized by the accelerated rate of physical development and high maturation rates of hand skeleton (0.4 years above the standard). In the Middle Asian region the highest maturation rates belong to the Turkmen urban school children from Chardzhev, the lowest maturation rate in this region is seen in the rural Tajik children from Varukh. Growth and maturation rates depend on various environmental factor: climatic, geographic and social. Differences of skeletal maturation in the observed groups may be interpreted in the context of maintaining (Khalkha-Mongols, Tuvinians, and Tajiks) or transformation (Turkmen, Chuvashs, Bashkirs, Altaians, Russians) of the traditional way of life. Social stress, connected with the military actions, caused the acceleration of maturation rates in the longevity group of the Abkhazians. Longevity populations were traditionally characterized by the low rates of growth and development (Abkhazians till 1991, Belorussians).

Key words: *skeletal age, TW-2, maturation rates, human ecology*

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CRANIOFACIAL GROWTH TRENDS IN THE FIRST YEAR OF LIFE BASED ON CT DATA

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The first year of life is a crucial period of craniofacial growth during which most of the main individual and racial features of the facial skeleton are formed. But these important growth changes are still relatively poorly described due to bad preservation of skulls of children of this age in archeological skeletal samples, absence of this age cohort in X-ray longitudinal studies as well as rarity of appropriate CT data. Importantly, quantitative description of growth trends expressed as "normal values" of craniofacial measurements in 3D is lacking. In the present study more than one hundred CT scans of boys and girls of the first year of life were digitized to produce numerical values and growth curves for 30 linear measurements of the mid-face. The children are skeletally normal patients of several hospitals in Moscow, Kaluga and Lipetsk, most of the subjects are ethnically Russians. Slice thickness of the scans ranges from 0.3 to 1.5 mm. 40 landmarks were being placed on 3D surface reconstructions by the first author and their coordinates were further converted into linear distances between the landmarks. In order to construct growth curves the sample was divided into four age groups (newborns, 1-2 months, 3-6 months and 7-11 months) separately for each sex as to account for sexual dimorphism as well. Reliability of our data has been additionally confirmed by very good congruence of our results and those obtained previously on forensic material. The results numerically describe main ontogenetic trends of this period of ontogeny such as slow growth of the upper face in height and length compared to width, very rapid vertical orbital expansion, relatively subtle changes in nasal and mid-facial protrusion. But the study also provides more detailed picture of growth processes and interplay between different mid-facial structures.

Key words: *craniofacial growth, computed tomography, children*

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SECULAR PATTERNS OF GROWTH PROCESSES IN MODERN MOSCOW INFANTS COMPARED TO THE INFANTS OF THE 1970'S

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The dynamics of the body dimensions (body length and mass, chest circumference) of Moscow infants of 2000's from birth to 12 months compared to that of infants of 1970's is observed. Modern data were collected by the authors on the basis of child outpatient clinics from medical cards, following ethic norms. A longitudinal sample of about 500 children was formed, including monthly dynamics of physical development indices accompanied by the full medical background. Archive data of 1970's was collected in the course of a cross-sectional anthropometric study. The comparison of dynamic curves, preliminary standardized, of body length of boys and girls describes the process of secular increase of modern infants length, more expressed in the second half of the first year of life and increasing towards the age of 12 months. The level of differences is 0.4–1.0 and 0.4–1.4 SD for boys and girls correspondingly. The comparison of dynamic curves of body mass and chest circumference describes the opposite tendency of some decrease of the dimensions of modern children from birth to 6 months from the level of 0.6 SD to zero. Secular increase of length combined with the decrease of mass and chest circumference means that the process of lepthosomization of body build in modern infants is growing as compared to the second part of the 20th century. The absence of the distinct secular differences of the length growth curves through the first 6 months of a child's life is connected with the intensive compensatory growth, which smooths the limitations of the prenatal growth in search of the stable growth curve.

Key words: *physical development indices, growth curves, infants, secular trends*

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CONFIRMATION REGARDING SIMILARITY AND DISSIMILARITY TO PHYSICAL GROWTH CURVE OF TWINS BY CROSS-CORRELATION FUNCTION

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Scientific verification is impossible without quantitative assessment of the similarity or dissimilarity to the curve of growth pattern of twins. In this study, this assessment was verified by applying a cross-correlation function in analysing changes from collapsing one of the curves to examine their similarity. The minimum growth curve must be functionalized to apply a cross-correlation function. Thus it is important to approximate the growth curve by the Wavelet Interpolation Method (WIM) proposed by Fujii (1999). Cross correlation function can then be applied to the quantified curve by WIM. Longitudinal growth data consisting of height, weight, sitting height, and leg length was obtained for a pair of identical and a pair of fraternal twins from age six (first year of elementary school) to age 17 (third year of high school). As a result, changes in the cross-correlation coefficient were found by applying the cross-correlation function to identical and fraternal twin height growth described by WIM and collapsing one (set of) growth distance values and velocity values. With r = 0.93 for identical twins and r = 0.74 for fraternal twins, similarity in identical twins was found to be very high when examining changes in correlation coefficients. Similarity among identical twins was also found to be high when weight, sitting height and leg length were analysed, with high correlation coefficients in all three.

Key words: *cross-correlation function, wavelet interpolation method, twins, similarity, dissimilarity*

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SOMATIC DEVELOPMENT OF MONGOLIAN AND KALMYKIAN CHILDREN AND ADOLESCENTS

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The aim of the study is to compare growth characteristics of Mongolian and Kalmykian children and adolescents. The materials were collected by the authors in 2007-2008 and in 2010–2011 as a result of anthropological investigations in the cities of Elista (Republic of Kalmykia, Russian Federation) and Ulaanbaatar (Mongolia). Total number of the investigated children from 9 to 17 years of age was about 2,000. The program included standard anthropometric measurements (Bunak, 1941), hand grip strength, somatotype evaluation according to Shtefko-Ostrovsky method. A number of indices were calculated including Body Mass Index (BMI), absolute and relative fat mass (Slaughther et. al., 1988). Statistical analysis, performed with the software "Statistica 8.0", included descriptive statistics, normalization procedure, one-way ANOVA with Scheffe's test for multiple comparisons. The results show significant differences between Kalmykian and Mongolian children in most of the measurements: stature and weight, chest, waist, hip and arm circumferences, body diameters are bigger in Kalmykian schoolchildren and the differences are stronger in boys. During the whole age period Kalmyks are taller than their Mongolian peers. At the age of 17 Kalmykian boys' stature is 173.89 cm, while for Mongolians it is 168.34 cm ($p<0.001$); for the girls the corresponding figures are 161.8 and 159.42 cm ($p<0.05$). Mongolian boys at almost all age groups have smaller values of chest circumference and BMI but surpass Kalmykians in chest depth. Mongolian girls after the age of 13 have slightly bigger values of chest circumference and BMI, as well as bone diameters. Mongolian boys and girls have significantly smaller values of skinfold thickness and fat mass. In both ethnic groups the accumulation of fat layer is bigger on the trunk, particularly in the abdomen area. There were no differences between Kalmykian and Mongolian adolescents in maturation rates evaluated by the development of secondary sex characteristics. As both groups have similar ethnic origins, it can be concluded that the revealed differences are the results of the influence of socioeconomic factors.

Key words: *growth, physical development, biological age, Kalmykian schoolchildren, Mongolian schoolchildren, auxology, anthropology*

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DYNAMICS OF THE SEXUAL DIMORPHISM INDICES OF BODY DIMENSIONS OF CHILDREN FROM BIRTH TO 17 YEARS

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Age characteristics in the process of forming of the direction and degree of definitive adult sex differences are reviewed using a great number of children's samples, collected by the authors and taken from the literature. To estimate the value of sexual differences the Kullback method is used. The analysis of 63 ethnoterritorial samples of the newborns showed that the minimal variability belongs to the body mass – the main object of stabilizing selection and the main marker of the quality of intrauterine development. Body length and head and chest circumferences have relatively higher indices of sexual dimorphism, independent from ethnic and different ecological factors. Through the interval from birth to 7 years of age according to the data of three ethnic samples – Russians, Kazakhs, Kirghizs – the bigger skeletal and muscle dimensions of boys are maintained till the age of three years. Indices close to zero level through the age of 3-7 years in Russian and Kazakh samples are an evidence of comparable growth rates of children of both sexes. While negative values of the indices in Kirghiz children point to the more intensive growth processes in girls. The values of skinfolds in girls are higher through the whole interval and this tendency is stronger in 7-year-olds, more evident in Mongoloid groups. The common pattern of sexual dimorphism of skeletal and muscle dimensions through the period of 8-16 years may be described by the parabola of the 4th order with three bend points, connected with the differences of pubertal spurt in boys and girls. The dynamics of sexual differences of the skinfolds is characterized by a small degree through the second childhood and the beginning of the puberty, and its further gradual increase from 12 years of age towards the definitive status.

Key words: *sexual dimorphism, body dimensions, children from birth to 17 years*

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THE IMPACT OF PHYSICAL CONNECTEDNESS ON BODY HEIGHT IN SWISS CONSCRIPTS

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Background: Human populations differ in height. Recent evidence suggests that social networks play an important role in the regulation of adolescent growth and adult height. We further investigated the effect of physical connectedness on height. Material and Methods: We considered Switzerland as a geographic network with 169 nodes (district capitals) and 335 edges (connecting roads) and studied effect of connectedness on height in Swiss conscript from 1884–1891, 1908–1910, and 2004–2009. We also created exponential-family random graph models to separate possible unspecific effects of geographic vicinity. Results: In 1884–1891, in 1908–1910, and in 2004–2009, 1st, 2nd and 3rd order neighboring districts significantly correlate in height ($p<0.01$). The correlations depend on the order of connectedness, they decline with increasing distance. Short stature districts tend to have short, tall stature districts tend to have tall neighbors. Random networks analyses suggest direct road effects on height. In 1884-1891, direct road effects were only visible between 1st order neighbors. In 1908–1910, direct road effect extended to 2nd and 3rd and in 2004–2009, also to 4th order neighbors, and might reflect historic improvements in transportation. Conclusion: Height in a district depends on height of physically connected neighboring districts. The association decreases with increasing distance in the net. The present data suggest that people can be short because their neighbors are short; or tall because their neighbors are tall (community effect on growth). The vision strongly contrasts the current concept of growth as a mirror of health and economic prosperity.

Key words: *community effect on growth, connectedness, body height, direct road effect, exponential-family random graph models*

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SECULAR VARIABILITY OF HEAD SIZES IN BELARUSIAN CHILDREN (MINSK)

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The trends in variability of general head sizes (head circumference, longitudinal diameter and transverse diameter) and the shape of head (cephalic index) in 4–17-year-old children of Minsk over the last 80 years (1920–2000) are analyzed. In 1980–2000 a significant increase of all indices was revealed. Head circumference in the older age groups is bigger in the children of 1980 in comparison to those of 1920 – by 2.16–3.09 cm longer in boys, 2.42–3.14 cm in girls; longitudinal diameter – by 1.40–1.85 cm and 1.14–1.30 cm respectively; transverse diameter – by 0.82–1.35 cm and 0.69–0.83 cm respectively. At the same time the head index reduced during the period of 1920–1980: by 1.32-1.88 in boys and 0.62–1.83 in girls. A significant growth of general head sizes was completed in 1980-2000. If there were some variations in head circumference and longitudinal diameter in children of different age during these 20 years (first some reduction, then some increase), the transverse diameter reduced at all ages. The reduction of the cephalic index continued in 1980–2000 due to a more intensive reduction of the average values of the head breadth in comparison to the head length. So some changes in head shape and sizes in children of Minsk were observed during 80 years: the process of dolichocephalization (or debrachycephalization), i.e. a decrease of the head index (the ratio of the transverse diameter to the longitudinal one) was revealed. If in 1920–1980 this process took place together with the increase of head sizes, then in 1980–2000 both longitudinal and transverse diameters were reduced, the decrease of the transverse diameter being more significant.

Key words: *head sizes, dolichocephalization, Belarusian children*

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DOES BIRTH ORDER REALLY MATTER? ASSOCIATION WITH ANTHROPOMETRICS IN CHILDREN FROM THE GREATER BILBAO (SPAIN)

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Birth order has been related to the anthropometric variation both in children and adults, but the evidence is still inconsistent. Examining the relationship in different populations may lead to improved insight. We aim to determine the associations between birth order and a set of anthropometric traits defining body morphology and composition. The sample consisted of 847 children (219 years) from 533 nuclear families living in the Greater Bilbao (Spain). Simple measures and derived variables [stature, iliospinal height, weight, body mass index (BMI), trunk/extremity skinfolds ratio (TER), sum of 4 circumferences (CC4), sum of 6 skinfolds (SF6), and the three components of the HeathCarter's anthropometric somatotype (endomorphy, mesomorphy and ectomorphy)] were zscored for age, separately by sex. Associations were analysed using linear multivariate regression models controlling for different covariates and pvalues were adjusted for clustering of siblings within families. Overall, very few associations were statistically significant at $p<0.05$. Thirdborn boys were associated with greater iliospinal height zscore (0.38, p=0.04) and stature zscore (0.37, p=0.06) than firstborns. After adjustment for parental education, secondborn girls showed reduced SF6 (0.21, p=0.32) and endomorphy zscores (0.20, p=0.37) but greater ectomorphy (0.19, p=0.05) than firstborns. Additional adjustment for maternal age slightly attenuated the associations. In conclusion, birth order showed a tendency towards a positive association with vertical dimensions in boys and negative with adiposity in girls. Our findings do not support an association of birth order with weight, BMI, TER, mesomorphy and CC4.

Key words: *anthropometrics, birth order, body composition, children, siblings, vertical dimensions*

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SECULAR CHANGES OF THE NEWBORNS' BODY WEIGHT AND WOMEN'S BODY SIZE IN KRAKÓW AND POZNAŃ (POLAND) DURING LAST CENTURY

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Long-term changes in morphological characteristics of population, progressing from generation to generation towards constant direction, reflect the secular trend. These changes apply to both birth and adult body size of a human and they are observed over the century. Responsible for this variability are mostly non-genetic factors, mainly those related to the socio-economic situation. Such elements of the human environment determine the implementation of the genetic potential. The aim of the study was to determine the existence of intergenerational changes in newborns' body weight and adult body size of women living in Kraków and Poznań over the past century. Finally the goal of this study was to defining factors responsible for these modifications. This research analyzed data of 15884 newborns (body weight) and 3612 women (body height and weight) at the age of 18, derived from 1900 to 2010. The analysis of differences between individual cohorts was made by means of one-way analysis of variance (ANOVA) and Tukey test. Despite short-term fluctuations, the results showed significantly increasing trends of all studied features. Changes in birth weight were similar in both cities - in Kraków increased by 184 g (♂) and 206 g (♀), in Poznań by 216 g (♂) and 120 g (♀). Changes in women's body size were also significant, but the level was different depending on the place of residence. In the last century, women's body height increased by 8,2 cm in Kraków and by 10,2 cm in Poznań and their body weight increased by 1 kg and 5 kg respectively. Considered period of time covered the years of socio-economic changes which occurred as a result of the political system transformation. Crises, prosperity ages and other factors which determine the standard of living and health care had an influence on the developmental level of the Polish population's physical features.

Key words: *secular trend, newborns, body size, socio-economic changes, political transformation*

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ANTHROPOMETRY AND SECULAR TRENDS IN SARATOV (RUSSIA)

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Growth and development are influenced by different environmental factors, like nutrition, health, socio-economic life circumstances, and psychosocial factors. The analysis of pattern in growth and development is an important tool to observe growth trends over time and leading to a better understanding of children's growth and development under specific life circumstances. Little is known about the changes and secular trend in growth and sexual development in Saratov over the last decades. In this study anthropometric data of schoolgirls (aged 6-18 years) of the Russian city Saratov were analyzed. The investigations took place in three different years; 1969, 2004, and 2011 including an overall number of 2110 girls. The data involve measurements of height, weight, and other body measurements. Of these variables, body mass index, metric index and frame index were calculated. In addition information on secondary sexual characteristics and menarcheal age were collected to describe sexual development of the girls. The data were analyzed with Least-Mean-Square-method (LMS) (Cole 1990) and Probit-analysis (Finney 1971) to visualize the results. A comparison of anthropometric data and different stages of sexual development over the time showed that girls from 2011 are taller and heavier than from 1969. This is true for all age groups. Furthermore, mean menarcheal age decreased in the analyzed time period while BMI changed only little. The presented results of Saratov will be discussed in the light of secular trend and with implications on modern health related questions, like obesity and skeletal robustness.

Key words: *anthropometry, sexual development, menarcheal age, secular trend*

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ANALYSIS OF PHYSICAL DEVELOPMENT OF MOSCOW SCHOOLCHILDREN AGED 8–18 YEARS (ON THE RESULTS OF LONGITUDINAL STUDIES)

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The study of physical development in longitudinal researches is carried out with the aim to determine the dynamics of changes of anthropometric indicators, the level of biological maturation and functional indicators of children and adolescents in different time intervals. The processes of physical and sexual development are interconnected and reflect the general patterns of growth and development but at the same time they significantly depend on social, economic, sanitary, hygienic and other conditions, which influence is mostly defined by human age. During three longitudinal studies of physical development of Moscow schoolchildren (1960-1969, 1982–1991 and 2003–2013) the indicators of body mass and length, chest circumference, ratios, stages of biological development and muscular strength of the right hand were evaluated. The 10-year time scale of the observations allows determining the vector of changes of somatic development, puberty and functional capacities of children from decade to decade. The third longitudinal study of physical development of Moscow children and adolescents shows that modern schoolchildren exceed their peers of the 1960's and 1980's in main anthropologic indicators (body mass and length, chest girth) and the level of biological development (menarcheal age and the degree of development of the secondary sexual characters at an earlier age). The results of the studies show a change of body proportions in modern schoolchildren: the increase of body length is combined with the increase in leg length. During longitudinal observations of 2003-2013 a significant decrease of functional indicators (of hand strength) was found in children of all age groups. The findings dictate the necessity of new modern references for the assessment of physical development, reconsidering of normatives of biological development of schoolchildren and searching for the reasons of decrease in functional indicators.

Key words: *longitudinal studies, physical development, level of biological development, dynamometry*

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DEVELOPMENT OF SUBCUTANEOUS AND VISCERAL ADIPOSE TISSUE IN BULGARIAN ADOLESCENTS

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The purpose of this study is to investigate development of subcutaneous and visceral adipose tissue in Bulgarian children and adolescents by anthropometrical methods. The data analyzed are part of the three separate cross-sectional studies of 9–16-year-old children from Sofia, Plovdiv and Smolyan cities in Bulgaria, conducted in 1999–2009. The general sample included 3095 adolescents aged 9 to 16 years (1568 boys and 1527 girls). Height (cm), weight (kg) and waist circumference (cm) were taken on each person with standard methods (Martin-Saller, 1957). Additionally, the body mass index (BMI), subcutaneous (SAT, cm2) and visceral (VAT, cm2) adipose tissue, and VAT/SAT-ratio were calculated. The quantities of subcutaneous (SAT, cm2) and visceral (VAT, cm2) adipose tissue were defined by the regression equations of Brambilla et al. (2006). Different categories of body nutritional status were defined by cut-off points of BMI for children by Cole et al. (2007; 2012). Statistical data processing was performed using the software STA-

TISTICA 10.0. The descriptive analysis, ANOVA and alternative analysis (Z-score) were used. The results of analysis showed significant differences in accumulation of SAT and VAT between groups of children with different nutritional status. The children with normal nutritional status were characterized by non-significant below average values (Z-score) for SAT, VAT-and VAT/SAT-ratio for their age and gender. In contrast, the groups of children with overweight and obesity were characterized by above average values for SAT and VAT ($p < 0.05$). The values VAT/SAT-ratio is below average for age and gender. With age the quantity of SAT and VAT in both sexes increase. Overall, the boys accumulate greater quantity of VAT in all period, and of SAT after 14 years. The differences between age, sex and territorial groups in quantity of SAT and VAT and their ratio were found.

Key words: *subcutaneous adipose tissue (SAT), visceral adipose tissue (VAT), VAT/SAT-ratio, body nutritional status, adolescents, Bulgaria*

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EVALUATION OF ARM ANTHROPOMETRY AND NUTRITION IN TURKISH PRESCHOOL CHILDREN

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Arm anthropometry – cross-sectional analyse of arm muscle area and arm fat area- has been used as a proxy of body composition in both clinical and field research and proposed to be an indicator of nutritional status. Present study aimed to evaluate nutritional status of preschool children aged 3-5 years old using arm anthropometry. The survey was conducted in Ankara, the capital city of Turkey, on 270 children (135 boys and 135 girls) from private and public preschools, whose parents gave consent to include their children in the study. Anthropometric measurements of mid-upper arm circumference (MUAC) and triceps skinfold were taken using standard technique and instruments, and arm muscle area (AMA) and arm fat area (AFA) were calculated. The results show that age differences in AMA between ages 3 and 4 were found to be statistically significant ($p<0.05$). Furthermore, gradual increase in AMA in boys with age was prominent, and in AFA in girls, respectively. Thus, muscle development was clear in favour of boys and fat development - of girls. Anthropometrical studies, particularly, those of arm anthropometry on preschool children in Turkey are very limited, we think that the present study will provide a contribution to this area.

Key words: *nutrition, arm anthropometry, arm muscle area, arm fat area, preschool children, Turkey*

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PREVALENCE OF UNDERWEIGHT, OVERWEIGHT AND OBESITY AMONG PRESCHOOL CHILDREN IN ANKARA, TURKEY AND ASSOCIATED SOCIO-ECONOMIC FACTORS

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The aim of the present study is to assess the prevalence of underweight, overweight and obesity among preschool children and to analyse factors contributing to this phenomenon. The study group consisted of 270 children (135 boys and 135 girls) aged 3–5 years, whose parents gave consent to include them in the study. Weight, height were recorded according to the standard protocols and, underweight, overweight and obesity were classified using BMI according to WHO criteria. Socio-economic status (SES) was determined using education level and occupation of parents. Developmental multiple domains, motor, concept, linguistics developmental levels were measured and a standard of development index were also taken into account. Younger children's development level was assessed with Developmental Indicators for the Assessment of Learning™, Fourth Edition (DIAL™-4). It was developed by Mardell and Goldenberg (1998) and adapted by Aral et. al. (2014) to Turkish culture and was utilized as data collection tools. Data indicated that younger children (3 and 4 years old) had sexual dimorphism, girls had significantly lower mean weight-for-age ($p<0.01$) and height-for-age ($p<0.01$). According to the mean z-scores of BMI, 1.1% of children were diagnosed as underweight (1.2% at age 3, 1.9% at age 4, no at age 5), 3.6% overweight (3.6% at age 3, 2.1% at age 4 and 3.9% at age 5) and 1.2% obese (1.2% at age 3, 0.9% at age 4 and 2.6% at age 5). Tendency of being overweight and obese was prominent in boys, prevalence gradually increased with age, where stunted girls were evident at younger ages. Development index, SES, weight and height factors were highly associated ($p<0.01$), and ANOVA results revealed better anthropometric status with better family background. It is suggested that the growth level of these more advantaged peers may have a positive impact of changing environmental conditions among preschool children in Turkish population.

Key words: *preschool children, growth, underweight, overweight, obesity, Turkey*

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CONSTITUTIONAL CHARACTERISTICS OF BIOLOGICAL MATURATION PROCESS IN ONTOGENESIS

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The rate of biological maturation may have a genetic nature, associated with a certain type of constitution (Nikityuk, 2000). Longitudinal study of 210 boys and 159 girls was conducted for 4 years (ages 3 to 6) and of 66 boys and 59 girls for 10 years (ages 7 to 17). Biological age of the examined subjects was estimated from 3 to 9 years with the somatic criterion (Philippine test), from 5 to 14 years with odontological criterion, and from 9 to 17 years by the development of secondary sexual characteristics. Somatotypes of all children were assessed according to the Shtefko-Ostrovsky method (1929) with the 4 selected types: asthenic (A), thoracic (T), muscle (M) and digestive (D). In the first childhood constitutional differences in biological maturity were expressed as trends likely due to insufficient differentiation of somatotypes at this stage. In the second

childhood somatotypes significantly differ in the results of the Philippine test only at the age of 7 years, when children have positive and negative values. Complete replacement of milk teeth with the permanent ones occurs in girl of type D at 10 years, of type M – at 11 years, of types T and A – at 12 years. In boys constitutional differences in teeth replacement are more pronounced before 11 years, while at the final stage (up to 13 years) they develop more synchronously. Variations of the loss of primary teeth in the representatives of different somatotypes are stronger than in the eruption of the permanent dentition. Secondary sexual characteristics in girls are accelerated in the types as follows: A<T<M<D, and in boys - A<T<D<M, which coincides with the secretion of estrogens for females, and androgens for males in the pubertal period.

Key words: *children, somatotypes, different criteria of biological age*

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SECULAR CHANGES OF ADIPOSITY AND PHYSICAL FITNESS DURING EARLY GROWTH

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Secular changes of somatic growth, body composition and functional capacity has concerned not only school children and adolescents, but also preschool age children. Highest level of spontaneous physical activity (PA) was found in Czech preschool children, with its following significant decrease in school and adult age. This means that the reduction of PA can have a more serious consequences in the following life. Since the 1950‘3-70‘s up to the first decade of this millenium, significant increase of adiposity, especially on the trunk (evaluated by skinfold thickness measurements) was revealed in Czech preschool children. Increased adiposity was accompanied by significant deterioration of motor developement (evaluated by motor tests – broad jump and ball throw, as markers of the adaptation to exercise) which has been considered as the result of PA reduction along last decades. Changes of lifestyle concerning nutrition and PA have therefore negatively influenced Czech growing population especially during the period of adiposity rebound (AR), which has been also occurring at a significantly lower age as compared to previous decades: Earlier start of AR, accompanied by increasing adiposity is considered especially as an increased risk with regard to later development of obesity and health prognosis. Global epidemy of obesity has concerned during recent decades also children and adolescents not only in the industrially developed, but also in transition countries, or in selected social strata of developing countries. - An adequately increased physical activity tended to reduce adiposity, improved cardiorespiratory efficiency in spite of an increased food intake, and significantly increased serum level of high density lipoproteins (HDL) in Czech preschool children. Percent of body fat correlated significantly with total cholesterol and triglycerides serum levels (TG and TC) already at preschool age, which indicates a significant role of PA in health development. Organized physical education for preschool children (physical education classes for preschooler with one of the parents, or any other caretaker), or special physical education regime introduced in selected Czech kindergartens improved significantly motor development already at preschool age. As follows, aimed intervention in lifestyle including PA regime has to start in children as early as possible.

Key words: *secular changes, preschool children, adiposity,motor development*

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CHARACTER OF SECULAR CHANGES IN FUNCTIONAL INDICATORS AMONG SCHOOLCHILDREN OF POLOTSK (REPUBLIC OF BELARUS)

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Dynamics of functional indices was followed for 8-, 13-, and 17-year-old schoolchildren of Polotsk. Data on 433 males and 450 females were collected in 2002 and 2012. There was a significant reduction of the systolic blood pressure (SBP) levels in 2012 relative to 2002: for 8-year-old males by 3.4 mm Hg ($p < 0.05$), for 13-year-olds – by 4.6 mm Hg ($p < 0.01$) and for 17-year-olds – by 8.7 mm Hg ($p < 0.001$). For females SBP decreased in all groups, but statistically significantly in 13-year-olds – by 9.8 mm Hg ($p < 0.001$) and in 17-year-olds – by 8.5 mm Hg ($p < 0.001$). Age changes of diastolic blood pressure in children were not so straightforward. Analysis of the pulse rate showed a significant secular decrease from 2002 to 2012: for 8-year-old males – 5.6 beats/min less ($p < 0.01$), for 13-year-olds – 7.2 beats/min less ($p < 0.001$), for 17-year-olds – 4.2 beats/min less ($p < 0.02$); for 8-year-old girls – 5.1 beats/min less ($p < 0.001$), for 13-year-olds – 9.9 beats/min less ($p < 0.001$), for 17-year-olds – 6.6 beats/min less ($p < 0.001$). Changes in hand dynamometry (HD) in the period from 2002 to 2012 were also investigated among Polotsk schoolchildren. A highly significant ($p<0.001$) decline of HD among 8-year-old boys was revealed: for the right hand – 1.6 kg less, for the left hand – 1.7 kg less. For children older than 10 years mean values of HD for both hands increased. In groups of males of 13- and 17-year-old the increase was up to 0.7–1.4 kg, though the differences were not significant. Among schoolgirls of all age groups HD values did not change. The decrease of hand strength among schoolchildren was observed in various countries, so the tendency for the HD level to grow parallel to the improvement of the functional traits of the cardiovascular system among adolescent boys of Polotsk deserves attention and might be connected with stabilization of ecological and economic situation in Belarus.

Key words: *schoolchildren, performance indicators, secular trend*

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DO WE WALK ENOUGH IN MODERN TIME?

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Modern human life style has led to significant decreases of everyday physical activity and bipedal locomotion. It has previously been shown that skeletal robustness (relative elbow breadth) is associated with daily step counts. The aim of the study was to investigate whether other skeletal measures, particularly pelvic breadth, also may have changed in recent decades. Elbow breadth, pelvic breadth (bicristal), and thoracic depth and breadth, of up to 28,975 healthy females and 28,288 healthy males aged 3–18 years from cross-sectional anthropological surveys performed between 1980 and 2012 by the Universities of Potsdam and Berlin, Germany, were re-analysed. Since 1980 relative elbow breadth (Frame index) significantly decreased in both sexes (<0.001). The trend towards slighter built was even more pronounced in absolute and relative pelvic breadth. In contrast, equivalent changes of parts of the skeletal system that are not involved in bipedal locomotion such as thoracic breadth, thoracic depth and the thoracic index were absent. The present investigation confirms the decline in relative elbow breadth in recent decades. Analogous, but even more pronounced changes were detected in pelvic breadth that coincides with the modern decline in upright locomotion. The consequences to health status of the following adult generations in future are unclear. Firstly, the findings underscore the phenotypic plasticity of humans while adapting to new environmental conditions and maybe they are not pathological changes. But the influences of health status in locomotor system cannot be excluded in future. From this point of view we do not walk enough today.

Key words: *bipedal locomotion, modern life style, skeleton breadth measurements*

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LONGITUDINAL COHORT STUDY OF GROWTH, DEVELOPMENT, PUBERTY AND REPRODUCTIVE HEALTH IN RUSSIAN BOYS

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Introduction. There are few longitudinal male cohort studies with serial assessments of growth and puberty. Design/Methods. We assembled a multi-disciplinary team of U.S. and Russian researchers to design and conduct a longitudinal boys' cohort study of male growth, development, puberty and reproductive health in Chapaevsk, Russia. At annual study visits scheduled at each subject's birth month, the same study physician (O.S.) assesses pubertal staging and one nurse (L.S.) measures anthropometric variables. Pubertal assessments are based on a 1–5 scale for genitalia and pubic hair staging by visual inspection, testicular volume is measured using orchidometers, and penile length is measured with a ruler. Blood and urine samples for hormonal, chemical, genetic and epigenetic analysis were collected at baseline and biennially. Results. In 2003–2005, 516 prepubertal boys were recruited at ages 8–9 years (86% of all eligible Chapaevsk boys) to be followed annually for at least 10 years. The participation rate has remained high with over 75% followed for 6 years and 64% at 9 years of follow-up with 4319 visits as of February 2014. A core set of 23 anthropometric indices measured at annual visits (e.g., height, weight, segment lengths and diameters, circumferences, skinfolds) are available, as well as an additional 30 measures conducted biennially. Longitudinal curves for selected anthropometric and pubertal measures will be constructed. 113 semen samples were collected at 18-19 years old and evaluated for semen quality, including sperm concentration and motility. Conclusions. To our knowledge, this longitudinal male cohort is the first to have serial assessments of growth and puberty performed by the same physician and nurse followed for over ten years, from prepuberty to young adulthood. This cohort provides an excellent foundation for describing growth and pubertal development trajectories and evaluating associations with environmental exposures.

Key words: *growth, development, puberty, longitudinal curves, Russians, males, anthropometry*

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PHYSICAL STATUS OF CHILDREN BORN IN 1996 (LONGITUDINAL AUXOLOGICAL STUDY OF CHILDREN FROM VILNIUS CITY, 1996–2013)

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Based on the 1985–1992 cross-sectional auxological Lithuanian growth study, the new growth monitoring system and percentile growth charts were implemented at clinical practice in Lithuania since 1995 (Tutkuviene, 1995). The aim of the present study was to evaluate physical status of children born in 1996 in Vilnius city from birth up to the end of puberty and to investigate their growth tendencies. Material and methods: data were derived in 2014 from personal health records of children (373 boys and 342 girls, total number 715) born in 1996 in Vilnius city. Main growth indices (height and weight recorded annually from birth up to the age of 17

years, and calculated body mass index) of children were investigated. Main growth indices were compared with the results of the longitudinal study of children born in 1990 from Vilnius city (Suchomlinov, 2011) and the results of the cross-sectional growth studies of Lithuanian children (Tutkuviene, 1995, 2000–2005). Results: at the age of 17 years children born in 1996 were 1.5–2 cm higher than in 1985–1992 ($p<0.05$) – boys' and girls' height was 180.1±7.5 cm and 168.1±6.1 cm, respectively. Children of both sexes from the current study, compared to their peers born in 1990, were higher at birth (boys 53.3±2.3 cm and 52.8±2.3 cm, girls 52.8±2.4 cm and 52.3±2.4 cm respectively, $p<0.05$). There were no differences in final height, weight or BMI between 1990 in 1996 birth cohorts; however, children born in 1996 had significantly higher BMI compared with the results of the cross-sectional growth study of Lithuanian children conducted in 2000-2005 (boys 21.8±3.4 kg/m² and 21.1±2.6 kg/m², girls 21.5±3.6 kg/m² and 20.2±2.3 kg/m² respectively, $p<0.05$). Conclusion: stabilization in height and gaining in BMI was observed in children born 1996 in Vilnius city.

Key words: *longitudinal auxological study, personal health records, height, weight, body mass index*

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GROWTH FROM BIRTH TO TWO YEARS: ECOLOGICAL ASPECTS

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To estimate the specificity of growth dynamics of Slavonic children from birth to 2 years in different ecological conditions, data on physical development of children of the former USSR from late 1960's – early 1970's were compiled. Among them, samples from the following regions: megalopolis of Moscow; sea port of Murmansk, settled over the polar circle in the permafrost zone; city of Norilsk, settled over the polar circle, one of the most polluted cities in the world; city of Magadan, settled in the permafrost zone, severe climate with short summer; industrial center of Cheliabinsk, air pollution over the norm and high radiation background; industrial center of Kuibishev, the highest level of the air pollution in Russia; industrial agglomeration of Donetsk, a zone of ecological disaster with the extreme exhaustion of natural resources. Growth patterns of four main indices of physical development (body length and mass, chest and head circumferences) were compared at different age groups: at birth, 1, 3, 6, 12, 18 and 24 months of age. The highest indicators of physical development and the rate of their changes through 0-2 years interval belong to the children from rapidly developing urban centers with intensive migration processes – Moscow, Murmansk, Kuibishev. Evidently, high level of urbanization is positively correlated with the high level of medical service. Children growing in the severe conditions of the North, in Norilsk and Magadan, have lower indices of physical development and lower rates of their dynamics. The combination of natural and anthropogenic stress in the ecology of Norilsk intensifies this tendency. Children of Cheliabinsk, living in the conditions of the high anthropogenic pollution, are characterized with the deficit of body mass and chest circumference through the second year of life, which is an evidence of asthenization of body shape, more evident in girls. The same tendency characterizes the growth of children from urban Donetsk. The lowest indices of children from Donetsk region are probably connected not only with the high level of technogenic stress, but also with the lower quality of life in this province, which includes nutrition status and medical service. The retardation of the girls from Donetsk and the region compared to the boys who assume to be more ecosensitive, may testify to the distress of the ecological situation in the region and to the extreme exhaustion of adaptive resources of the child's organism. The research is partly maintained by RFBR grant # 12-06-0036a.

Key words: *growth dynamics, physical development, infancy, early childhood, ecological stress*

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HORMONAL STATUS AS A FACTOR OF DIFFERENTIATION OF RATES OF DEVELOPMENT

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The problem of individually typological patterns of growth in connection with the general physical development is one of the most important issue in modern auxology, physical and age morphology. Among the numerous factors affecting the rate of development and somatic status, hormones belong to the most effective ones. This study applies the biotypological approach to the analysis of individual variability of hormonal status in pubertal males. A number of hormones, the most informative for this age, were selected: sex hormones and growth hormone (GH) – leading anabolic factors of growth and development in the pubertal period, and cortisol as their antagonist. As the most informative criterion of biological age, stages of sexual development were used, particularly of such a character as pubic hair (P). There are marked differences in the ratio of testosterone:cortisol: it increases more than twice from the stage P1-2 to P4. The ratio of estradiol: testosterone is reduced from the stage P1-2 to P4 more than twice. An apparent trend towards stabilization in the level of GH between stages P3 and P4 is consistent with the literature data. Anabolic trends in the endocrine formula in connection with the biological age (absolute and relative increase of testosterone in relation to cortisol and estradiol) are accompanied by the corresponding changes in the body build – strong development of endo- and mesomorphic components. The results clearly show the connection of the accelerated type of development with the highest level of testosterone and the minimal ratio of estradiol-testosterone.

Key words: *endocrine formula, biological age, auxology*

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PHYSICAL DEVELOPMENT OF CHILDREN IN MOSCOW REGION AND SOME STATISTICAL INDICATORS IN 1976–1980S

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Patterns of physical development of schoolchildren in different areas of Moscow Region (Podolsk, Istra, Dedovsk, Solnechnogorsk, Zagorsk, Golitsino, 1985, n=3512) with additional data of Tchulkovo, Ramenskiy district (1976, n=842) were compared. Height, chest circumference, shoulder and pelvic diameters were studied; questioning of parents was conducted. Main statistical parameters for every age group were calculated. The significance of differences was estimated using Student's t-test. One-way ANOVA and multiple comparisons by Scheffe's method were also used. The results of the 10-year study (1976–1985) show some reducing of the girls' height against its increasing in boys. In chest circumferences, girls and boys of 1976 have smaller values than those of 1985children. In shoulder and pelvic diameters, children measured in 1976 are ahead of those examined 10 years later. These results indicate to a certain heterochrony of secular changes: growth in length has stopped (at least in girls), while some dimensions continue increasing. Somatotypes of children examined in 1980 demonstrate a trend towards asthenization. Generally, it gets in line with the trends found in other populations, examined at the same period of time. The results of parental questioning indicate that 92.4% of children were from two-parents families, while 7.2% - from incomplete families. Parallel to this study, some analysis of demographical data for Moscow Region has been performed. The dynamics of matrimony-divorce rate as well as the rate of population increase was examined with the use of the official statistics data (FSSS 1997, 2003, 2012). It shows that since the beginning of the 1960s the matrimony rate exceeds the divorce rate: related figures are 8.1% to 1.5%. By 1975 related figures are 11.1 to 3.6%. After 1980's the situation is drastically changed. In the period of 1985-1990 the corresponding figures are 9.71% to 4%, and the divorce rate goes on increasing. As there was no official statistical data for Moscow Region in 1970's, it's hard to consider the dynamics of natural increase rate. However, the data for a later period indicate that after 1980's natural increase turns to natural "loss". This process is going on till 2012.

Key words: *physical development, schoolchildren, Moscow region, demographical data*

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Section HUMAN DIVERSITY

RUSSIAN FIELD STUDIES OF ETHNIC GROUPS IN CHINA AND SOUTHEAST ASIA

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The Russian school of physical anthropology is one of the oldest in Europe. Russian researchers have been actively engaged in studying modern and ancient populations in multinational Russia and abroad. In the 19th century N.N. MiklukhoMaklay described several ethnic groups of the Malay Peninsula and Oceania. In the 20th century a wide range of methods and hypotheses relating to craniology, anthropometry, dental anthropology, dermatoglyphycs, and genetics was introduced, and further studies of various populations of the world were carried out. In 1956–58, N.N. Cheboksarov worked in China. He studied northern and southern Chinese and other ethnic groups in Guangdong – Huay, Yao, Miao, Li (see Ethnic anthropology of China, in Russian, Moscow, 1982). Data on the peoples of China are important for elaborating the classification of Asian Mongoloids. According to Cheboksarov, Mongoloids fall into the Continental and Pacific branches. The latter branch is divided into Eastern (Arctic and Far Eastern) and Southern Mongoloids. All native peoples of South China, Southeast Asia, and several neighboring regions form the southern Mongoloid area. Cheboksarov described the Eastern Himalayan anthropological type of southern Mongoloids together with the TaiMalay and Indonesian varieties. Anthropometric and dental variation in Thay (three local groups), Khmu, northern Viet, Cham, and Churu was studied by I.M. Zolotareva, A.G. Kozintsev, and G.A. Aksyanova during the SovietVietnamese ethnographic and anthropological expeditions in 1976–78 and 1984 (see in The Paths of Mankind's Biological History, in Russian, Moscow, 2002). Three major phenomena were described: (1) contacts between Mongoloids and VeddoAustraloids in Southeast Asia; (2) increase of Mongoloid features in Vietnam from the Bronze Age onward; (3) the affinities of the northern Viet with the Far Eastern racial type. In 1987, V.P. Alexeev studied the aboriginal groups of the Tay Nguyen plateau and in 198890 V.A. Sheremetieva studied several groups of northern and southern Viet (unpublished results). East and Southeast Asia remain the key areas for field work and theoretical research.

Key words: *physical anthropology, Russia, China, Indochina, Vietnam*

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SART KALMYKS OF THE ISSYK KUL PROVINCE, KIRGHIZSTAN: THE ANALYSIS OF FIELD DATA

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The Sart Kalmyks are a small group of Oirat origin now living in the Ak-Suu District, Issyk Kul Province, Republic of Kirghizstan. It is impossible to accurately determine their number at present: according to the 2009 census, 3800 people were counted, but ¾ of the Kalmyks were recorded as Kirghiz for social reasons. The headcount in four villages – Chelpek, Burma-Suu, Tash-Kyya and Beryu-Bash, where 90% of the population are Sart Kalmyks – is about 12 thousand people. Due to their Western Mongolian origin the Sart Kalmyks speak a language which is very close to Kalmyk. At this moment, only few of its speakers have remained, mostly the elderly. Original ethno-cultural characteristics are gradually giving way to Kirghiz and general Muslim traditions. The language, ethnography, and history of the Karakol Kalmyks were studied by scholars such as A.V. Burdukov (1935), Sh. Dondukov (1973), E.R. Tenishev (1976), N.L. Zhukovskaya (1980), D.A. Pavlov (1984),

A.N. Bitkeyeva (2006), B. Nanzatov, and M. Sodnompilova (2012). The Sart Kalmyks rarely became the object of bioanthropological research. The few studies include that by D.O. Ashilova (1976), who made a number of conclusions based on anthropometric data. Though the ethnographic group of Sart Kalmyks incorporated into the Kirghiz nation in the past was related to the Western Mongolian ethnic group by common ancestry, language, and culture, now they differ in appearance from groups belonging to the Central Asian anthropological type (Kalmyks, Mongols, and Buryats) and show the closest affinity with Kirghizes. During our expedition in 2013, we conducted a comprehensive anthropometric and genetic study among the Sart Kalmyks. We have collected anthropometric data on 84 women and 119 men, made 830 photographs for creating generalized portraits, and studied the diagnostically important descriptive characteristics of the face. We also collected material for genetic analysis – 197 blood samples of 101 women and 96 men. Regarding ethnicity, the following distribution was observed: 111 persons stated that both their parents were Sart Kalmyks, and about a half of them (51 persons) knew the tribal affiliation of parents. Forty individuals are hybrids between Sart Kalmyks and Kirghizes, 29 have both parents of Kirghiz origin, and 8 people mentioned Kazakhs, Uyghurs, Tatars, and Bashkirs among their ancestors. Based on these materials, we will trace the origin and history of the Issyk Kul Kalmyks in comparison with Kalmyks living in Russia and China; assess the demographic and genetic structure of Karakol Kalmyks; and calculate genetic distances and the degree of relationship with Russian Kalmyks. Based on individual photographs, generalized portraits of the Sart Kalmyk men and women will be created. In sum, this research will highlight the most recent trends in the development of this ethnic group. This study was partly supported by a grant from the Russian Foundation for the Humanities, # 12-01-00063a.

Key words: *physical anthropology, anthropometry, population history, Sart Kalmyks*

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GENETIC DIVERSITY AND LINKAGE DISEQUILIBRIUM PATTERNS IN ROMA POPULATIONS LIVING IN CROATIA BASED ON X CHROMOSOME STR LOCI

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The aims of the study were to evaluate the genetic diversity and explore linkage disequilibrium (LD) patterns in three Roma populations of different migration origin, socio-cultural and dialect category using seven microsatellite (STR) loci in the Xq13.3 region of the X chromosome. These loci (DXS983, DXS8037, DXS8092, DXS1225, DXS8082, DXS1066 and DXS986) were analyzed in 189 Roma males from three populations in Croatia (Međimurje, Baranja and Zagreb), who belong to different migration and dialect groups. Several diversity indices (e.g. gene diversity, expected heterozygosity, mean number of pairwise differences) were calculated and the level of LD was inferred using exact test and D' statistics. Results suggest that Međimurje Roma population has the lowest genetic diversity (π = 4.756) and is significantly different from Baranja (π = 5.395) and Zagreb (π = 5.429) populations. Linkage disequilibrium analyses showed that Međimurje Roma population has the highest level of linkage disequilibrium while Zagreb population has the lowest. When compared to other isolates, Međimurje population shows highest similarity to small and stable isolated populations while Baranja and Zagreb Roma populations resemble large, more open isolated populations. In addition, results point to possible early separation of all the three populations despite the fact that Međimurje and Baranja populations belong to the same migration category and speak the same dialect. All three populations were most likely separated as early as the beginning of slavery in Romania, which was approximately 500 years ago.

Key words: *Vlax Roma, Balkan Roma, Bayash, microsatellites, X chromosome*

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TREPANATION AMONG THE NOMADS OF CENTRAL KAZAKHSTAN (8TH-3D CENTURIES BC)

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Burials with stone mounds, which gave the name to the archaeological culture of Tasmola ("Stone Grave") are being investigated by archaeologists in the very heart of Kazakhstan. Tasmola sites date to the 8th–3d centuries BC and are mainly located in Central Kazakhstan, though some parallels are found in southeastern Urals and in southern Siberia. The study of skeletal materials excavated over the past several decades resulted in assembling a large collection of ca. 60 individuals of good preservation. Ten male and one female crania demonstrated trepanation holes, all of which are located on the occipital or on the posterior part of parietal bones. The number of trepanations varies between one and 15 per skull. Similar cases have been recorded in the past, but only two concern crania of the same chronological and cultural background. The pattern of trepanations in Central Asia can be related to embalming rites, which have also been recorded in the Pazyryk Culture of the Altai. We assume that in our case perforations were made for ritual purposes and were post mortem, as no traces of healing on male crania were identified. While differing in appearance, trepanation cases from Central Kazakhstan may indicate proximity of the ideological views of Tasmola people to those held by people in Western Siberia, Mongolia, and China, although at the moment it is hard to define the purpose of such operations in Tasmola people. The diameter of holes is too small for brain extraction, and absence of obliteration suggests non-medical purpose of the intrusion. Perhaps, this could be explained by the specificity of the funeral rites of the early nomads Central Kazakhstan. Notably, in this case trepanations were performed on individuals of high social position, buried with golden artifacts, under large mounds. These features can indicate the flourishing of mummification and postmortem cranial autopsy rites in the early Iron Age population of Central Asia. Further analysis of similar manipulations could significantly expand our understanding of the death rituals in the ancient world.

Key words: *trepanation, Early Iron Age, Central Asia, Central Kazakhstan, death rituals*

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RESULTS OF AN INTEGRATIVE ANALYSIS OF METRIC AND NONMETRIC TRAITS IN CRANIA FROM THE MEDIEVAL CEMETRY AT MAMISONDON, NORTHERN CAUCASUS

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The paper focuses on the biological affinities of the medieval population of Mamisondon, the Alagir district, Republic of North Ossetia–Alania. Because the cultural affiliation of Mamisondon people is controversial, biological data can provide important information on the origin and population history of that group. We used data on two morphologically independent systems of traits: craniometric and cranial nonmetric. First, cranial measurements of medieval and modern groups from northern Eurasia including Mamisondon were subjected to canonical variate analysis (CVA) whereas frequencies of nonmetric characters of the same groups were subjected to the principal component analysis (PCA). Next the resulting CV and PC scores were treated as new traits and integrated using PCA. The results of both analyses, metric and nonmetric, are consistent despite the independence of both trait sets. The correlation coefficient between CV 1 and PC

1 reaches 0.9 and that between CV 2 and PC 2 equals 0.5. According to the results of both analyses, the Mamisondon people are autochthonous, possibly with some admixture from the Alans. Our data suggest that Adygeis are the most similar to Mamisondon people among the modern groups. The specific position of Mamisondon on CV 3 shows that random microevolutionary processes were an important factor in the population history of this group possibly due to its geographic isolation.

Key words: *North Caucasus, Alan Culture, Middle ages, craniometry, nonmetric cranial traits*

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NEW DATA ON A MEDIEVAL COPTIC POPULATION OF DAIR AL-BANAT, THE FAYOUM OASIS, EGYPT

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The medieval site of Dair al-Banat is situated in the Eastern part of the Fayoum governorate in a deserted area about 2 km from the monastery of Dair al-Malak. All female long bones from that cemetery were very gracile and so were all male arm bones. Most male femora and tibiae were gracile, but some were very robust. The estimated stature of Dair al-Banat men is average – 169.5 cm (range, 163–179 cm), and that of women equals 155.4 cm (range, 150–160.5 cm). Also, we studied limb proportions of males and females. Both were characterized by relatively long legs, forearms and shins, and relatively narrow shoulders and hips. All female arm bones and some male arm bones have weak muscular attachments. In certain men the insertion areas of the following arm muscles were well developed: tuberositas deltoidea, cristae tuberculi majoris and minoris, tuberositas ulnae, tuberositas radii and supinator relief. The leg bones of most individuals showed well developed attachment sites for muscles such as tuberositas glutea, linea intertrochanterica, trochanter major, epicondili medialis and lateralis femoris, tuberositas tibiae, and linea musculi solei. We conclude that people of Dair al-Banat spent much time walking. The typical postcranial pathology is the osteoporosis of long bones. Frequent cases of palatine porosity, cribra orbitalia, and periodontosis are accompanied by tooth loss.

Key words: *physical anthropology, osteology, muscular attachments, Egypt, Copts*

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COMPOSITE PORTRAITS OF SOUTHERN SINAI BEDOUINS

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The aim of the study was to create series of composite portraits (CP) of southern Sinai Bedouins based on photographs of the Israeli expedition of 1979–82 and using new digital technologies. For that purpose, 89 photographs of adult Bedouins in two norms—full face and profile, and those of 116 children aged 7–15 were processed with the “Face on Face” software (Savinetsky-Syroezhkin). Anthropometric and descriptive traits of the head and face were analyzed. CP were collected to specify the information about different aspects of anthropological variability in Bedouin tribes. Three adult and five children’s portraits reflect age-specific characteristics; the profile portrait provides information on the vertical facial profile and nasal morphology. Integral visual images representing various tribes and subtribes as well as the general portrait of the

adult part of the whole population were generated. Our analysis of metric and nonmetric facial variation in Bedouin subtribes revealed a number of significant differences (in transverse dimensions and height of the face, eye and hair pigmentation, and hair form). Various Bedouin tribes, then, differ in important features of appearance. Results of visual analysis of composite portraits are comparable with biometric data. In some cases the CP method is more informative. For example, CP of the homogeneous Muzeina tribe and the tribal group "others" are consistent with metric information; CP of Gebelia subtribes of patchy origin visualize and complete the numeric information. The profile portrait adds information on a number of features: height and overall profile of nasal bridge, morphology of supraorbital and chin areas.

Key words: *ethnic anthropology, composite portraits, South Sinai Bedouins, facial morphology*

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CEPHALOMETRIC VARIATION AMONG THE TURKMEN OF SOUTHERN RUSSIA

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Cephalometric data on Turkmen males (N=240) living in the Stavropol and Astrakhan Provinces of Russia since the XVII century are analyzed (the material was collected by this author and O. Babakov in 1987 in eight settlements of the Stavropol Province and in two in the Volga delta). Thirteen traditional head and face dimensions were included. All statistics were performed using Statistica 8.0 software. The analysis of variance showed no significant differences between the Chovdur, Igdir, Abdal and Suyundzhadzhi tribes (Wilks' lambda = 0.712135; F=1.53). Differentiation between villages is stronger (Wilks' lambda = 0.405974; F=1.80). Discrimination of the total population by either criteria ("tribe" and "village") shows no effect for total head and face measurements. Differences concern mainly details of facial morphology (tribes differ in zygomatic and nasal breadth; villages, in these features plus minimal frontal breadth, zygomatic breadth, and upper lip height). Based on the above traits, correct tribe attribution is possible only in 48.75% of individuals ranging from 39.5% in Abdal to 84.6% in Suyundzhadzhi. Correct village attribution was possible in 37.9% (Funtovo, 60.4%;Sharahalsun, 51.3%). Variation among all the Turkmen tribes (N=1064 individuals) is greater than in southern Russia alone (Wilks' lambda = 0.322341; F=10.8). However, correct classification in that case was possible only in 37.4% of cases (Stavropol Turkmen, 57.4%; Nohurly of Turkmenistan, 47.6%; Astrakhan groups, 10.5%). Weighted pair-group clusterization links South Russian Turkmen with Ersari of Middle Amudarya, Igdyrs and Chovdurs of Northern Turkmenistan. Tajiks, Turkmen, Kirghizes, Uzbeks and other Central Asian peoples (N=3895) were correctly classified in 54.9% of cases (Wilks' lambda = 0.38396; F=38.27), and Turkmen groups alone, in 81.8% (Tajiks, 75.9%; Karakalpaks, 1.7%, Uzbeks, 8.6%). In the same sample, Stavropol Turkmen were correctly attributed in 22.8%, those of Astrakhan, in 1.8%. Cephalometric traits, then, do not distinguish the Turkmen of southern Russia from other Central Asian populations. Descriptive traits appear to be more efficient. The research was supported by the Russian Foundation for the Humanities, project 12-01-00235).

Key words: *Turkmen, anthropometry, cephalometric traits, Stavropol and Astrakhan regions, ANOVA, discriminant analysis, cluster analysis*

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THE STUDY OF CRANIAL MORPHOLOGY IN CASES OF ARTIFICIAL CRANIAL DEFORMATION USING ANGULAR MORPHOMETRY

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Artificial deformation of the head is one of the most widespread ancient practices of changing human appearance. It has been studied by more than two hundred years. Certain problems relating to this custom can be solved with the help of physical anthropology. Angular morphometry is rooted in cranio-trigonometric studies of the early 20th century. The essence of this method consists in analyzing cranial morphology through a description of its shape by the system of triangles the angle values being used in multivariate statistical analysis. Numerous studies of artificial cranial deformation using the cranio-trigonometric approach were published in the first half of the 20th century. They were mainly based on the craniometric systems of H. Klaatsch and J. Imbelloni and on the notion of "cephalic constants", such as the 'Klaatsch central angle (Z)'. We selected some 400 skulls with various types of deformation coming from various regions of northern Eurasia. They were measured according to the angular morphometry program developed by S.V. Vasilyev and R.M. Galeyev. This program is based on a system of 33 triangles generated by craniometric reference points. The trigonometric systems of artificially deformed and undeformed skulls differ in various respects. The heavier the deformation, the larger these differences are. The braincase undergoes heavy transformation whereas general angular characteristics of the face change little if at all. Visual differences of artificially deformed crania are more evident in the curvature of individual skull bones than in the position of craniometric points within the cranial space. The angular characteristics of deformed braincases differ by types of deformation. Based on the results of the angular morphometric analysis we can distinguish two subtypes of circular deformation: straight and inclined types according to J. Imbelloni.

Key words: *angular morphometry, artificial cranial deformation*

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MEDIEVAL POPULATION OF THE MIDDLE DANUBE: ANTHROPOLOGICAL AND ARCHAEOLOGICAL ANALISIS

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The purpose of this study was to get a better insight into the lifestyle of medieval Slavic populations by examining skeletal remains. The populations of two 12th–13th-century settlements on the Middle Danube were studied. One group is an urban population, the other one is rural. The Duplyaya fortified settlement was situated on the left bank of the Danube, 10 km north of the mouth of the river Caras. The Omolitsa rural settlement is also on the left bank of the Danube, near Belgrade. Burials of at least 150 individuals were excavated. Both settlements are well dated by coins. The analysis revealed differences in frequencies of stress markers and pathological bone changes between the urban and the rural groups. The urban population was more affected by a variety of infectious and systemic diseases such as cancer, while the injury rate is virtually the same. Indicators of cranial trauma are almost the same in both groups, but the urban group shows more diverse types of injuries. Differences might result from different lifestyles of the rural and urban populations. Physical features of the two groups differ too, though both belong to the same type of southern Slavs. Urban dwellers had robust skulls and less protruding noses. To visualize differences between the groups, composite "cranial portraits" were generated with Galton's method.

Key words: *Slavic populations, lifestyle, stress markers, anthropological types*

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DERMATOGLYPHICS OF ABKHAZO-ADYGHEAN PEOPLES OF THE CAUCASUS

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Populations of Caucasus are dermatogyphically distinct, being generally intermediate between those of Western Asia and Europe (Heet, 1976; Heet, Dolinova, 2002). Previous data on Abkhazo-Adyghean groups are scarce. In this report, dermatoglyphic data on 51 groups of Caucasus, totaling about 10200 males, are analyzed. The sample includes eight Abkhazo-Adyghean populations (about 2400 males): Abkhazians (495), Abazins (217), Abadzekhs (125), Bzhedugs (348), Shapsugs (240), Chemguis (193), Cherkess (166), and Kabardins (645). Two multidimensional analyses were conducted using a set of key diagnostic traits. Generally, the Abkhazo-Adyghean samples are similar and homogeneous. The mean Generalized Dermatoglyphic Distance (GDD) equals 8.4, which is nearly twice less than that between groups of the entire Caucasus. Among the speakers of Caucasian languages, Abkhazo-Adygheans are closest to Kartvelians and Iranians (GDD ranges within 6.1–6.3) and somewhat less similar to the Turkic-speaking groups except Nogais and to Dagestanians (7.1–7.4), being furthest from the Nakh-speaking people. The South Caucasoid Complex is lower in Abkhazo-Adyghean and Kartvelian speakers (58.0 and 58.7, respectively) than in Turks (61.0), Dagestanians (62.3), Armenians (62.7), and Iranians (62.9). Two significant principal components differentiate Northern and Southern Caucasoids. All Abkhazo-Adyghean groups except Cherkess are included in the larger cluster (2/3 of the samples), occupying a central position there. The Bzhedugs and Shapsugs show the "southernmost" characteristics, Abkhazians, Abazins, Kabardins, Abadzekhs and Chemguis being the "northernmost". Cherkess group take a central position in the second cluster. Results of the study are discussed in the context of the population history of Caucasus.

Key words: *dermatoglyphics, Caucasus, Abhazo-Adygean peoples*

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PALEODEMOGRAPHY OF THE 10TH–13TH-CENTURY POPULATIONS IN THE TISZÁNTÚL (HUNGARY)

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Result of craniological studies suggests that the structure of populations living in the Great Hungarian Plain (Hungary) might have changed considerably between the Age of the Hungarian Conquest (10th century) and the Arpadian Age (11th–13th century). This conclusion follows from the analysis of skeletons from cemeteries dating both to the Age of the Hungarian Conquest and to the Arpadian Age. Given the above result, the basic aim of this study was to perform comparative paleodemographic analysis of representative 10th and 11th–13th-century skeletal populations excavated from cemeteries in the Tiszántúl region, the eastern part of the Great Hungarian Plain. The samples were separated into two groups according to archaeological periods (the Age of the Hungarian Conquest and the Arpadian Age). It was found that the 10th-century populations showed greater variation in mortality parameters. By contrast, the Arpadian Age populations, especially those dating to the 11th century showed a much more homogeneous demographic profile. Among the 11th-century populations, much lesser variation could be detected than among the 10th-century samples. It is possible that 10th-century populations composed of various ethnic groups of different origin settled in the Carpathian basin according to their former environment. This might have caused territorial isolation

and was followed by anatomical and demographic distinctions. However, in the 11th century, differences between groups became much smaller, possibly due to the political activities of King Saint Stephen, which resulted in a more homogeneous population.

Key words: *paleodemography, skeletal populations, Great Hungarian Plain, Tiszántúl region, age of Hungarian Conquest, Arpadian Age*

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FACTORS ASSOCIATED WITH THE ONSET OF MOTHERHOOD IN POLAND

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Factors of lifestyle and social behaviour were examined in relation to the age at first childbirth given by Polish women. In a sample of 1924 parous women aged 35–45 years at the time of examination, crude associations between maternal age at first birth and selected covariates including place of residence, educational attainment, employment status, financial strain, physical activity, cigarette smoking, alcohol use and weight status were evaluated. The bivariate relations were then adjusted to marital status and use of oral contraceptives (OCU).The study revealed key sets of social predictor variables for maternal first birth age in Poland. The large city residents with higher educational level, currently employed and without financial strain, non-smoking cigarettes and non-drinking alcohol, participating in physical exercises and maintaining proper weight and oral contraceptive users were more likely to delay their first childbirth over the median age of 23 years, than their counterparts. The most important predictors of the maternal first birth age included: educational attainment ($F=19.8$; $p<0.001$), place of residence ($F=4.2$ $p<0.021$), employment status ($F=3.7$; $p=0.026$), tobacco use ($F=5.0$; $p=0.007$), and use of oral contraceptives ($F=3.6$; $p=0.033$), they explained 15% of the total variance in the maternal first birth age. The probability of delivering first child at more advanced age was almost two times higher for the large-city residents than for their rural counterparts (OR=1.58); five times higher for women with better educational qualifications as compared to primarily educated peers (OR=5.24). Currently employed women were 1.5 times more likely to be primiparous at a more advanced age than the unemployed counterparts (OR=1.5). Current smokers were 1.3 times less likely than their peers who had never smoked to deliver a child at an older age (OR=0.75). The OC users were 1.5 times more likely to delay childbirth than never OCU counterparts. The study results confirmed the importance of women's educational level in undertaking decision about motherhood.

Key words: *maternal age at first childbirth, social status, lifestyle behaviour*

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MAPPING DENTAL MARKERS IN EURASIAN POPULATIONS: WHAT WAS HIDDEN IN TABLE DATA?

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The study aims to consider numerous dental data from Eurasian populations in a spatial and temporal context. Mapping dental markers and PC scores as an innovative approach involves 906 samples; 594 of them are living groups and 312 are cranial series dated from the Late Pleistocene to the Early Iron Age. The results highlight the division of the whole area into two main provinces—western and eastern. The distinctive landscape, however, changes dramatically with the chronological depth when gracile lower molars as a distinguishing characteristics of our species are considered. The maps provide the evidence of the four-cusped LM2 to be a constant marker of western Eurasian populations, while the four-cusped LM1 turns to be an eastern trait in the Upper Paleolithic and early Holocene. Since the four-cusped LM1 is generally considered a western feature in recent populations, the discovered phenomenon provides a new view of the population history of the continent. The maps demonstrate the earliest western localization of gracile LM1, followed, in different ratio, by eastern traits (shoveling, dtc, dw) only in the Mesolithic and Neolithic northeastern Europe. The most intense dispersal of a similar combination from Asia to the west is traced in the Early Metal and Bronze Ages, mainly along the steppe belt of the continent. By the turn of the Common Era the landscape takes on essentially modern outlines. The results of the study suggest that LM1 and LM2 evolved independently in Eurasian populations, thus marking two separate ancestral groups. The separate ancestry could result from different tempos of transition of the key tooth role, thus suggesting four-cusped LM1 to be more archaic. In fact, should we admit at last that all the relevant dental traits specified as eastern are basically archaic? Several implications will be discussed.

Key words: *phenogeography, Eurasia, dental markers, lower molars, gracilization, population history*

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ON THE ORIGIN OF THE SOUTHERN URALIAN AND FOREST-STEPPE VOLGA VARIETIES OF THE SINTASHTA AND POTAPOVKA CULTURES, MIDDLE TO LATE BRONZE AGE TRANSITION

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The study of the Bronze Age sites in the Southern Uralian and Volga steppes is crucial for addressing many issues of Eurasian prehistory. The discovery of a number of archaeological sites dating to the transition from the Middle to the Late Bronze Age, and in particular of a series of fortified settlements of Arkaim type, resulted in a revision of the existing periodization of the archaeological cultures in the region, and of the views concerning their origins. It was immediately suggested that people who lived in these settlements and left kurgan graveyards with remains of early battle chariots, abundant animal sacrifices, and very specific burial practices, were Indo-Iranians. We have had an opportunity to study skeletal materials from the Sintashta-Arkaim sites in Southern Urals and from the forest-steppe Potapovka sites of the Volga region, which are culturally related (materials are stored at the Volga State Socio-Humanitarian Academy in Samara). Various analytical methods were utilised, and close relationship between the two neighbouring populations was revealed. At the same time, the considerable heterogeneity of these groups, which has no parallels among preceding or succeeding Bronze Age populations, was noted. Almost all anthropological series demonstrate features that could indicate either steppe or northern forest affinities. Some series could

represent a result of a mechanical mixture while others attest to incipient hybridization. Despite the evidence of military activity in the society (fortified settlements, chariots, weapons), a small number of injuries suggests that Sintashta and Potapovka populations were involved in conflicts only occasionally. It should be emphasized that despite the apparent cultural homogeneity of the cemeteries, the buried people were not necessarily related to each other. The central and elite graves often contain individuals of a hypermorphic European type, perhaps of steppe origin. We therefore conclude that one must concentrate on elite burials to identify the founders of the Sintashta and Potapovka traditions in this archaeologically homogenous and, at the same time, biologically heterogeneous group.

Key words: *Bronze Age, Southern Urals, Sintashta-Arkaim, Potapovka, Indo-Iranian origins*

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FINGER LENGTH RATIO IN CHUVASHIANS

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In a Chuvashian sample (803 males and 738 females) we evaluated the mean values of 2D:4D ratio, the contributions of phalanges and metacarpals to the 2D:4D ratio; the symmetry between right and left 2D:4D ratios. Age, sex, anthropometric data and radiographs of both hands were collected. Each hand was visually classified with the x-ray method as either Type 1 (index finger longer than ring finger); Type 2 (equal); or Type 3 (shorter than the ring finger). The following measurements were obtained from the index and ring fingers: (1) midpoint of base of the proximal phalanx to midpoint of tip of the distal phalanx; and (2) midpoint of the base to midpoint of tip of the metacarpal. Visual classification was significantly associated with the measured 2D:4D length ratio. Women had a higher prevalence of Type 1 and Type 2, but lower prevalence of Type 3 ratio in both hands. Men had lower measured 2D:4D phalangeal, metacarpal and ray (combined) ratios than women. Symmetry between the right and left hand measured 2D:4D ratios were significant in phalangeal ($r=0.657$, $p<0.001$), metacarpal ($r=0.638$, $p<0.001$), ray ($r=0.682$, $p<0.001$) ratios and visual classification types (contingency coefficient = 0.559, $p<0.001$). No sex dimorphism was found between the right and left hands. Correlations between age and visual classification were significant on both sides before and after adjustment for sex. This is probably a sign of a secular trend and should be replicated in other samples. Evaluation of the association between 2D:4D finger length ratios (representing the prenatal environment, i.e., early androgen exposure) and reproductive indices, such as age at menarche, menopausal age and length of reproductive period was done. Retrospective data on the age at menarche and menopausal age as well as x-rays of both hands were obtained from 674 Chuvashian women aged 18-70 (mean 46.32±15.42). We found that a low 2D:4D ratio (radiologically evaluated), a masculine 2D:4D ratio type (visually evaluated), and a putative bioassay for prenatal androgen exposure were associated with a later menarche and shorter reproductive period. No association was found with menopausal age.

Key words: *hand, 2D:4D, finger length ratio, menarche, menopause, Chuvashians*

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DERMATOGLYPHICS OF KAZAN TATARS

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Kazan Tatars are the largest group of the Volga-Ural Tatars. They reside in the Republic of Tatarstan and other parts of the Volga-Ural region. The report deals only with Tatars living in Tatarstan. New archival and field dermatoglyphics materials were used (six samples). For the first time in Russia, dermatoglyphic data were analyzed in the diachronic aspect. Four samples were collected during the expedition of the Anuchin Research Institute and Museum of Anthropology MSU in 1937–38 headed by S.A. Shluger, V.M. Shapkin, and I.N. Elistratov. The total sample size is 1147 (845 males, 302 females). The sample was divided with regard to four districts (northern, eastern, southern and western). Two samples were collected by the author during the 2012 expedition in Zelenodolsk district (northwest) and Elabuga district (northeast) of the Republic of Tatarstan (83 males, 80 females). Altogether 928 males and 382 females were investigated. Dermatoglyphic data suggest that Kazan Tatars are a heterogeneous Eastern European population which includes southern European and hybrid Caucasoid-Mongoloid components. The 1937–38 samples (males and females) are more Mongoloid than those collected in 2012, and the tendency is more prominent in males.The decrease of the Mongoloid component over the last 70 years can be related to extensive population immigration of Slavic people to the region caused by its industrial and agricultural development. All female samples were more heterogeneous already in 1937–38. There is also a pronounced Southern European component in one of the modern samples (Tatars of northwestern Tatarstan).

Key words: *Tatars, dermatoglyphics, Volga-Ural region, ethnic history*

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THE ANCIENT POPULATION OF LCHASHEN AS A REPRESENTATIVE OF THE BRONZE AGE ARMENIAN POPULATION

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The settlement and cemetery of Lchashen are located on the southwestern shore of Lake Sevan. Lchashen is one of the most significant sites representing the Middle and Late Bronze Age culture of Armenia. The excavations of the cemetery were started by H. Mnatsakanyan in the 1950s and continued by L. Petrossyan until the 2000s. The skeletal collection at the State Historical Museum of Armenia totals over 300 cranial samples and over 100 postcranial skeletons representing people associated with the Middle and Late Bronze Age Sevan-Artsakh and Lchashen-Metsamor cultures. The Bronze Age sample from Lchashen is the most representative among the published contemporaneous samples from Caucasus. Cranial measurements of this sample were published by V. Alekseev. Those people were dolichocranic and had broad faces and robust skeletons. The precise dating of the funerary complexes, conducted by P. Avetisyan and A. Piliposyan has made it possible to subdivide the sample into three main periods of the Middle and Late Bronze Age (MBA—17th-16th/15th centuries BC; LBA I – 15th-13th centuries BC, LBA II – 13th-12th centuries BC) and to evaluate the changes of physical type over several centuries. Late Bronze Age crania turned out to be more gracile. This transformation was assessed in the cultural context and interpreted as resulting from the consolidation of the Late Bronze Age Lchashen-Metsamor culture and gracilization caused by admixture and other microevolutionary processes. Sex and age data on the Lchashen sample are representative and can be used for the reconstruction of demographic patterns. Mortality indexes indicate relative longevity of the Middle and Late Bronze Age people of Lchashen relative to other contemporaneous populations of Eurasia. The distinctive feature of this longevity is the predominance of elderly males in

relation to females of the same age. This disproportion is likely related to the high social rank of patriarchs. Another demographic feature is the high mortality of females in the reproductive age. Owing to the large size of the Lchashen sample, its average craniometric and osteometric parameters can in some sense be regarded as standard. The Late Bronze Age Lchashen-Metsamor culture was also named after the Etiuni ethnonym uncovered in the Urartian cuneiform inscriptions (P. Avetisyan, H. Avetisyan). If so, the Etiuni people were moderately robust, tall, and quite long-lived.

Key words: *Bronze Age, Sevan-Artsakh culture, Lchashen-Metsamor culture, robusticity, gracilization, microevolution, longevity*

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ON THE ORIGIN OF MEDIEVAL EAST SLAVIC TRIBES

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Nonmetric cranial trait frequencies in medieval East Slavic tribes and comparative samples from unrelated groups were examined. The aims of the study were as follows: (1) to assess the degree of biological affinity in medieval East Slavic tribes and to test the hypothesis that East Slavic peoples have a common origin; (2) to reveal their genetic affinities with the autochthonous (Baltic and Finno-Ugric) populations of northeastern Europe; and (3) to see if a genetic continuity existed between people of the Chernyakhov culture and medieval Eastern Slavs. Analyses of phenotypic differentiation were based on Nei's standard genetic distance and hierarchical GST statistics. The results suggest that the genetic affinity of the East Slavic tribes is due not only to inter-tribal gene flow but, more importantly, to their common population history. Evidence of gene flow between the Baltic and Finno-Ugric groups was revealed in the gene pool of Eastern Slavs, as was genetic continuity between medieval East Slavic tribes and the preceding Chernyakhov population. These findings support a "generalizing" hypothesis of East Slavic origin whereby the Slavonic community was formed in a particular ancestral area and subsequently spread throughout Eastern Europe.

Key words: *East Slavs, Balts, Finno-Ugrians, Chernyakhov culture, cranial nonmetric traits*

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GENETIC ANALYSIS OF ADMIXTURE BETWEEN BAYASH ROMA FROM NORTHWESTERN CROATIA AND THE GENERAL CROATIAN POPULATION

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The Roma are a minority group that do not share a common homeland, speak different languages and consist of individuals of various religions. Population-genetic studies of Roma as a transnational isolate have mostly sought to compare their genetic affinities with proposed parental populations. The aim of this study is to assess the genetic structure of the Bayash Roma population from northwestern Croatia, and of the general Croatian population, and to investigate the extent of admixture between them. Population differentiation and structure were analyzed using a set of genetic microsatellite data from two original studies (100 Bayash Roma from northwestern Croatia and 195 individuals from the general Croatian population). Results demonstrated that two population clusters best explain the genetic structure. Most individuals of the Bayash Roma population were assigned to a single genetic cluster and most individuals of the general Croatian population were assigned to another. Admixture analysis revealed that the percentage of non-Croatian individuals in the general Croatian population is approximately twice higher than the percentage of non-Romani individuals in the Romani population. Higher percentages of admixed and non-Croatian individuals found in the general Croatian population and lower percentages of admixed and non-Roma individuals found in the Bayash Roma population are in line with the presence of ethnomimicry in Roma.

Key words: *population substructure; admixture; Bayash Roma, ethnomimicry*

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POSSIBLY THE FIRST CASE OF AGENESIS OF SECOND AND THIRD MOLARS IN HUMAN SKELETAL REMAINS FROM KENDIRCI HELLENISTIC PERIOD GRAVES, TURKEY

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Human dental studies spanning the period from the Paleolithic to the present revealed an extremely high variation in the occurrence of agenesis in different populations. The aim of the present study is to study agenesis in the ancient population of Kendirci, Izmir, Turkey. The site is located on the western coast of the country – the Aegean region – and dates to the Hellenistic Period. Nineteen graves with 11 adult skeletons (7 males and 4 females)were excavated. Images of mandibles were obtained using a Planmeca ProMax(®)

3D Cone beam computed tomography (CBCT) unit (Planmeca Oy, Helsinki, Finland). Results revealed skeletal lesions including joint and infectious diseases, and mild and severe lesions of jaws and teeth. Possibly the first case of the agenesis of eight molars (congenitally missing four second molars and four third molars) was recorded in an adult male. Congenitally missing teeth other than the third molars are rarely observed in ancient human skeletal remains. Our results contribute an additional information on this rare trait in western Anatolians during the Hellenistic Period.

Key words: *human skeletal remains, agenesis, Hellenistic Period, Anatolia*

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AN ANALYSIS OF PATRILATERAL KIN INVESTMENT BIASES IN TWO PATRILOCAL KIPCHAK TURK POPULATIONS FROM KIRGIZSTAN AND BASHKORTOSTAN

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Kinship network structures are an important part of the human family and of nepotistic helping behavior. Matrilineal kinship links are universally stronger than patrilineal ones, at least in urban or modernized societies. In Sociobiology, the higher kin caregiving by matrilateral relatives, especially by the maternal grandmother and maternal aunts, is explained by the kin selection theory in combination with the paternity certainty hypothesis. A mother always knows that her child is genetically related to her, whereas in the male family line there is uncertainty of genetic relatedness and therefore more reluctance in child-care. Nevertheless, in some traditional societies (e.g., rural mainland Greece), patrilateral kin caregiving seems to be stronger than matrilateral one. This cannot be explained by the paternity certainty hypothesis; however, it might be a result of son-biased child investment. We focus on two Kipchak Turk populations, which are both patrilocal and assumed to still have a more or less traditional patriarchal family structure, in order to test the universality of kin caregiving structures and its evolutionary interpretation. In Kirgizstan, we found very strong patrilateral and patrilineal kin caregiving ties, in keeping with the patrilineal structure of the society. In Bashkortostan, by contrast, both matri- and patrilateral tendencies existed side by side. Overall, Bashkirs appear to be at an intermediate modernization level, characterized by stronger matrilineal family ties and matrilineal child-care.

Key words: *asymmetric kin caregiving, kin selection, paternity certainty, matrilineal investment, patrilateral bias, Kirgizstan, Bashkortostan*

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CRANIOLOGICAL DIFFERENTIATION OF MODERN MANKIND

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To assess the patterns of human cranial differentiation we used characteristics other than those traditionally employed in racial studies. Based on the size and shape of the skull three modern craniotypes were established – Tropids, Holarctids, and Pacifids. Differences between them concern three major dimensions of the braincase (Martin 1, 8, and 17) and their ratios, as proposed by V.V. Bunak (1922). In addition to standard ratios (8:1, 17:1, 17:8) the following generalized parameters were used: ORV (total growth dimension) = (12+82+172)1/2 and indexes of form: dolichoid = (1/8*1/17)1/2*100; brahioid = (8/1*8/17) 1/2*100; hipsioid = (17/1*17/8) 1/2*100. The Tropids originated in the tropical zone of the Old World. They have the smallest crania with ORV=262.6, with the largest longitudinal diameter and the smallest transverse diameter. Holarctids, who originated in northern Eurasia, are characterized by the largest crania ORV=266.7, the largest transverse development, and the smallest cranial height. The Pacifids originated in East Asia and spread on both sides of the Pacific (in Asia and America). They are characterized by large crania (ORV=265.7), which are high and broad but short. Apart from these groups, there are also local ones such as Capoids (Bushmen and Hottentots) and Tropical Pacifids (Andamanese and Aeta). This classification is based on general cranial shape, not on "racial" traits. Therefore certain disagreement between geographic races and craniotypes is predictable (Pestryakov, 1995; Pestryakov, Grigorieva, 2004).

Key words: *craniometry, cranial differentiation, cranial types*

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FROM BIOLOGICAL HISTORY AND DEMOGRAPHY TO LINGUISTICS AND DNA ANALYSIS: A HOLISTIC APPROACH TO POPULATION STRUCTURE STUDIES IN THE ADRIATIC AREA

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Anthropological research of modern European populations indicates pronounced diversity between and among various groups, confirming the complexity of interactions of the components of the "eternal triangle" (heredity, environment and culture). Such studies require an interdisciplinary approach and a large scale of diverse data: sociocultural, linguistic, archeological, anthropo-genetic, biological, and biomedical. For several decades, holistic anthropological research, based on the belief that human evolution and variability can be understood only by the simultaneous study of biological and socio-cultural phenomena, has been conducted in the Eastern Adriatic and in the Balkan region as well. Detailed characterization of historical events, population movements and migrations, demographic peculiarities, family structure, linguistic peculiarities, and various biological and genetic traits were investigated, revealing possible routes of peopling of this geographic area. Within the context of this research, this paper will address various scenarios of microevolution, including factors such as population exchange, demic diffusion, short-term and long-term migration movements and population mobility, possible founder effects, the form of selection of reproductive partners, the effect of possible settling and population reflux and the dependence of demographic characteristics of various historical groups. Current findings concerning mitochondrial DNA and Y-chromosome lineages of the population of Eastern Adriatic will be analyzed and interpreted with an emphasis on the fact that historical processes are the laboratory in which modern human populations were created.

Key words: *anthropology, population structure, bio-cultural evolution, migrations, history*

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THE SCYTHIANS AND SARMATIANS IN THE STEPPES OF SOUTH RUSSIA: CHANGE OF EPOCHS – REPLACEMENT OF GENE POOLS

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The Russian steppes, due to their geographic location, have always served as a meeting place of cultures and peoples. It seems likely that contacts of Iranian-speaking nomads, i.e. Scythians and their successors Sarmatians, with the sedentary population in the beginning of the Early Iron Age influenced not only cultural traditions but also the genetic diversity of both parties. Comparative analysis of data on the nomads' genetic diversity implies that in spite of certain linguistic affinity, they are by no means similar genetically. The gene pool of the Scythians, i.e., Scythian nomads of the Volga-Don interfluve of the 6th – 3rd centuries BC) contains two distinct components, East Eurasian and West Eurasian, the latter amounting to 70 percent. As to Sarmatians, i.e. the nomads roaming the left bank of the Don in the Middle-Sarmatian time, their gene pool is 94 percent West Eurasian. Comparative analysis of the gene pool components showed that mtDNA lineages belonging to the West Eurasian component common to these groups were nevertheless different by origin, and their affinity seems to be rooted in the early stage of the West Eurasian gene pool formation. Thus, the main waves of Iranian-speaking nomads introduced very different gene pools into the Southern Russian steppes. The genetic diversity of the early wave, the Scythians, is associated with Central Asia and Southern Siberia; while the later wave, the Sarmatians, carried the gene pool of Middle Eastern origin. Interestingly, the genetic conclusions are in accord with linguistic data implying that contrary to the predominant view, Scythian and Sarmatian languages belonged to different East-Iranian subgroups. It is worth noting that genetic traces of the two nomadic groups differ considerably. The Scythian gene diversity cannot be revealed either in ancient sedentary or in modern population of the Azov steppes. Meanwhile Sarmatian genetic influence can still be traced both in the ancient sedentary and modern population of the Russian steppes and the neighboring regions.

Key words: *Scythians, Sarmatians, gene pool*

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MORPHOLOGY OF SELLA TURCICA IN TURKISH ADULTS FROM PAST TO PRESENT

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Morphological aberrations of the sella turcica were assessed in Turkish adults, modern and those of past centuries. Lateral cephalographs taken from 32 adult (23 male, 9 female, Group 1), dry skull base specimens (Late Ottoman Period), and pretreatment cephalographs of 35 adult patients (21 male,14 female, Group 2) scheduled for orthodontic treatment at Gazi University Orthodontic Clinic were studied. Both samples had Angle Class I relationships. Prevelance of six different morphological types was determined. These include oblique anterior wall, sella turcica bridging, double contour of the floor, irregularity (notching) in the posterior part of dorsum sellae, and pyramidal shape of dorsum sellae. Normal morphology of sella turcica was found in 40.6%, 54.3%, and 47.8% in Group1, 2, and total, respectively. Sella turcica bridging (15.6%) and irregularities of the posterior part of dorsum sellae (18.8%) were more common in dry skulls, while the double contour of the floor (14.3%) and irregularities of the posterior part of dorsum sellae (14.3%) were more common in Group 2. Sella turcica bridging (15.6%) occurred more often in Group 1. There is a noticeable variation in the morphology of sella turcica in this population of normal adults. In approximately one half of the cases, sella turcica was rated as normal and a variety of dysmorphological types was detected. The results can be important when compared with data concerning patients with craniofacial aberrations and syndromes. As bridging of the sella has suggestive associations with disease entities, deviations from the normal anatomy should be evaluated.

Key words: *Sella Turcica, cranium, radiography, morphology, lateral cephalometrics, Turkish adults*

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THE ANCIENT HISTORY OF THE GENE POOL OF RUSSIA AND THE CONTIGUOUS COUNTRIES

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Wide opportunities of the geographic method in physical anthropology have been demonstrated by many Soviet anthropologists such as V.V. Bunak , A.I. Yarkho, G.F. Debetz, M.G. Abdushelishvili, V.P. Alexeyev, T.I. Alexeyeva , Yu.G. Rychkov, O.I. Ismagulov, I.M. Zolotareva, etc. Owing to Russia's vast territory, its population is quite diverse in terms of race (two of the 3-5 geographic races – European and Asiatic) and language (six linguistic families). A three-digit number of ethnic groups and scores of anthropological types and linguistic subgroups contribute to a huge genetic diversity. Different attributes of the gene pool and all the variation accumulated over the previous phases of development will be discussed in the multivariate space and in the geographic context of northern Eurasia. The principal component analysis was based on the correlation matrix of independent traits (morphological and genetic) co-varying with economic and cultural attributes. Data were subdivided according to two chronological stages spanning the time from the Paleolithic to the present, and integrated patterns of genetic variation were assessed based on the covariation of independent traits ("historical correlation"). A correlation between the age of the trait and its

distribution area has been established. A marked difference between the gene pools of modern populations of northern Eurasia living west and east of the Urals, reflected in both genetic and morphological traits and prevailing over most part of ancient history (two chronological stages – 26–16 and 15–12 thousand years ago), is unrelated to recent changes in ethnic structure. The results are presented as distribution maps of single traits and of the first principal component.

Key words: *Northern Eurasia, genetic polymorphisms, principal component analysis*

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TO THE QUESTION OF DISTRIBUTION OF SPECIFIC INFECTIONS AMONG RURAL MEDIEVAL POPULATION IN RUSSIA: THE CASE OF ROZHDESTVENO CEMETERY (15TH–16TH CENT. AD)

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Our study was based on the osteological material from a rural cemetery of the settlement Rozhdestveno I (Odintsovo, Moscow region). The material was obtained due to salvage excavations in 2006-2007 under the direction of Mikhail Gonyanyi. The burial site could be dated by the 15th-16th centuries AD according to the mass material and specific artefacts. Totally, 152 burials have been studied. Most of them were redeposited. This fact argues for the prolonged use of the same cemetery clusters partly due to the limitation of the dwellings existing on the border. High percentage of children's mortality (42%) and the analysis of the stress markers on the skeletons of adult individuals permit to suppose the unfavorable living conditions in the community. Both among males and females (totally in 12.6% of cases), there is a complex of features which allows us to speak about a specific infection (treponemal). The most remarkable manifestations were found on the female skeleton (20-29 years old, burial 122). In spite of partial preservation and in some cases taphonomical destruction of the compact bone layer, we found substantial changes of the bone tissue on the long bones of extremities, scapulae and ribs. Proliferate changes of the surface are noted on almost all preserved bones. Acromial processes of the scapulas and outer surface of the 12th rib are covered by porous layers. Also on the upper and lower extremities the regions of periosteal inflammation are marked. On the tibial and femoral bones the process is more manifested. Deep lesion focus (12.6 mm) in the distal part of the left tibia involves the medullar canal and differs from the gummatous destructions on the right tibia. Probably it is a complication of the syphilitic gumma by secondary pyogenic infection, which led to syphilitic osteomyelitis. The presented case is the most expressed and typical for the tertiary syphilis among the investigated material of the Rozhdestveno I site. Written sources testify to the extensive expansion of this disease on the territory of Europe at the end of 15th–16th centuries. It can be confirmed by synchronous findings in Rostov Velikyi, Vologda, Mozhaisk and serves as an evidence of the appearance of venereal syphilis on the territory of Eastern-European lowland.

Key words: *palaeopathology, 15th-16th centuries, treponemal infection, medieval Russia*

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THE ANALYSIS OF REPRODUCTIVE PROCESSES IN THE POPULATION OF ELISTA

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This paper presents the results of the analysis of reproductive processes in the urban population of Elista, Kalmykia, and comparative data on other urban populations of the Volga-Ural region. Within the new context of changes in demographic processes, it is interesting to assess their effects on reproduction. The study was carried out in Elista as a sample survey of 460 women older than 45 by measuring indices of potential selection (IT) and its components following Crow's method (1958). On average, there were 5.8177 pregnancies, 2.1448 births and 3.3224 abortions per one post-reproductive woman. The variance in the average number of children (Vf) is below the average itself, evidencing stability of reproduction. The share of obstetric pathologies (spontaneous abortions, miscarriages, ectopic pregnancies and stillbirths) amounts to 0.27, which is slightly higher than in the Kazan population (0.22). Thus it could be stated that only 37% of all pregnancies ended in delivery; and accordingly 57% of pregnancies were artificially or spontaneously terminated. The study of potential selection indexes in urban populations revealed a sharp increase in the contribution of non-biological factors to the selection coefficient value: the force of social pressure is 2.9412 in Stavropol, 2.7399 in Kazan, 2.5418 in Cheboksary, 2.0595 in Saransk, 0.9930 in Syktyvkar, and 1.3092 in Elista. The employment of different methods for the calculation of the total index allowed, for the first time ever, to quantify the contribution of the social component to the value of selection coefficient in a population (Spitsyna, 2006). It is shown that artificial control of reproduction has different effects on reproductive processes in populations by diminishing individual differences in fertility selection and fitness. These results enhance our understanding of the influence of biological and environmental components on reproductive processes in human populations. The study was partly supported by a grant from the Russian Foundation for the Humanities # 12-01-00063a.

Key words: *population, potential selection, reproduction, fertility, obstetric pathology*

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THE ANTHROPOLOGICAL MAP OF BULGARIA IN THE 20TH CENTURY: CORRECTING A CONSCIOUS ERROR

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In 1938–1943 the famous Bulgarian academician, physiologist and genetic Methody Popov, who opposed Nazi racial theories, collected a large anthropological material. This is the second and the widest ethno-anthropological survey of the Bulgarian population. The material has been elaborated and the results were published only after M. Popov's death (1954) by his student Georgi Markov in 1959. However, because of political reasons Markov had to make a conscious error in the text (not in the numeric data), to ensure the publication of the results. This error has been repeated in some later Bulgarian works about the anthropology of Bulgarians for inner use. In this paper the material of M. Popov's survey is analyzed by region and by county, using methods such as cluster analysis, which have not been applied to those data. The results are compared with those of three other nationwide ethno-anthropological surveys of Bulgaria carried out in the 20th century. This analysis shows that the anthropological map of Bulgaria is very patchy. Northern

Bulgaria is an area of predominance of the Dinaric type (in combination with Alpine and East Baltic types), which is characteristic of Central Europe. Southern Bulgaria is the area of Atlanto-Pontian (Atlanto-Mediterranean) type. There are few areas of intrusion of Dinaric forms in southern Bulgaria – in the eastern part of Sofia region, in the Rhodopes, and in Eastern Thrace. There are also areas of Atlanto-Pontian intrusions in North Bulgaria – along the Black sea coast and along the Danube. However, the Atlanto-Pontian type (which is the most frequent anthropologic type in Bulgarians) is concentrated mostly in southeastern, not northeastern Bulgaria, as in the text published by G. Markov. This confirms the opinion of anthropologists such as J. Czekanowski, C. Coon, A. Poulianos, V. Alekseyev, etc., that modern Bulgarians descend mainly from ancient populations living in the Balkans before the Great Barbarian Migration. This conclusion is confirmed by dermatoglyphic and genetic studies.

Key words: *bulgarians, ethnic anthropology, Dinaric type, Atlanto-Pontic type, political misuse of anthropology*

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ANGULAR MORPHOMETRY OF SKULLS OF THE ABORIGINES OF LOYALTY ISLANDS, MELANESIA

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The purpose of this work was to study a series of 67 crania from Loyalty Islands, Northern Melanesia, housed at the Musée de l'Homme in Paris. The main tasks are to reveal specific features of morphogenetic parameters of male and female crania and to calculate primary statistical characteristics. This series was collected mainly in the first half of the 19th century, after the islands had been colonized by the French. Other specimens come from archaeological excavations in the mid-20th century. The series was measured according to the cranio-trigonometric program elaborated by the authors and tested for homogeneity using standard deviations and coefficients of variation. Crania from Loyalty Islands are generally dolichocranic and often higher than wide. The face is relatively low and wide with alveolar prognathism, very wide nose, low orbits, sharp horizontal profile, and flat nasalia. This combination is observed among both males and females. Based on the principal component analysis of the angular parameters of the braincase, we can conclude that males from Lifou and Maré islands are distinguished by sagittaly curved parietal bones. Braincases of females are less variable. When females and males are analyzed simultaneously, their braincase shapes show few differences, though absolute dimensions reveal some sexual dimorphism. In terms of facial angles, males fall into two groups regardless of the islands. Facial skeletons of females are more uniform. Their simultaneous analysis with the principal component method revealed no sexual dimorphism in angular parameters.

Key words: *craniometry, Melanesia, Loyalty Islands*

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PALAEOANTHROPOLOGICAL STUDY OF THE POPULATION OF ABASHEVO CULTURE, WHICH LEFT THE SECOND LIPETSK BARROW

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In 2011 employees of the State directorate for protection of cultural heritage of Lipetsk region under the guidance of Golotvin A.N. (PhD) performed rescue excavations of the partially destroyed archaeology site – the "Second Lipetsk barrow" situated in the southern outskirts of Lipetsk, in the watershed plateau of the Voronezh and Belokolodets rivers (the right bank of the Voronezh river). The excavations revealed three grave pits arranged along the North-South line. The grave pit 1 was situated in the southern part of the barrow, had subrectangular shape, and was oriented along the North-South line. On the bottom of the pit, the archaeologists recorded five human skeletons on the organic bedding. All the buried people were lying on their backs, with their heads oriented eastwards and their hands in the pelvis area. All the skeletons were more or less disrupted. The grave pit 2 was situated in the central part of the barrow, had subrectangular shape, and was oriented along the North-South line. On the bottom of the pit, the archaeologists recorded fragments of four human skeletons on the organic bedding. The skeletons were completely disrupted, only leg bones of two individuals were lying in situ – they suggest that the buried people were lying with their heads oriented eastwards (as in the pit 1). The grave pit 3 was situated in the northern part of the barrow, had subrectangular shape, and its long axis was oriented along the East-West line. On the bottom of the pit, there was a human skeleton on the organic bedding. The skeleton was lying in situ, on the back, with hands in the pelvis area and with head oriented eastwards. According to the author of excavations (Golotvin A.N.), the graves of the "Second Lipetsk barrow" belong to the burials of aristocratic warriors of the Don-Volga Abashevo culture. Moreover, Golotivin A.N. and Pryakhin A.D. find there some features characteristic for the Catacomb culture (flinty arrowheads, individual elements of knives). The C14 dates allow preliminary dating of the complex to the 3rd-2nd millennia BC. Thus, the burials of the "Second Lipetsk barrow" contained about 10 individuals. We have performed the craniological reconstruction and measured the skulls. Moreover, we have studied the osteological materials, examined the body proportions, calculated the intravital statures (about 170 cm for males and 162 cm for females), estimated the muscular texture (which is well-marked among the males) and revealed stress markers and palaeopathological changes (enamel hypoplasia, dental calculus).

Key words: *palaeoanthropology, craniology, osteology, Abashevo culture*

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FORENSIC GENETIC DATABASES FOR MIXED POULATIONS

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A genetic and demographic study of the Minsk, Moscow and Kharkov populations was performed using questionnaire and census data. Three megalopolises, differing in population size, are characterized by heterogeneous ethnic composition, high migration coefficients ranging from 0.40 to 0.55, long average migration distances (564–921 km) and a high proportions of interethnic marriages (up to 33%) resulting in intensive gene flow between ethnic groups. These populations can therefore be considered as mixed in the genetic and anthropological senses. In samples from the most numerous ethnic groups of the three

megalopolises – Byelorussians of Minsk (N=370), Russians of Moscow (N=205), and Ukrainians of Kharkov (N=115) – comparative analysis was carried out using the frequency distribution of 18 autosomal forensic STR loci (vWA, TH01, TPOX, CSF1PO, D5S818, D7S820, D13S317, D16S539, F13B, D18S51, D8S1179, D21S11, FGA, PentaE, PentaD, D2S1338, D19S433, D3S1758). Hardy-Weinberg equilibrium was demonstrated in all three samples. No significant differentiation was observed in the total loci set, indicating close genetic relationship between the three Eastern Slavic peoples in forensic autosomal STR loci. The three samples demonstrate a low level of genetic differentiation: estimates of genetic distance (Nei, 1978) between the samples lie in the 0.9968–0.9990 interval, and average Fst equals 0.0240 for the 18 loci. The estimates of expected and observed heterozygosity by 18 STR loci are as follows: Byelorussians (Minsk) – He = 0.7942, Ho = 0.7730; Russians (Moscow) – He = 0.7926, Ho = 0.7719 and Ukrainians (Kharkov) – He = 0.7895, Ho = 0.7761. Lower values of observed heterozygosity compared to expected heterozygosity are caused by migration flow within the main ethnic group to the population of the megalopolis from other subdivided populations, demonstrating the Wahlund effect. Peculiarities of genetic and demographic parameters of the three megalopolises are discussed in the context of the problem of forensic genetic databases formation (autosomal STR, mitochondrial and Y chromosome markers) for mixed populations. A more intense male migration suggests more significant dynamics of genetic markers of Y-chromosome, compared to mitochondrial DNA markers. For the forensic genetic database of Minsk it is important that the main migration flow comes from the territory of Belarus and consists of ethnic Byelorussians with low migration from Russia or Ukraine.

Key words: *forensic genetic database, STR loci, megalopolis, mixed population, genetic-demographic parameters, migration, gene flow*

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EARLY MEDIEVAL COPTS OF THE FAYOUM OASIS, EGYPT: AN ANTHROPOLOGICAL STUDY

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This study deals with skeletal remains of the early medieval Copts from the necropolis of Deir el-Naqlun, the Fayoum Oasis, Egypt. That these skeletons and mummified bodies are indeed Coptic follows from the fact that they were found during excavations at the territory of a Coptic monastery and there were some elements of Coptic monastic garments on many of them. The study was performed together with the Center of Egyptological Studies of the Russian Academy of Sciences in 2002. We studied 30 skulls using the standard craniological program. Twenty of them belonged to males and ten to females. The cranial index is average and most male skulls tend to mesocrany. Height indices of the braincase suggest that male skulls are medium high. The facial skeleton of males is relatively narrow (lepten). The orbital index is average and so are nasal dimensions. The horizontal facial profile in males is very sharp, especially at the middle level. Such profiles are characteristic of Caucasoids. The cephalic index characterizes female skulls as mesocranic with a tendency to dolichocrany. According to height indices, they are relatively high. The facial indices suggest that females had relatively narrow faces, high orbits, and average nasal dimensions. Their faces are more sharply profiled than those of males. Postcrania are represented by skeletons of six males and two females and by more than fifty isolated long bones from collective graves. Preliminary studies showed that the average stature of males, calculated after V.V. Bunak's formula, equaled 164.8 cm and that of females, 156.2 cm.

Key word: *physical anthropology, craniology, osteology, Copts, Egypt*

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CLADISTIC ANALYSIS OF ANCIENT ANATOLIAN POPULATIONS: MOUND OF VAN FORTRESS AND KARAGÜNDÜZ SAMPLES

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This study aims to compare craniometric traits of Van-Karagündüz and Mound of Van Fortress (MVF-Christian and MVF-Islamic) populations which lived during the Middle Ages, and to assesss biological relationships between these groups and their affinities with other Anatolian populations. We used 8 measurements (maximum cranial length, maximum cranial breadth, basion-bregma height, porion-bregma height, bizygomatic breadth, upper facial height, nasal height, nasal breadth) and 3 indices (cranial index, upper facial index, nasal index) on crania of 191 skeletons belonging to three populations. SPSS 19 was used for calculating biological distances and for cluster analysis, from which phenograms were derived. Results of cluster analysis separate MVF-Christian and MVF-Islamic populations even though they lived in the same place and at the same time. In addition, we recognized two distinct subgroups within the populations (MVF-Christian and Karagündüz) and (MVF-Islamic and Tepecik). Both subgroups lived in Van. These populations were similar to other contemporary eastern and western Anatolian populations such as Dilkaya, Panaztepe, Datça, Nikolaos, Truva 2. However, they were distinct from Çatalhöyük, Boğazköy, Çayönü, Hisarlık, İznik and even farther from Tilkitepe, Sardis, Alişar and Lidar. The results suggest that contemporaneous groups tend to be closer to one another than chronologically diverse ones.

Key words: *craniometry, Mound of Van Fortress, Karagündüz, ancient Anatolia*

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GENETIC TRACES OF THE TURKIC INFLUENCE IN ARMENIANS AND NEIGHBORING POPULATIONS

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We intended to evaluate the rate of genetic signals from Turkic tribes in the gene pool of various groups of modern Armenians and compare it with the corresponding rate in neighboring populations. The most frequent Y-chromosomal haplogroups in Central Asia were considered as genetic markers of Turkic expansion. The rate of Turkic genetic signal in different territorial groups of Armenians representing almost the whole area of historical Armenia varies in the range of 0–1%, with 0.5% on average for the general population. Comparable rate of Turkic genetic input is also detected in Georgians and non-Turkic speaking ethnic groups of Iran. This level contrasts sharply with that found in other neighboring populations: 6% in modern Turkey, 10–12% in Iranian Azeris, and 10% in Lezgins. These results are consistent with the historical records indicating the main routes of Turkic expansion south of the Caspian Sea and along its western coast. In many cases, the expansion has also resulted in language replacement through the elite dominance model. The virtual lack of Turkic genetic traces observed in Armenians or Georgians as well as the preservation of their language indicates the conservation of their genetic structure despite the centuries of Turkic expansion in southern Caucasus. This genetic evaluation raises questions about the reasons that have impeded genetic contact of Armenians with Turkic tribes. The reason that is most likely a priori is the adoption of Christianity and the formation of a strong ethnic and cultural identity long before the Turkic migration into the region.

Key words: *Armenian population, Turkic expansion, genetic signals*

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DERMATOGLYPHICS OF THE VOLGA-KAMA POPULATIONS: THE ANALYSIS OF VARIATION BETWEEN PHALANGEAL PATTERNS

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This paper analyzes digital dermatoglyphics of the Volga-Kama populations: patterns, bilateral variation, correlation between patterns; also, an attempt was made to investigate the potential of one of the least studied trait systems – patterns on middle and proximal finger phalanges – for group differentiation. The material consists of fingerprints of males from the archives of the Department of Anthropology: Bashkirs, Tatars, Mari, Udmurts (Bashkortostan), Chuvashes (Chuvashia) as well fingerprints of Mordovian and Russian males from southeastern Mordovia (copyright property, A. Yudina, 2013). The total number of individuals is 558. Frequencies of patterns on distal phalanges of the Volga-Kama people are generally typical of Caucasoids. However, the complication of skin relief and an increase in the number of deltas on distal phalanges as well as the accumulation of simple patterns on medial and proximal phalanges may evidence a Mongoloid tendency. The comparison of groups by pattern frequencies on all the three phalanges enabled us to single out populations with a minimal Mongoloid tendency or none at all (Mordovians, Russian), a group with the strongest Mongoloid tendency (Bashkirs), and intermediate groups (Mari, Chuvashes, Tatars, and Udmurts). The first cluster is characterized by the increased share of patterns without orientation on medial and proximal phalanges. The structure of within-group correlations between the traits is similar in all samples. Patterns within each phalangeal system and among the systems show a weak correlation, with rare exceptions. Multiple discriminant analysis, cluster analysis, and multidimensional scaling jointly demonstrate the diagnostic importance of the medial and proximal phalanges, indicating the expedience of their further use along with traditional features in the study of group differentiation.

Key words: *dermatoglyphics; digital phalanges, peoples of the Volga-Kama region*

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Section HUMAN EVOLUTION

ÜÇAĞIZLI CAVE II: MIDDLE PALEOLITHIC ASSEMBLAGES FROM SOUTH-ANATOLIA

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Most scientists agree that modern humans left Africa relatively recently, and it was traditionally thought that the route taken was northwards, overland through the Middle East and beyond. However, there is growing disagreement about the route or routes taken by humans and when they migrated out of Africa. In this article, we will discuss about Middle Paleolithic archaeological evidence from Üçağızlı II Cave in order to assess the timing and geographic origins of Upper Pleistocene human colonization. Üçağızlı Cave II is a Middle Paleolithic locality situated on the Mediterranean coast of south-central Turkey. Üçağızlı II contains higher densities of lithics and bones as well as residues of hearth features, indicating a higher intensity or frequency of human frequentation. The Cave Lithic technology is dominated by Levallois production and hard-hammer percussion used to reduced the cores. All of the layers systematic reducing of the core is considered with mainly unipolar, secondary centripetal Levallois production. Orientation of the production is mainly flakes and scarcely seen blades manufactures. Typological feature is characterized with higher proportion of Levallois flake, Levallois points, Mousterian points, side scrapers types and lower proportion of upper Palaeolithic tool types. Those technological and typological evidence shows the cave is in Levantine Middle Palaeolithic assemblages.

Key words: *Üçağızlı II Cave, Middle Paleolithic, Anatolia, Hatay*

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CRANIAL VAULT MORPHOLOGY OF EASTERN EUROPEAN AND EASTERN SIBERIAN MESOLITHIC POPULATIONS: A COMPARATIVE ANALYSIS

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We carried out a morphometric analysis of cranial vault and upper face in Mesolithic populations of Eastern Europe (Oleniy Ostrov, Zvejnieki, Popovo, Peschanitsa, Vasilievka III, Murzak-Koba, Fatma-Koba). A comparison was made with a newly discovered cranium from Lokomotiv (R-8), Irkutsk, Eastern Siberia. The total number of individuals is 36. Our methods included 3D geometric morphometrics as well as conventional distances. Measurements were taken according to R. Martin. Data were subjected to the principal component analysis. We examined trends of similarity in the neurocranial and upper facial morphology among these individuals. The structure of the upper face is determined by how flat the region immediately below the brow ridges is. Upper facial flatness is usually regarded as a feature differentiating Asian Mongoloids from other populations of the world. However, V. Yakimov (1957, 1960) described the same feature among Upper Palaeolithic and Mesolithic people of Europe. Given that the most ancient individuals from Siberia do not have exceptionally flat upper faces, this characteristic can no longer be regarded as specifically Mongoloid, in keeping with Yakimov's view. Lokomotiv-R-8 cranium was found in 1995. So far this is the earliest complete human skull from Northern Asia, dating to the 7th millennium BC (8690±120 cal. BP, TO-10507). It has very pronounced 'Asian' features in its frontal bone structure. Hence, its comparison with other ancient individuals from Eastern Europe is especially interesting. Results of our multivariate statistical analysis differentiate individuals with

short parietals, short and wide braincase, narrow forehead and large naso-malar angle from those with the opposite trait combination. Although Lokomotiv-R-8 fits within the range of variation of Mesolithic individuals from Eastern Europe, its large naso-malar angle separates it from the rest of the sample in some of the analyses. Surprisingly, Lokomotiv-R-8 reveals affinities with Oleniy Ostrov individuals, whose geographical position is the most distant from Lokomotiv-R-8 within the research area. In conclusion, our results show that upper facial flatness, which is marked among modern Mongoloids, appears among some of the earliest individuals from Russia and Eastern Siberia. However, the patchy geographical distribution of this feature precludes any inferences about its origin and evolution. The study was supported by the Russian Foundation for Basic Research; Grant # 13-06-00045a

Key words: *cranial morphology, craniometry, 3D-morphometry, Mesolithic populations*

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AGGRESSION, THE AR GENE POLYMORPHISM AND REPRODUCTION IN MALES: HADZA AND DATOGA COMPARED

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In this paper we test the association between aggression, AR gene polymorphism and reproductive success as expressed in the number of children born in males from two African societies (Hadza, nomadic foragers) and (Datoga, pastoralists). The data on 439 adult African males (210 Hadza and 229 Datoga males, respectively) were collected between 2007 and 2013 in Northern Tanzania, Lake Eyasi region. Men with lower number of CAG repeats of the AR gene rated themselves as more aggressive. Age and the number of CAG repeats were significant predictors of the number of children born. Men with lower number of CAG repeats started reproduction in earlier age and were generally more successful in reproduction in both ethnics. Men with higher numbers of CAG repeats start to reproduce later in Datoga. Supported by RFHR, # 12-01-00032, RFBR # 12-04-31869 and # 13-04-00858.

Key words: *aggression, androgen receptors gene, reproduction, Hadza, Datoga*

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MOLARS FROM DENISOVA CAVE AND PALEOGENETIC DATA OF A HOMININ FROM SIMA DE LOS HUESOS: PERSPECTIVES OF THE HUMAN EVOLUTION MODELS

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The much more interesting results of new coming investigations for the emergence of Homo sapiens in Eurasia are the mitochondrial and nuclear DNA sequence retrieved from few anthropological samples excavated in Denisova Cave in the Altai Mountains in southern Siberia. The individuals from Denisova cave represent an unknown type of hominin that shares a common ancestor with anatomically modern humans and Neanderthals. While both Denisovan mtDNA sequences from different individuals represent individual archaic hominin lineages, the Denisovan nuclear genome from one of them appears less divergent, forming a sister group with Neanderthals. An almost complete mitochondrial genome sequence of a hominin from Sima de los Huesos (Spain) was quite recently published. The site became famous due to the largest assemblage of Middle Pleistocene hominin fossils dated about 300,000 years ago. According anthropological investigations, the skeletal remains and teeth share a number of morphological features mostly closed to Homo heidelbergensis and also display distinct Neanderthal derived traits. Data of mitochondrial genome sequence of a hominin from Sima de los Huesos show that it is closely related to the lineage leading to mitochondrial genomes of individuals from Denisova cave. Paleogenetics explained that the background of Denisova genome derives from a population that lived before the separation of Neanderthals, Denisovans and modern humans. This component may be present due to gene flow, or to a more complex population history (Krause et al., 2010; Reich et al., 2010; Meyer et al., 2012; 2014). Nowadays odontological studies provide additional criteria for comparing morphological data, because teeth are preserved in greater numbers than are other parts of the skeleton, they are a closer reflection of the genotype, they are more directly affected by the forces of naturals election, and they are easily treated by quantitative methods. The morphological data gave possibility to stress that two upper molars of Denisovans preserved some archaic morphological features, and that is why they are separated from the odontological morphological complex of Homo neanderthalensis and Homo heidelbergensis, both as AMH. In context of genomic data Denisovans received gene flow from a hominin whose ancestors diverged deeply from the lineage leading to Neanderthals, Denisovans and modern humans. Who is this general ancestor of all the taxa? Data on odontology allow assuming that Homo erectus sensu lato can be the most probable applicant for the role. The investigation was done in frame of the Project of RFBR # 13-06-12035.

Key words: *paleolithic, emergence of Homo sapiens in Eurasia, Denisova cave, Neanderthals and Modern Humans*

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THE FIRST MODERNS IN ANATOLIA: ÜÇAĞIZLI CAVE AND ORNAMENT USING

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Üçağızlı Cave is located on the Mediterranean coast in the Hatay Province, about 10 km South of the point where the Asi River empties into the sea. The cave is on a steepslope at about 18 m above the current sea level and was discovered and first investigated in the late 1980s by Angela Minzoni-Deroche. The current excavation began in 1997 and has been led by Prof. Dr. Erksin Savaş Güleç, from the University of Ankara. Two principal cultural components are represented in Üçağızlı Cave. The first, more recent component closely

resembles the Ahmarian complex known from other sites in the Levant. The second, earliest of these, corresponds to the so-called Initial Upper Paleolithic phase. The Initial Upper Paleolithic is considered a technocomplex transitional between Middle and Upper Paleolithic. Paleolithic deposits preserved within Üçağızlı Cave span a period of approximately 12,000 years; Accelerator Mass Spectrometry (AMS) radiocarbon dates indicate ages between 29,000 and 41,000 radiocarbon years (circa 31,000 to 43,000 calendar years). In all layers of the cave abundant amount of shell beads which used as ornaments, have been found. Advanced lithic technology and coordinated ornament use found in the cave indicate the presence of the first modern humans in Anatolia.

Key words: *Anatolia, first moderns, Initial Upper Paleolithic, Upper Paleolithic, ornament using*

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THE THREE LEAPS IN THE HUMAN EVOLUTION

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Human are very special and very different. These are the only living being on earth endeavoring in self investigation. Then one can ask if the evolution processes regarding human are specific to this species only, or not. My answer is “yes”. This species had to experience three consecutive and important leaps before becoming modern human. 1. The Leap of Bipedalism. 6–7 mya as a result of Rift and plateau formation in east Africa, a primate made an adaptive response to that formation. This adaptive response was hunting and gathering food in shallow waters on two legs. This shallow water made a selective pressure on that primate to walk bipedally. 2. The Leap of Mental Overturning. When about 2 mya the body erection reached a certain angle, the embryo made an adaptive response to this vertical body posture. The embryo turned upside down. This is the mental overturning that started the growth of the cranium as well as the brain. 3. The Leap of Mental Threshold. After chasing its enemy, the chimp throws the stick and does not say to itself: “This stick has served me effectively; I better keep it for another occasion”. If the chimp had a brain of 500 cc, would it say: “I better keep this stick and even improve it”. The chimp may not think so with 500 cc brain, not even with a 550 cc or even a 600 cc brain. But there will be a time and a brain capacity that such a thought will occur. I call that point “Mental Threshold”. Once this mental threshold was transcended, the hominid that held a stone in one hand and a stick in the other; had the courage to intrude into the hunting zone of any animal including the worst predator.

Key words: *mentis eversionis, bipedalism, mental overturning, mental threshold, human evolution*

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SIDELKINO. ONE OF THE ASPECTS OF THE FORMATION OF THE DENTAL MORPHOLOGY DIVERSITY IN THE MESOLITHIC

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The lower jaw from the Mesolithic burial ground, Samara region, village Sidelkino, "Gora Mayak" (2001 year's excavations, leaded by archaeologist Dmitry Stashenkov) was studied. mandibular teeth remained constant change, including the third molars. The study of the dental morphology features was conducted according to the russian odontological program (Zubov, 2006). Permanent dentition was present completely, including third molars. The description was divided into grades diagnostically significant for determining the evolutionary status of the specimen, its place in the anthropological intraspecific differentiation. Among archaic features are the following: continuous edge ridge (med-end) on the left LM1, differentiation of the end, hyd, prd on the left LM3, vestibular position of the hld on the left LM1, tami on the right LM1, tuberculum centrale on the right LM3, retromolar space, index of foramen mentale (62.3% – right side of the mandible). Evolutionary progressive features: shallow intertubercular furrows, left LM2 – smooth occlusal surface without additional elements and +4 pattern, 2end (IV) variant on the left LM3, axial position of hld on the left LM1, poor differentiation of LM1 surface, prd> med, the absence of developed cingulum, index of foramen mentale (54% – left side of the mandible), moderate/weak deep of molars' furrows, parallel furrows on the hypoconid of the right LM3. "Western" odontological complex expresses in the following features: pattern "x"5 on LM1, 2med (II), 1hyd (IV), type 1 of the 1med/1prd contact, variant T (1prd-2prd/II), enamel extention score 3 on the LM2, absence of dw, dtc, tami, protostylid / and its pit on some molars. Feature of the «Eastern» odontological complex: pattern "+" on the LM1. Thus, the odontological type of the Sidelkino specimen can be defined as specific to modern humans with a certain level of archaic/dearhaization along with the significant predominance of the evolutionary progressive traits. It belongs to europeoid odontological complex with the manifestation of a single east/mongoloid element. Some metric characteristics of Sidelkino molars bring it together with modern European populations, but according to some archaic metric graduations Sidelkino specimen is associated with the Upper Paleolithic European groups.

Key words: *Sidelkino, Mesolithic, dental anthropology, physical anthropology, human evolution*

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CRANIOFACIAL MORPHOLOGY OF THE CHILD OF STAROSELIE INTO THE POSTNATAL DEVELOPMENTAL CONTEXT OF NEANDERTHALS AND MODERN HUMANS

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This study aims to integrate the child craniofacial morphology of Staroselie into the developmental context of Neanderthals and modern humans. The fossil remains of the child are from the archaeological site of Staroselie, which is not far from town Bakhchisarai (Crimea). The site was excavated by A.A. Formozov in 1952–1956 with the burial exhumed in 1953. The biological age of a child is 1–2 year old. The craniology of the child appeared to show mixed Neanderthal and modern characteristics, and since it was considered to be in situ in a Middle Paleolithic context, the site has attracted considerable international interest since its discovery (Roginskiy, 1954). New excavations were conducted by a joint American-Ukrainian team in 1993–1995. The team was highly critical of Formozov's inexact recording methods. Thus, they stressed that the burial of child

is unquestionably modern dating to the 18th century AD (Alexeeva, 1996). The authors ignored that the radiocarbon dates for cultural levels upper and lower of the burial gave the interval 35,510±1170 – 36,160±1250 BP, because of absent of direct radiocarbon (AMS) dates from the human remains (Gvozdover et al., 1986)]. Morphologically the skull cap is large, there is an absence of a thick brow, and the projection of the head is modern. There is no doubt that the burial of Staroselie is Homo sapiens. The child of Pech de l'Azé is the same biological age as Staroselie one, thus we used both of them to study craniofacial morphology into the context of Neanderthals and modern humans developmental trajectories. The Pech de l'Azé child was first described by Patte and then by Ferembach et al. The geological age of the specimen is 51–41 cal kya BP (Soressi et al., 2006). The individual is similar to other Neanderthals by it craniofacial morphology. Craniofacial morphology analysis is considered as a complex of three anatomically separated modules of neurocranium, face and mandible [Kondo et al., 2005]. We compare growth profiles (changes in size) and allometric relationship of each module for 28 nonadult Neanderthals, 21 nonadult Paleolithic AMH and 470 modern children. Comparative data show the close allometric relationship of Neanderthals and Staroselie child only in neurocranium/face developmental trend. Investigation was done in frame of the grant RFBR 13-06-12035.

Key words: *Paleolithic, Neanderthals, Modern Humans, ontogenesis*

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NEANDERTHALS IN ALTAI HIGHLAND AND THEIR MORPHOLOGICAL PATTERNS

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Neanderthal remains in Altai are identified in locations subdivided by hundreds of kilometers. The purpose of this study is to considertheir postcranial morphological patterns. Okladnikov Cave. Several specimens shared a combination of archaic and unique characteristics. While the totality of postcranial morphological traits suggests that those humans were Neanderthals, certain archaic traits link them with Homo erectus (Mednikova, 2011a). They were least similar to early anatomically modern humans of the Skhul and Qafzeh group and most similar to Near Eastern Neanderthals such as Tabun C1 and partly Shanidar. Denisova Cave. Recently studied high-quality genome sequence of a woman indicated Neanderthal presence in "home cave" of Denisovans (Prufer et al., 2014). The proximal pedal phalanx of DNA owner from Denisova Cave is broad relative to its height (Mednikova, 2011b). This opposes the Denisova individual to most modern members of the genus Homo. The specimen is even broader and more robust than the phalanges of Neanderthals or early modern humans. The extraordinary inner robusticity of that bone was atypical even for many Neanderthals.A distal phalanx of the left (?) hand of Homo, found in level 12 of Denisova Cave in 2011, resembles Neanderthal phalanges in terms of length, width of apical tuft, and relative flattening, differing from them by a somewhat greater transversal hypertrophy of the shaft (Mednikova, 2013a). Recent finds from Chagyrskaya cave were more "Neanderthal-like". E.g., based on dimensions, proportions, pathological changes, and indicators of habitual activity of ulnaits owner was apparently a Neanderthal – a robust male similar to certain Near Eastern Neanderthals such as Shanidar (Mednikova, 2013b). Altai caves became homeland for Neanderthals who seemed to be various from morphological point of view. The results can reflect different waves of Neanderthal migration or/and different level of hybridization with another inhabitants of Central Asia, like Denisovans. The study was supported by RFBR ofi-m 13-06-1224.

Key words: *Altai Neanderhals, postcranial morphology, Chagyrskaya, Okladnikov, Denisova caves*

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GENDER PECULARITIES OF HUMAN POPULATIONS

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Analysis of the chromosomes on archeological material has shown that the X chromosome is roughly 80 000 years older than the Y chromosome. Thus it turns out that the male sex chromosome appeared later than the X chromosome.The most widespread model of the origin of the Y chromosome is from the autosome (a nonsexual chromosome). As a result, the X and Y chromosome don‘t recombine correctly and this leads to the degradation of the Y chromosome. Some researchers have concluded that the period when there was no Y chromosome yet mankind was made up of only women. However there were different categories of women: the usual normal women who had children, but also hermaphrodites with female phenotypes. Men developed from the latter category of women. One of the X chromosomes gradually lost fragments and turned into a Y chromosome containing less than 100 genes.It has been found out that a polluted environment especially affects the Y chromosome.There are fewer and fewer normal men. There is a female illness that the doctors call prolapsus of the uterus. We think that this isn't an illness but a stage of evolution when women begin to acquire male signs. The existence of hermaphroditic people in ancient times is confirmed by the analysis if several drawing in which people with female breasts and a male sex organs are depicted. The degradation of the Y chromosome is bringing about the modification of the male gender. Because of the degradation of the Y chromosome the number of boys being born may go down.

Key words: *human populations, gender peculiarities, origin of Y-chromosome*

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STUDY OF THE VARIATION OF THE DEGREES OF SUPRAORBITAL RIDGE EXPRESSION IN ADULT HOMO SAPIENS

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A large sample of human crania, which included geographically different populations, was examined (adult individuals only). The grades of supraorbital ridge (ST) expression were assessed – separately in the male and female cranial samples – using a quality scoring scale (from 1 to 4 – from the lowest degree of ST development to the highest degree of ST development). Several metric traits describing the shape and size of the whole neurocranium and the shape of the frontal bone were also collected. Canonical variate analyses were used to establish the sets of variables that best discriminate the groups of ST grades in the cranial samples analyzed, and also to determine which of those variables most strongly differentiated the groups of ST grades. The results indicated that the same set of variables most discriminated the groups of ST grades in both the female and male samples, and they also strongly suggest that the size and shape of the neurocranium influence the ST degree of development. However, in the case of the female cranial sample, the most discriminating variables were the size of the cranium and angle describing the shape of the frontal bone, while in the case of the male cranial sample, the most discriminating variable appeared to be the relative breadth of the cranial vault. The results of this study add some important data to the disscusion of the relationship between the morphology of the neurocranium and the variation in the grades of supraorbital region development in Homo sapiens crania.

Key words: *supraorbital ridge development, canonical variates analyses, neurocranium*

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Section HUMANS and ENVIRONMENT

DEMOGRAPHIC PROFILE OF THE GOLDEN HORDE CITY AZAC'S POPULATION

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In total from the Azac's necropolis (the territory of current Azov) 814 skeletons containing 263 male ones, 260 female ones and 268 children's (32.3%, 31.9%, 32.9%) were researched. Besides the research of the summary samples, comparative analysis of the bone material was carried out, the data was taken from different parts of the necropolis that were differentiated by territory, by rites or by peculiarities of a burial (mass graves). The examined samples demonstrate differences not only in the anthropological content but also in paleodemographic and paleopathological aspects. Specific features of the analyzed group were mostly connected with the level of people's well being, professional occupation as well as with the existing rites and gender roles. Among the examined Golden Horde samples, the wealthiest one appears to be a group that was in a possession of the central part of the Azac's necropolis and of the part on the current territory of Moskovskaya street, 95. The central necropolis was covering the richest districts during the whole time the city existed. The burial ground in Moskovskaya str. stands out among other Azac's necropolises due to its specific features of rites and abundance of tools. These groups have the highest ratings of average lifespan and relatively low percentage of episodic stress markers. It should be noted that these groups differed in the types of traumatism in males and apparently in the quality of life for females. In the central burial ground (and only there) there were recorded intravital combat skull traumas, and for the male burials in Moskovskaya str. multiple traumas to the top part of the skull are characteristic. The rate of episodic stress markers and traumatism in female burials in the central burial ground is significantly higher than in the Moskovskaya's burial ground, but the lifespan is shorter.

Key word: *Golden Horde, Azac, peculiar parts of the necropolis, paleodemography*

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BRONZE AGE FAUNA FROM SALAT TEPE, SOUTH EAST ANATOLIA: COMPARISONS WITH FAUNA FROM UPPER TIGRIS REGION

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This article is mainly concentrated on the changes or continuity in patterns of animal exploitation over time. Salat Tepe is 30 km to the west of Batman in the modern town of Yukarı Salat, ca. 90 km to the east of the provincial center of Diyarbakır and ca. 5 km to the north of the Tigris River. The Upper Tigris Region will be flooded by the lake which will be formed by the Ilısu Dam, thus, it is important to study the animal bones assemblages in order to complete missing information before the dam reservoirs would begin to fill with water. Salat Tepe is a multi-period site and only Bronze Age materials were evaluated in this article. This study addresses the question how faunal remains could add to our understanding of the social and economic organization of the region. In this article the faunal data from several archaeological sites were used, situated in Southeast Anatolia Region and Northern Syria. General view of a faunal assemblage in the Bronze Age indicates occurrence of shift in exploitation across the region throughout the periods, especially for the faunal remains from Southeast Anatolia and Northern Syria. Therefore, faunal analysis is essential to the understanding of both local and regional dietary strategies spanning a Bronze Age and contributes to interpretation of human-animal interaction within the period.

Key words: Salat Tepe, animal bones, zooarchaeology, Bronze Age, South-East Anatolia

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ISOTOPIC AND ELEMENTAL ANALYSIS DATA FOR THE RECONSTRUCTION OF THE MOBILITY OF THE BRONZE AGE STEPPE SOCIETIES

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Study of the lifestyle of the most ancient of pastoralists from skeletal evidence is the important direction in anthropology. Isotopic and elemental studies allow reconstructing the landscape and climatic characteristics of human environment. Importantly, these analyzes allow the options to obtain individual characteristics describing the living space of human or animal specific past, and in certain cases - even during their lifetime. The stable isotope ratio 13/12C and 15/13N of bone tissue collagen of humans and animals is used to determine the main components of everyday diet. 87/86Sr (strontium) in biological objects reflects the local geological rocks and is used to identify indigenous and immigrant individuals. Values of the standard deviations for isotopic parameters for the twelve groups of buried mounds from the Northern Caucasus area were calculated. Minimum values were determined for a group of sedentary population of the Early Bronze Age burials of Velikent (0.23). Maximum values were obtained (1.3 - 1.4) for the Early Catacomb groups of burials (Peschany, Temrta). Thus, the statistical analysis suggests that during the arid periods the population could take over large areas. Obviously, in the more arid pastures biological productivity was low, and pastoralism provoked large-scale seasonal migrations. So isotopic indicators show regions of considerable stability in seasonal nomadic populations associated with the culture of the Early - Early Middle Bronze Age, as well as the significant impact of climate change on the expansion of pastureland. The study was supported by RFBR, grant # 13-06-00792.

Key words: *Bronze Age, South Russia steppes, mobile population, paleodiets, stable isotopes, strontium isotopes*

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RUSSIAN FEDERATION POPULATION DECLINE

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In demographic processes whose principal characteristics are birthrate decrease and mortality growth, sharp shifts have been noted in the Russian Federation starting from the 1990's. Mortality grew from 10.4‰ to 15‰ in 1986–1994. The birthrate fell from 2 to 1.3 children in 1987–1993. The mortality reached to 1.807.400 people in 1992, with the birthrate falling to 1.587.600 people. The process of depopulation which was called "the Russian cross" began. Nearly 2 million people died annually in the country according to the official data of the Russian Federal State Statistics Service in 1993–2013. A special and a very serious problem is a middle-aged men mortality that is 7–8 times higher, than in the developed countries. The present study considers some social-economic and ecological processes, which promoted the growth of negative indicators in the population dynamics. We compared the mortality and decline of the population in different regions of Russia and showed that there is a correlation between alcohol mortality and decrease of population. A confessional factor is very important also. The mortality rate is far below the average for the country in those territories of Russia, where the population is predominantly Muslim. The demographic transition in Russia is characterized not only by a drop in fertility, as in the other developed countries, but also by increase in mortality. The mortality is a real indicator of the socio-economic and demographic situation for this or that region of Russia and it should be used by the authorities of different levels for the development of the area.

Key words: *population decline, life expectancy, dynamics of mortality, birth rate, adaptation, Russia*

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SECULAR CHANGES IN MORPHOLOGICAL STATUS OF THE ABKHAZIANS FOR THE LAST 30 YEARS

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The paper presents the results of anthropological studies of the adult Abkhazian population (aged 20 to 90 years old) of three villages for 30 years. The data were collected in 1980, 1990 and 2010. Secular changes of stature were examined in the pooled data. The results show that Abkhazians, born between 1920 and 1990, reveal the existence of secular trend in stature, with the rate of 0.24 cm for men and 0.85 cm for women for each decade. Secular dynamics of stature for men is not even, whereas for women - it is a gradual increase over the entire historical period. Maximal average values are found in women born in 1981-1990. For men, minimal average values of stature are found for those born in 1931–1940, as a consequence of a difficult period of social upheaval (collectivization, purges, the Great Patriotic War), maximal values - for those born in 1961–1970, as a result of the acceleration process. Men born in 1981–1990 are characterized by a slight decrease in their height as a result of the unfavorable growth conditions in the 1990's. Analysis of the distribution of individual values for stature indicates the continuation of acceleration process and its stabilization for women. Comparative analysis of the skinfolds in the Abkhazians of different generations was also performed, and body mass components (subcutaneous fat and total body fat) were calculated with J. Matiegka's equations. The findings show a marked increase in the skinfold thickness (subscapular, chest, abdominal) in men and women of the 2010 survey, as well as high rates of age-related changes in these traits. The same is true for the fat mass. With each subsequent survey, the younger generation of the Abkhazians is characterized by weaker physical development as demonstrated by hand grip strength. The results of the study show that environmental factors have a strong effect on the physical status of the genetically stable population of rural Abkhazians. In the former longevity population of Abkhazians there is a trend towards acceleration of the age-related changes. This may be explained by the unfavorable socioeconomic processes of the 1990's in Abkhazia.

Key words: *physical anthropology, stature, body weight, body-mass index (BMI), fat mass, secular trend, age changes*

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VITAMIN D STATUS IN NORTHERN INDIGENOUS PEOPLE OF RUSSIA LEADING TRADITIONAL AND "MODERNIZED" WAY OF LIFE

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Vitamin D status in the groups of Northern indigenous people of Russia leading close to traditional (semi-nomadic reindeer herding), post-traditional (in settlements) or "modernized" (in towns) way of life was analyzed. The study groups consisted of 328 Nenets and Komi aged 18-60 years living in the Arctic (66-67ºN). Urban Komi (n=101) living in non-Arctic area (57-61ºN) formed a control group. The concentration of serum 25OHD, as a transport form of vitamin D, was assessed by the enzyme immunoassay analysis. The group average 25OHD levels in both rural and urban Arctic residents are within the range of the values seen in the non-Arctic urban subjects adjusted for season: 39.7- 47.7 nmol/l. Abandoning traditional lifestyle associates with lower vitamin D levels in the Indigenous Arctic people. Mean ± standard deviation of 25OHD values among Nenets were lower in those living in the administrative center (a big settlement) with a population of 1460 (32.2±12.90 nmol/l) than in the residents of small settlements (39.6±14.08 nmol/l), and in reindeer herders (42.4±13.45 nmol/l). Komi people living in towns had lower 25OHD concentrations (47.7±12.00 nmol/l) than Komi reindeer herders (68.7±25.20). The transition from semi-nomadic to post-traditional and "modernized" way of life has

lead to a decrease in consuming traditional foods among the indigenous people of the Russian Arctic. Our data support the notion that the traditional northern diet promotes healthy vitamin D levels, while adherence to the "western" type of diet correlates with a lower 25OHD concentration. Supported by 026-F grant of the Perm State Pedagogical University.

Key words: *nutrition, lifestyle, vitamin D, 25OHD, indigenous people, circumpolar regions, Arctic*

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TO THE BIOARCHAEOLOGY OF CHILDREN'S BURIALS FROM GONUR-DEPE BRONZE AGE SITE, TURKMENISTAN

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The aim of this communication is to discuss the results of bioarchaeological investigations of the remains from Gonur-depe tombs, where sub-adult human beings were buried. Gonur-depe is a well-known Bactria-Margiana archaeological complex site (Southern Turkmenistan, III–II mill. BC). The skeletal remains of 37 individuals received from 36 tombs in 2009–2010 excavation are analyzed. The sample has such an age structure: 8.3% belongs to the fetus and newborns, 30.6% - to children less than 1 year, 30.6% - to 1–3 year-olds, 8.3% - to 4–6 year-olds, 11.1% - to 7–9 year-olds, 8.3% - to 10–12 year-olds and 2.8% - to 12–15 year-olds. Cribra orbitalia was the most common stress marker. Distribution of this indicator shows significant differences between the infantilis I and infantilis II age subgroups. Variability of the long bones was considered separately for each age interval. Deviations from the M. Maresh standards were calculated by dividing the individual values of the parameter to the age standard ones. Individual deviations from the age standards vary in the range of 0.73–1.02 (average value – 0.90). Proximal segments of the extremities reveal a greater delay in growth rather than the distal ones. The infants aged 0.2–2 years demonstrate the smallest "lag" from age standards of longitudinal growth rates. Primary distal growth in the sub-adult sample is connected with the dolicho- and mesomorphic types of body proportions (relatively elongated forearm and calf). Overall, the results of bioarchaeological research of the sub-adult burials from Gonur-depe confirm once more the thesis about good adaptation of this ancient group to the local environmental conditions and show that main body proportions of the adaptive types according to Tatyana Alexeeva (in this case – the Arid one) are formed in the early childhood. The investigations are supported by the Russian Fund for Basic Research (project 13-06-00233a).

Key words: *bioarchaeology, children's burials, Arid adaptive type, Turkmenistan, Bronze Age*

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CROW'S INDICES OF DIFFERENTIAL FERTILITY IN RUSSIA'S TWO LARGEST CITIES: INTERETHNIC VARIATION AND SECULAR TRENDS

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Using Russia's 2002 census data, population replacement parameters and Crow's indices of the opportunity for selection have been analyzed in Moscow and St.-Petersburg in 7 cohorts of females with completed fertility (years of birth from the early 20th century till 1962). During the whole time period, average number of births per female (kav) in 5 ethnic groups under study (Russians, Ukrainians, Byelorussians, Tatars and Jews) was less than 2, that is not enough even for simple population replacement. In female 1953–1957 birth cohort kav varies from 1.33 (Jews) to 1.61 (Tatars). Proportion of infertile females (having no births) in two megalopolises is considerably larger (up to 20% in the senior age cohorts) than in populations with traditional culture. Selection component due to differential fertility (If) was high in female cohorts born before the 2nd

World War, and later kept stable at 0.3–0.4, mostly due to relative stabilization of interfamily variation in fertility (family planning and birth control, predominantly by means of medical abortions). Component due to differential prereproductive mortality, Im, has shown a 50-fold decrease during the 20th century as a result of social progress and improvements in medical care, and nowadays attained negligible values (<0.03). It means that in these urban populations process of selection relaxation, with respect to both components – If and Im, has been almost completed. An important predictable consequence of selection relaxation is an increase of population genetic load, which implies further development of genetic counseling. Intensity of intergroup selection (based on interethnic variation in birth rates within each megalopolis), is many times lower than that of intragroup selection (interfamily variation), and also tends to decrease, presumably, as a result of demographic transition – changes of migrant's reproductive behaviour in urban environment. Judging by 1926 census data, at that time interethnic differentials in vital statistics in Moscow were much more significant than now, and almost all ethnic groups demonstrated a positive natural increase.

Key words: *Crow's indices, fertility, mortality, selection relaxation, urban populations, interethnic differentials*

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COMPARATIVE ANALYSIS OF PHYSICAL DEVELOPMENT OF SCHOOLCHILDREN FROM DIFFERENT COUNTRIES

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Comparative analysis of the main indices of physical development of children, teen-agers and youth at the age of 7–17 years from Belarus, Russia, Poland, Serbia, Bulgaria and Estonia was performed. All samples were examined in the late 1990's – early 2000's. Through decades and from one generation to another, changes in physical development of children and youth, in different territorial and ethnic groups are important to study. In Belarus, studies of children and youth physical development were conducted by the team of the Department of Anthropology and Ecology, Institute of History, National Academy of Sciences, from the beginning of 1980's till the beginning of the 21st century. Studies in Belarus were held in different parts of the Republic. Total number of the examined was 5744 persons (2900 males, and 2844 females). It was shown that the positive secular trend was going on in the populations of towns and villages in the 1990's, and that urbanization is an important factor influencing the age of puberty. The study also demonstrated local variations in growth patterns under extreme environmental conditions, and exposed different growth rates in Belarusian schoolchildren at the age period from 7-17 years. Annual growth rates in stature have been also analyzed in schoolchildren from different countries. On the whole, the variations of main physical parameters in children and youth showed similarities and differences in the examined ethno-territorial groups. Belarusian children of both sexes showed closest tendencies in growth dynamics with Russians and Poles, and boys also with Bulgarians. The tallest children are Serbians and Estonians. As in the case with height, Belarusian children of both sexes are similar in body weight to the Russians and Poles. Similar to height, the biggest differences are seen between Belarusian and Estonian children. According to the rates of growth, Belarusian children of 7 to17 years old are similar to the other ethno-territorial groups, as maximal growth and weight gain is seen in similar age periods.

Key words: *physical development, schoolchildren, comparative analysis, ethno-territorial groups*

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HEALTH AND REPRODUCTIVE PROBLEMS IN BELARUS POPULATION (ANTHROPOLOGICAL VIEW)

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Health is a great value for every human and society as well. Knowledge of health is multidisciplinary, and takes a great part in different areas of contemporary science. This knowledge concerns not just medicine, but the range of biological and humanitarian sciences, including demography, psychology, sociology, and ecology as well. Anthropology is in the front row as a science, integrating biological and social knowledge about humans. Anthropology also covers the complex mechanisms in health support by adaptation, homeostasis. It also uses data of somatotype, physiology and biochemistry. Methods of health quantitative evaluation were produced by anthropology on the basis of those criteria. Anthropological researches of Belarusian population health status are held through decades by the staff of the Department of Anthropology and Ecology, Institute of History, NAS of Belarus. Relevance of those studies even increased after the Chernobyl disaster, which had a substantial influence on the economics as well as on individual and public health. State and national efforts were directed to minimize the effects of Chernobyl disaster through the 25-year period, past after it. Radioactive nuclides contamination of the territory was registered in every region. But Gomel, Mogilev and Brest regions suffered most. A number of 2402 settlements, with 1,141,272 inhabitants are now situated in the zones of radioactive contamination. Environmental damage has its negative influence on health and biological status of the population. It caused local changes in morbidity situation, physical development and processes of growth in children. Health decline is marked in the last decades as is evidenced by increasing morbidity in children and teen-agers, illnesses in newborns, reproductive health decline. That contributes to negative population growth. Difference in male and female lifespan also shows poor health state of the population, which is 12 years in the Republic. A new national Belarusian demographic security program for 2011–2015 was approved in the context of public and individual health decline.

Key words: *health, physical development, ability, morbidity, life span*

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THE RELATION BETWEEN NEWBORNS' BODY WEIGHT, POPULATION INCOME AND NUTRITION IN RUSSIAN REGIONAL STATISTICS

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We analyzed regional average body weight at birth, monetary income and food related data in 42 regions of the Russian Federation for the period 2006–2010. The regional statistics were obtained from the database of the Social Insurance Fund of the Russian Federation (annual average body weight at birth), and the Federal State Statistics Service (income and food related data). The regions where the percentage of ethnic Russians exceeded 85% were chosen to participate in the study. Despite the economic indicators (monetary income, level of inflation and total food expenditure) and food composition had been changing during the study period, the national average weight at birth had remained stable. The regional statistics do not reveal any connection of birth weight with either per-capita monetary income, total calorie intake, or the daily consumption of each of the major nutrients. We suppose, that is natural under the conditions when dietary energy supply is sufficient in general. Birth weight, however, significantly correlates ($p < 0.05$) to the proportion of the animal-derived proteins, fats and dietary energy ($r = 0.52$, 0.4 and 0.5, respectively). The fact testifies that, even when caloric intake is sufficient, the quality of nutrition, and in particular, the proportion of foods of animal origin, is essential for the status of the newborn. Supported by 026-F grant of the Perm State Pedagogical University.

Key words: birth weight, income, nutrition, diet, animal-derived foods

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EATING HABITS OF TEACHER CANDIDATES

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Apart from parents, teachers have a determining role in forming students' attitude to health. Consequently, creating and forming a health attitude that meet modern principles has to have a great emphasis in teacher training. The research includes measuring body composition, evaluating results and consultation of first-year students of primary, pre-school and nursery education. Our aim is to screen students belonging to a risk group because of their nourishment. After investigating the students' family relationships, we had a questionnaire about their family anamnesis, health status, eating habits and free time activities. Their physical status was examined by the In Body 720 body composition analyzer. The survey sample is 820 female students. With the semi-longitudinal survey we tried to find out whether students belonging to the risk group accepted our advice and changed their lifestyle. Their different physical status would prove that during their second examination, two years after the first one. The health status of the students is estimated, including their self-evaluation about their body shape, their nutritional habits, fitness index, obesity diagnosis, the relationship between parents' education level and students' nutritional status, and correlation between parents' and students' BMI. The practical relevance of our survey is that the possible positive change in students' health comportment attitude will have a good effect on the lifestyle of the future generations.

Key words: *BMI, healthy lifestyle, obesity, In Body 720 body composition analyzer*

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A CASE STUDY OF HOMO SAPIENS MANDIBLE VARIABILITY IN CONNECTION WITH HABITAT

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Intraspecific variability of a modern human mandible was determined using a principal component analysis following by a varimax rotation. Individual standardized data for the following series were included in the analysis: Eskimo from Ekven, 4-7 centuries AD, – 61 jaws; Eskimo from Naukan, 19-20 centuries AD, – 23 jaws; Anglo-Saxon from Dunstable, 5-6 centiries AD, – 40 jaws (Dingwall, Yaung, 1933); Ancient Egyptian series, IX dynasty, – 37 jaws (Woo, 1930); series of Badari culture, Egypt, 5-3 centuries BC, – 32 jaws (Stossiger, 1927); Hokiens, southeast China, early 20 century, – 38 jaws (Harrower, 1928); Hylams, island Hainan, China, – 39 jaws (Harrower, 1928); Tamils, India and Ceylon, – 33 jaws (Harrower, 1928). During the analysis three principle components (PC-1, 2, 3) were determined. The first PC describes the overall size of a bone and is not associated with angular dimensions. PC-2 characterizes the variability of a mandibular angle (M-79) and a height of branches (M-70). PC-3 strongly correlates with a height of a symphysis (M-69) and an angle of a chin protrusion (<C'). We found that the Eskimo series have the largest jaws, while the bones from the ancient Egypt and the Tamils series are the smallest. By this we show that PC-1 reveals the presence of ecological gradient on the mandible dimension. We discovered that a mandibular angle and a height of branches are related negatively, therefore jaws with a vertically oriented high branch occupy the maximum values pole and jaws with short inclined branch are in the minimum values region. The first group of the jaws pertains to Anglo-Saxons; the other one is typical to Eskimo from Ekven. Hylams' jaws show the maximum variability along the PC-1 and PC-2. From the PC-3 we obtain that the greater the angle of a chin, the higher the symphysis is, and vice versa. Jaws of Eskimo and Hokiens have the highest chin, the jaws of Tamils, Anglo-Saxons and Hylams are low and protrusive. On the plot below we show an individual value of PC for each of the mandible. Jaws of the Eskimo take up a marginal position in all PC. This is related, probably, to extreme conditions of their habitat. Hokiens' jaws are the most morphologically similar to the Eskimos series. Opposite poles of the PC are occupied by different Caucasoid series.

Key words: *craniology, mandible, Homo sapiens, environment, principal components method*

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THE ANALYSIS OF METHODS OF GENDER DIMORPHISM ASSESSMENT BY EXAMPLE OF ADULT BELARUSSIAN POPULATION

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According to the hypothesis widely spread in the scientific literature, the male sex is more sensitive to unfavorable influences of exogenous and endogenous factors. For confirmation of this hypothesis, a lot of works is devoted to the analysis of the degree of gender dimorphism. Parameters used for the assessment of the degree of gender dimorphism are often interchangeable and demonstrate certain limitations in practice. Thus, it is important to compare different methods of assessment in order to reveal the most convenient/informative parameters. We chose four different indices from the most frequently used ones in the studies aimed at the investigation of gender dimorphism. Namely: coefficient of gender dimorphism (GDC), t-criterion, D-index and Kolmogorov-Smirnov criterion (K-S). A sample from a native Belorussian population described in the 1970's served as a study material. The data were accumulated in accordance with the complex anthropometric program. We distributed all examined subjects in three age groups. All four indices were calculated for separated parameters in each age-specific category. All assessment methods have demonstrated age-dependent increase of the degree of gender dimorphism in case of circumferential parameters. The most prominent differences in the degree of gender dimorphism between age-specific cohorts have been revealed for signs connected with fat development. The degree of gender dimorphism on these parameters increases significantly in the senior age group. Based on the results of the our study, the following conclusions can be made: 1. The t-criterion is different from the GDC criterion by the multiplication factor connected with the sample size, and it is not suitable for comparison of groups differing in the number of subjects; 2. In case the curve of theoretical distribution is incorrect, a calculated value of D-criterion does not correspond to empirical data. 3. Among all the studied methods, the most universal parameters of gender dimorphism are the GDC and K-S.

Key words: *anthropometry, gender dimorphism, coefficient of gender dimorphism, D-index*

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Section MISCELLANEOUS

ASSOCIATIONS BETWEEN SOME FEATURES OF MORPHOLOGY AND PSYCHOLOGY AS THE GENERAL ANTHROPOLOGICAL CHARACTERISTIC OF THE GROUP

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In this work, data on correlations between anthropometric and psychological features in four samples are compared: 1) Moscow high school students (25 boys and 50 girls at the age of 16 - 17); 2) Chinese students studying in Moscow (24 boys aged 19 to 27); 3) the students from different countries of the Peoples Friendship University of Russia – PFUR (15 boys aged 21 to 31 and 10 girls aged 21 to 24); 4) the elderly women from one of the villages of the Ryazan region (27 women aged 41 to 85). It is revealed that the trends of associations between somatic and psychological features in the studied samples vary considerably. For high school students and for students from China significant negative correlations between absolute body size and self-esteem were found, but the reasons for such associations in both samples are different. Foreign students studying in the PFUR, in contrast, are demonstrating a positive relationship between high self-esteem, body length, body weight and BMI. In the sample of the elderly Russian women links between self-esteem and somatic features are not detected. In two samples gender differences in the level and direction of morphological and psychological ties were also detected. It can be assumed that the associations between somatic features and self-esteem largely depend on the ethnicity, age and gender and can be considered as an important general characteristic in the anthropological description of a particular group.

Key words: *somatic and psychological features, trends of associations, gender differences, self-esteem*

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ANTHROPOLOGICAL MUSEUM OF MOSCOW STATE UNIVERSITY AND HUMAN DIVERSITY IN ITS COLLECTIONS

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Last year we marked the 130th anniversary of the Museum of Anthropology. The idea of its creation belongs to a famous Russian scientist – zoologist and anthropologist A.P.Bogdanov. He devoted 20 years of his life to overcome difficulties, connected with the organization of the Museum. First, he established the Society of Amateurs of Natural history, Anthropology and Ethnography in 1864, then - three exhibitions – Ethnographical (1869), Polytechnic (1872) and Anthropological (1879). The key goals of the latter were to acquaint society with essential natural principles of anthropology, to establish Anthropological museum and to obtain studying materials for the chair of anthropology. The materials of this exhibition formed the founding collection of the Museum of Anthropology. The collection united paleoanthropological, archaeological and ethnographical objects, to serve as a base for studying ancient history of mankind. The Museum opened its doors in 1883 and D.N.Anuchin became its director and main implementator of the Bogadanov's idea. He continued to hold office for 40 years and created curatorial departments that remained unchanged till nowadays. They are: Morphology and Human Evolution, Paleoanthropology, Archaeology, Ethnography and Illustrations. The department of Morphology and Human Evolution possesses originals and copies of fossil discoveries of ancient humans

across the territory of Russia and neighbouring countries (Teshik-Tash, Staroselie, Afontova Gora etc.). There are high-class copies of the main fossil hominids from Africa, Europe, Asia, skeletons and stuffed models of modern primates also. The department of Paleoanthropology unites the collections of skulls and skeletons from Upper Paleolithic to 17-18th centuries across the territory of our country. The collections of Archaeological department embrace the whole history of mankind from prehistoric past to the Slavic antiquities, including ivory figurines from the Avdeevo site. The department of Ethnography houses the collections from Africa, the Americas, the Pacific and Siberia that were gathered in the second half of the 19th century and demonstrates native cultures at the period of the first contacts with Europeans. The department of Illustrations contains photos, glass negatives, drawings, death masks and busts of the peoples from different parts of the Earth, including pencil drawings of the famous Russian scientist N.N. Miklukha-Maklay, made during his voyage to the New Guinea. The collections of the Museum of Anthropology are deeply involved in the research process, serving as a base for preparing scientific articles, term papers, diplomas and theses.

Key words: *anthropology, museum, museology, history, collections*

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ANTHROPOLOGICAL METHODS AS A WAY TO ANALYZE THE ART IMAGE OF ANCIENT GREEK SCULPTURE

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Ancient sculpture is one of the best examined objects in the world culture so it can be used for the verification of some hypothesis in anthropology and art history. Applying of anthropological methods to analyze art objects creates a new methodology and reveals tendencies in the evolution of the image. The essential distinctions between the archaic and classical images in spite of the paradigm of the anthropological type stability lead to the search of the reasons for such considerable differences. The purpose of this study is to detach the anthropological content from its ideal content determined mostly by the canon of proportions. The author's photos of ancient sculptures and the archaic sculptures photographs by Gisela Richter are used. Such characteristics as height and width proportions of faces, size and disposition of the eyes, lips and nose were subjected to statistical analysis. The anthropological methods denote the typological features of different periods. The differences between the archaic and classic sculptures appear in the inclination of the eyes, in face proportions, and lips thickness. The variability of the facial proportions in archaic period is higher due to the lack of the canon. The differences between the facial proportions of two periods are the result of the proportional schemes evolution. The study allows us to mark out the characteristics of the image related to the proportions regulated by the canon from real anthropological features such as a structure of the periorbital area and facial horizontal profile. The stability of the reproduction of these features through time and space suggests the influence of real anthropological environment on the images. The change of the image in the VI-V cc. BC presumably reflects the change of the anthropological type, which took place in the remote past. In art this change became apparent later. The study of the faces of sculptures reveals the proportional similarity of the Palmyra funerary sculpture and the Greek archaic images. However, the structure of the periorbital area of these two groups differ which can probably be explained by the differences between the anthropological types of the population.

Key words: *ancient Greek sculpture, face proportions, evolution of art image*

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ROMAN MEDICINE VS. CRANIAL SURGERY OF THE BARBARS

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Surgical trephination is a tradition known worldwide and it has been practiced since the Upper Paleolithic. Its earliest written evidence dates back to the ancient Egypt. Mostly as a method of wound treatment, surgical trephination was also known in ancient Europe following the works of Hippocrates, Celsus, Heliodorus and Galenus. Despite the written sources and the abundance of bioarcheological remains from the era, very few trephined skulls have been unearthed so far from the territory of the Roman Empire. More than 130 surgically trephined skulls have come to light in the territory of today's Hungary. The earliest evidence derives from the Neolithic. The history of Hungarian trephination research was discussed in details in the works of Lajos Bartucz (1966), Tamás Grynaeus (1996), Péter Tomka (2000) and László Józsa and Erzsébet Fóthi (2007), but none of these works cite any Roman relics from the province of Pannonia (today Western Hungary). A recently published article (Tóth-Kiss, 2008) describes a possible case of surgical trephination from the Roman Age, but the evidence introduced in the paper better corresponds to the diagnosis of enlarged parietal foraminae. However, earlier publications have already mentioned 3 cases from Barbaricum, the Sarmatian territory partly enclosed by Roman provinces (today Eastern Hungary). 3 other Sarmatian cases of surgical trephination have also come to light during the excavations and the osteological research of the last decade. The authors wish to give a detailed description of these 6 Sarmatian cases, compare them with accessible evidence of Roman trephinations from other imperial territories, and put forward a possible explanation of the controversy between the written resources and the osteological evidence.

Key words: *surgical trephination, Roman Age, Sarmatians, Hungary, paleopathology, cranial surgery*

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PREDICTORS OF ACCEPTANCE OF EVOLUTION IN MILWAUKEE, WI, USA

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Recent research indicates that less than half of American agree with the idea that modern humans are the result of evolutionary processes that shape the biological world. Most attribute the lack of belief in evolution in the U.S. to religious fundamentalism. In fact, acceptance of evolution has been shown to vary inversely with the importance of religion across countries, but these results have not controlled for other factors such as economic development and education. To explore the role of religion in the acceptance of evolutionary more deeply, we surveyed visitors to the Milwaukee Public Museum during summer 2013. Information was collected on education levels, religious affiliation and practice, and familiarity with concepts of human evolution. Acceptance of evolution was assessed using the Measure of Acceptance of the Theory of Evolution (MATE) instrument, a twenty-item Likert-scaled questionnaire. Based on a total of 259 questionnaires, we found that neither religious denomination nor frequency of church attendance were related to educational attainment. Now was religious denomination related to knowledge of evolutionary terms. Christian affiliation was associated with lower acceptance of evolution, with nondenominational Christians showing the lowest level of acceptance. In a multivariate model, knowledge of evolutionary terms was predicted by both education and religious denomination. Acceptance of evolution was predicted by education, religious denomination, frequency of church attendance and knowledge of evolutionary terms. Our results are consistent with previous findings in U.S. samples demonstrating religious denomination, religiosity and education as predictors of evolutionary acceptance among adults. In addition, they confirm our hypothesis that religion and education represent largely distinct pathways in the acceptance of evolution. The major impact of religious denomination is on the acceptance, not knowledge of, evolution. These results focus attention on understanding what processes al-

low religious fundamentalists to block the conversion of knowledge about evolution into evolutionary belief. In addition, they raise a larger cultural question about the predictors of evolution acceptance in countries where evolution is more accepted. Is education level the only predictor or do factors such political conservatism and personality differences play the role that religious fundamentalism plays in the U.S.?

Key words: *acceptance of evolution, religion, education*

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MICROSTONYX FROM THE UPPER MIOCENE OF HAYRANLI-HALIMINHANI, TURKEY

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Microstonyx major refers to the Suid remains retrieved from two different localities that date back to the Late Miocene period, Derindere Member of the Incesu Formation in the Hayranlı-Haliminhanı area (Sivas, Turkey). These localities have the potential of yielding hominoid fossils. Microstonyx teeth display some changes in incisor morphology, which are interpreted as a further adaptation to rooting. These changes occurred during a short period of time most probably between 8.7 and 8.121 Ma ago and it could be related to environmental change. It seems that the partially open shrubland and savannah grasslands during the early or/and the Middle Turolian period (MN 11-12) has created a rich faunal diversity exaggeration in the Hayranli-Haliminhani area. These findings are discussed within the regional context and how it contributes to our knowledge of fossil mammals in Anatolia.

Key words: *Suidae, Microstonyx, ecology, Late Miocene*

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THE EXACT DAY AND TIME OF PETRALONA SKULL DISCOVERY

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In the present-day bibliographical data the 16th of September 1960 is indicated as the discovery day for the famous Petralona human skull. The first of the authors is a son of the late Ioannis Malkotsis (BSc Agronomy) who was one of the six persons present during the very moment of the skull's discovery inside a small chamber towards the, until then known, end of Petralona cave. I. Malkotsis was also a person who took the first photos, mainly due to whom the discovery status of Petralona skull is world wide known among anthropologists, as well as other scientists and/or ordinary people. On the opposite side of the photo, by Malkotsis' hand, instead of the 16th, the 15th of September 1960 is written. Discussing this matter we concluded that the 15th of September 1960 is the correct day of Petralona human skull discovery. On the other hand, according also to the shadows observed on the other two photos, as well as according to a recent oral communication of Dr. Aris Poulianos (a father of the second author), the discovery time of about 10-11 p.m. is the most probable. The above evidence approaches with more accuracy the exact day and time of Petralona skull discovery, reconfirming once more the very point where it was found within the Petralona cave underground surroundings.

Key words: *Petralona skull, discovery day, Khalkidhiki, Central Macedonia, Greece*

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NEW UNIQUE MUSCLE OF THE ELBOW JOINT IN HOWLER MONKEY (ALOUATTA SENICULUS)

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In this study, we are investigating the group of muscles located on the preaxial aspect of a forearm in howler monkey (Alouatta seniculus). All primates, including humans, usually have three muscles in this area: m. supinator, m. brachioradialis, m. extensor carpi radialis longus and m. extensor carpi radialis brevis. However, some mammals do not have m. brachioradialis and have mm. extensores carpi radiales joined in one. During dissection of a young specimen of the howler monkey, we discovered a supernumerary muscle. This muscle originates at the condylar ridge of humerus distally of the m. brahioradialis, runs medial to it and inserts on the proximal part of the radius. To our knowledge, in the literature there are no references to such a muscle either in howler monkey, or in other monkey species. On the other hand, in human surgery there are reports on the reduplication, anomalous structure and topography of the four typical preaxial muscles of the forearm occurring at high frequency (up to 50%). A research of such anomalous muscles is very important for the use of their tendons in 'hand surgery'. To determine the homology of the unusual muscle that we found, we compared it with the known abnormal and extra muscles of the preaxial aspect of forearm in humans and other primates, as well as some other mammals and reptiles. In this area of forearm, in some lower tetrapods there is a fifth muscle called m. tractor radii, which is most similar in its position to the supernumerary muscle of the howler monkey, but differs from it, as well as from all the other muscles considered, by its innervation. Since the unique muscle that we describe here in howler monkey does not have any clear homology with the known forearm muscles, we suggest calling it the m. contrahens cubiti. This term corresponds to its function as it decreases the angle in the elbow.

Key words: *primates, forearm, extensors, anomaly*

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CARNIVORES FROM THE LATE MIOCENE LOCALITY OF HAYRANLI (HAYRANLI, SIVAS, TURKEY)

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The locality of Hayranlı-Sivas is one of the few known late Miocene localities in Turkey with the presence of large mammals. Thus, the study of Hayranlı is very important to understand the mammal evolution in Turkey. The locality is situated in the central Anatolian plateau (Sivas, Turkey) and includes many fossil remains including carnivores. Aim of this study is contribute to carnivore evolution in Turkey based on the fossil findings in Hayranlı-Sivas. The study findings indicate the presence of the following taxa: Hyaenictitherium wongii, Ictitherium intuberculatum, Lycyaena dubia, and Machairodus giganteus. L. dubia is the first record from the Anatolia. The material of each taxon was described and determined by comparing with other materials from various Eurasian localities. During Early or Middle Turolian 9-7 Ma. (MN 11–12), shrubland and open savanna grassland landlife might contribute to rich faunal diversity in Hayranlı location Moreover, carnivores of area represented by four taxa bio-chronologically, have been adapted to this ecology during the evolutionary processes. M. giganteus in closed ecosystem locality HAY-91 and H. wongii, I. intuberculatum, and L. dubia in open ecosystem locality HAY-2 are probably the most dominant carnivores of the survey area.

Key words: *carnivore, fossil, evolution, Sivas, Turkey*

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THE FIRST PHOTOS ON THE DAY PETRALONA SKULL WAS DISCOVERED

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Since September 15th, 1960, when the Petralona human skull was found (cf. also another Greek communication to the 19th EAA Congress, concerning the exact day and time of discovery), several controversial publications have appeared in the international bibliography. According to the authors of the present announcement a full re-examination of the available data is necessary. Towards this direction the first eight photos (some of which have never being presented in front of a scientific Congress) are shown here. During the above mentioned discovery day, these photos were taken by the agronomist Ioannis Malkotsis, who was one of the six men involved. Thus, on one hand, the pictures regarding the group of the Petralona cave "explorers" during that same day, and on the other hand, five of the skull's views (enface, right profile, above, right profile at ¾ and view from below for its basicranion) are visualized for the Congress participants. The photos were mainly taken keeping the skull on a flat surface (such as a table), but the basicranion view must have being taken when holding it, probably in hands of an unknown woman. The 1st photo that the Petralona man has become worldwide known is that from the front-page of the Thessaloniki "Macedonia" newspaper, September 18th, 1960. In this front-page the view of the right profile at ¾, along with the six persons is presented in a photomontage by an unknown photographer as well as an unknown journalist of the newspaper. Thus, (standing) Kostas Sariannidis, Ioannis Malkotsis, Bassilis Avramis, Ioannis Stathis (with the skull), as well as (sitting) Stavros Hatzaridis and Christos Sariannidis are shown. All eight photos, scanned at a high digital analysis are also presented and discussed herewith.

Key words: *Petralona skull, first photos, Khalkidhiki, Central Macedonia, Greece*

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ANIMALS IN THE FUNERAL RITE AND RITUAL PRACTICE OF THE ANCIENT POPULATION OF GONUR-DEPE

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On the Bronze Age settlement Gonur-depe, ways of ritual use of animals can be divided into three main groups. The first group of animal remains from burials includes: 1) some dissected parts of animal carcasses placed in the burial as a farewell food; 2) full and uneviscerated animal carcass placed in the burial as an offering to the higher powers; 3) animals placed entirely in the burial, buried next to it or in concomitant construction, to accompany the deceased to the underworld and become part of its property; 4) full animal carcass in a cenotaph replaced the deceased and buried according to the existing burial rites; 5) some carcass parts of one or more different animals placed in the burial and laid out in a certain order; 6) grave goods from animal bones (including unprocessed isolated corneous rods and astragals). Thus different forms of animal use are often combined. The second group includes separate animal burials or their parts: 1) animals were completely buried in a specially prepared pit or ditch (with grave goods or without); 2) the full animal carcass buried in a specially prepared pit in the dissected form, laid out in a certain order; 3) buried isolated animal parts (mainly the head or horns); 4) parts of the carcasses of animals (or meat food) put in a vessel. The third group includes burials of the cremated animals or their parts: 1) entirely cremated animal carcasses left by the burning; 2) the cremated animal remains placed in specially arranged and issued poles; 3) the remains of burned animals placed in a specially arranged structures in the form of cysts.

Key words: *Bronze Age, Gonur-depe, animal remains, burials*

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PLANTS IN LIFE OF THE POPULATION OF GONUR-DEPE (ANCIENT MARGIANA)

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This research is devoted to results of the study of plant remains from excavations of a Bronze Age site Gonur-depe (Turkmenistan, Bactrian-Margiana Archaeological Complex or Oxus Civilization). Plants were widely used in both utilitarian and rituial purposes. Agriculture was developed in the settlement. Several kinds of wheat, barley, millet, legumes, fruit trees, grapes were cultivated. Saxaul, arboresced thistle, tamarisk, djuzgun, and camel-thorn were used as fuel. Poplar (*Populus sp*.) and willow (*Salix sp*.) were used in the buildings structures (beams in the palace, roofs of the external walls of the Kremlin). Some types of wood were brought from afar, and used for making of the artifacts: maple, elm, sumac or smoke tree (*Cotinus corrygria*), Vitex sacred (*Vítex agnus-castus*) and others. Plants theme is often found in cult things (pottery, seals, amulets, mosaics). Different images of the "world tree" were found. Among the finds, there is a unique figure of "the goddess of vegetation" with accurately executed ears of wheat. On the seals and amulets floral images which can be interpreted as "tulip", "poppy", "cannabis" are seenb. Furthermore, large vats and baths for pre-soaking plants, stone graters, pestles, mortars and strainers (conical vessels with holes in the center of the bottom) were found. It is assumed that they could be used for making a ritual drink – like Soma – Haoma.

Key words: *archaeobotanical researches, Oxus Civilization, Gonur-depe, Bronze Age*

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PALEOANTHROPOLOGY OF KAZBURUN FUNERAL-SETTLER COMPLEX OF SOUTHERN URALS

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The Late Bronze Age in the Southern Transurals (Beta Analytic: 1890–1750 BC) is characterized by uniformity of obsequies of barrow burials and Srubnaya culture settlements. In the basin of Urshak river, having area of 23.4 km2, Kazburun archeological region was identified, which monuments materials were used as a base for a complex of natural science investigation methods. The Kazburun archeological microdistrict belongs to homogeneous in archeological material interfluve of Urshak river and Dema river. A group of investigated sites included the monuments of Kazburun burial and settlement complex (Kazburun I–III barrow mounds, Muradymovsky settlement, Usmanovsky I, II and III settlements). They carried out paleopedology investigations of the Late Bronze Age settlements, belonging to one cultural tradition – Usmanovsky II settlement (Usmanovo–2, settlement), Usmanovsky III settlement (Usmanovo–3, settlement), located at the Urshak river bank, Muradymovsky settlement – at the bank of a small brook. As may be supposed, people of this culture came to the Urals from the south, from dry steppes, almost semi-deserts and brought traditions of house building of gypsum (Sherbakov, Shuteleva, Obydennova, Balonova, Khohlova, Golyeva, 2010). In the biggest settlement various anthropologic material was found. In the mound of the settlement there was a grave of a child (1.2–1.5 years old). A study of the Kazburunovsky I burial mound provided the following anthropological materials: two adults buried at the age of 50–59 years. After anthropological analyzes carried out by K.A. Gorshkov, the cause of death of one of them was found out: a fracture of the skull base. In addition, the buried human had traces of paleo-disease that led to the complete merging of the large pelvic bones and femurs, as well as to the complete immobilization of the spinal column. Also, the

remains of two boys, aged 7 and 14 years, were found in the studied mounds. The 14-year-old boy was diagnosed with a fractured left femur, most likely during his lifetime, and that could be a possible cause of death. This teenager also had "stress marker" on his teeth, which leads to a conclusion about food irregularity in the diet of human groups in the Late Bronze Age. The traces of paleo-disease with similar symptoms were revealed in one of the buried adults in Muradymovskoe settlement (Obydennova, Sherbakov, Shuteleva, 2006). At present this requires further research.

Key words: *Late Bronze Age, Southern Transurals, Srubnaya and Andronovskaya cultures, paleo-disease*

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PALEOPATHOLOGICAL ANALYSIS OF SKELETAL REMAINS FROM A 10TH-12TH CENTURY AD CEMETERY FROM HUNGARY

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The aim of our study is to present results of the paleopathological investigation of a 10th-12th century AD cemetery from South-East Hungary. The examination of the skeletal remains of 59 individuals was performed using standard macromorphological methods of bioarchaeology. Before the paleopathological analysis of the series, sex and age at death of individuals and state of preservation of the observable skeletal elements were also recorded. In spite of the poor state of preservation, the examined osteoarchaeological series showed a wide range of paleopathological alterations: skeletal traces of degenerative articular changes, traumas and infectious diseases were observed. This presentation focuses on infectious lesions. On the basis of the detected alterations (rib lesions, superficial vertebral changes / hypervascularisation, endocranial alterations and potential stress indicators or infection markers, such as cribra orbitalia and long bone periostitis) the diagnosis of probable early-stage TB was supposed in five cases. Although a positive correlation seems to exist between these alterations and TB, they are not always pathognomonic to tuberculosis. In order to confirm the assumed diagnosis, further biomolecular investigations are planned. A mature female individual showed signs of severe destruction of the right maxilla most probably as a result of periodontal inflammation. The same skeleton revealed skeletal evidence of symbolic trephination on the middle of the sagittal suture. It cannot be excluded that this intervention was made for medicoritual purposes. Our results contribute to improving the knowledge on health status in historic populations of Hungary at the time of political and cultural transition from Eastern traditions to feudalism and Christianity. The support of the Hungarian Scientific Research Fund, OTKA NN 78696 and OTKA N° 78555 is greatly acknowledged.

Key words: *paleopathology, Hungary, 10th-12th century AD, tuberculosis, periodontal inflammation, symbolic trephination*

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COLOR AND CONSTITUTION: EXPERIENCE OF STUDYING AESTHETIC PREFERENCES

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It is impossible to draw clear interdisciplinary boundaries in the study of color concept regarding interactions between human and color-light environment, and anthropology may be used as a complex approach to this study combining both science and humanities. In this case we can define color preference as part of the

general human constitution along with morphological and psychological features. Using a sample of 157 Moscow students (80 males and 77 females) we examined correlations between color attitude and somatic (somatotype, pigmentation, dynamometry) and psychological (anxiety and neuroticism level, extraversion–introversion trait) features. Color attitude was measured verbally and projectively by coloring graphic tests with simple and complex shapes. On the basis of verbal color tests' results we calculated coefficient of color preference and general color attitude index. Coefficients of harmonious color combinations are based on the results of graphic tests. Sex differences in neuroticism, state and trait anxiety levels are valid: females are more restless and anxious while males are more emotionally stable. Most of the examined individuals do not have a disliked color or colors, having one is strongly correlated with higher level of both neuroticism and state anxiety, correlation is slightly stronger for females. The most common choice of a favorite color is blue and green. There are sex differences in the preference of black, white, purple, yellow and turquoise colors: males prefer achromatic colors relatively more. Most of morphological features are uncorrelated with color choice; however there are some certain correlations with eye and hair color. There are some correlations between color attitude and somatotype: athletic males and mesoplastic females have a negative color attitude significantly rarely and thus emotionally are less dependent on color environment. Choice of harmonious color pairs is psychosomatically determined only for a test with simple shapes. Complex shapes coloring reveals color associations defined rather by social and cultural aspects of color perception. However, the amount of harmonious choices is two or three times bigger than the amount of inharmonious, and females tend to select harmonious color pairs more often than males. Prevalence of harmonious color choices to some extent indicates possible biological expediency of this behavioral adaptation that formed human aesthetic color perception.

Key words: *constitution, color, color preference*

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Section MOLECULAR ANTHROPOLOGY – NEW ADVANCES

THE GENE POOL OF INDIGENOUS CRIMEAN POPULATIONS: MEDITERRANEAN MEETS EURASIAN STEPPE

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Crimean Greeks are far descendants of Ancient Greek Colonists of Crimea and following Greeks migrants. The history of other ethnic group of the Crimean peninsula – Crimean Tatars – is linked with migrations of Eurasian steppe nomads in XIII century, which likely mixed with predating populations of Crimea. Three most informative modern genetic systems were used for the reliable reconstruction of ethnogenesis of these indigenous Crimean populations: 1) genome-wide autosomal SNP markers representing the genetic contribution of both parents; 2) mitochondrial DNA markers (maternal line); 3) Y-chromosomal markers (paternal line). We analyzed totally 400 DNA samples from unrelated male volunteers which representing three sub-ethnic groups of Crimean Tatars (Steppe, Mountain, Coastal) and two sub-ethnic groups of Crimean Greeks (Urums, Romeis). The results of uniparental markers analysis (multidimensional scaling, maps of genetics distances) coincided with that of biparental autosomal SNP markers (principal component and ADMIXTURE analyses). Gene pool of Steppe Crimean Tatars carries mainly the genetic component typical for Turkic populations from Eurasian steppe (Nogais, Uzbeks, Turkmens, Karakalpaks, Kazakhs, Kazan Tatars, Chuvashes). Another genetic component dominant in East Mediterranean peoples (especially, in Greeks and Turks) is mostly expressed in Mountain and Coastal Crimean Tatars and in both Crimean Greeks populations. No notable genetic similarity of indigenous Crimean populations with their closest geographical neighbors – Ukrainians and Russians – was revealed. It is the most likely that discovered features of Steppe Crimean Tatars gene pool reflect the genetic contribution of medieval Eurasian Steppe nomads. The component predominant in Mountain and Coastal Crimean Tatars gene pools and in Crimean Greeks suggests that genetic contribution of East Mediterranean populations continued in Crimea for many centuries. The work has been supported by RFBR grants 13-06-00670, 14-06-31331 and by grant from the Presidium of Russian Academy of Sciences “Dynamics and conservation of gene pools”.

Key words: *Crimean Tatars, Crimean Greeks, gene pool, migrations, Eurasian Steppe nomads, East Mediterranean peoples*

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GEOGRAPHIC VARIATION OF THE HUMAN GENE POOL: THE GLOBAL PATTERNS

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The studies of genetic variation in human populations started 100 years ago: in 1914, the pronounced differences in frequencies of blood groups were revealed for the first time. During the century-long history of intensive research the arsenal of population geneticists has changed six times. The immunological markers or blood groups (1) were only available genetic systems for decades until biochemical markers (2) were widely introduced in 1960s. Both types are now known as “classical markers”; the datasets on their variation in human variations worldwide are large and have been summarized by both Western (Cavalli-Sforza et al., 1994) and Russian (Gene pool and gene geography of USSR) scientific gene geographical schools. The classical markers are virtually out of experimental use in present days. But because their variation has been well described and analyzed, these generalized conclusions are widely used as a background for current research. Since 1990s, the mitochondrial DNA (3) and Y-chromosome (4) became the most popular genetic systems in population studies. Hundreds of papers were dedicated to their variation, and accumulated datasets include hundreds thousands of samples from thousands of populations worldwide. However, the number of papers on these markers decreases each year, because the genome-wide (5) and full genome (6) markers are becoming the new favorite tools in the arsenal of researchers, but data on these genetic systems are not abundant yet. Thus, the crucial task is to summarize the accumulated data on mitochondrial DNA and Y-chromosomal variation, to extract the generalized patterns and to make the overall conclusions of the global gene pool structure from these two kinds of genetic data. Then these systems will be for many decades the great story-tellers about general trends in human variation and value of these “new classics” will be high even when no living researcher will remember experimental methods for their analysis. The talk will present the largest databases on mitochondrial DNA and Y-chromosomal variation worldwide and the cartographic atlases summing up both particular and universal patterns of these systems. This study was supported by RFBR grants 13-04-0171, 13-06-00670, 14-06-00384, 13-04-90420, 14-06-31331 and Presidium RAS program “Molecular and cell biology”.

Key words: *gene pool, gene geography, database, classical markers, mitochondrial DNA, Y-chromosome, world atlas*

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BETWEEN ANDES AND AMAZON: GENETIC TRACES OF SEX BIASED SERIAL CONTACT IN THE ARAWAK-SPEAKING YANESHA

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The Yanesha are a Peruvian population who inhabit a transitional area between the Andes and Amazonia; their intermediate position may have favored contact flows both in their gene pool and in their cultural characteristics. In particular, the language they speak belongs to the Arawak language family, which suggests an Amazonian origin. However, a strong influence by Quechua, the most widespread language family of the Andes, makes for a more complex demographic past. The Yanesha are investigated here as a case study of language and population dynamics across the Andes-Amazonia divide, with 214 individuals genotyped for both Y chromosome (17 STRs and 16 SNPs diagnostic for assigning haplogroups) and mtDNA data (control region sequences and 4 SNPs diagnostic for assigning haplogroups). We uncover sex-biased genetic trends that probably arose in different stages: first, a male-biased gene flow from Andean regions, genetically consistent with highland Quechua-speakers and probably dating back to Inca expansion; and second, traces of European contact consistent with Y chromosome lineages from Italy and Tyrol, in line with recent migrations. Most research in the history, archaeology and linguistics of South America has long been characterized by perceptions of a sharp divide between the Andes and Amazonia. Our results serve as a clear case-study confirming demographic flows across that 'divide'.

Key words: *Yanesha, mtDNA, Y chromosome, South America, language*

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THE GENE POOL OF NANAIS FROM RUSSIAN FAR EAST: POPULATION AND CLAN STRUCTURES

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Nanai population is 'a white spot' for both genetics and demography, despite it is the largest indigenous ethnic group of the Amur region. The variety of dialects of Nanai language (which belongs to Manchu-Tungus branch of the Altaic family), and Nanai cultural diversity indicate the complex population structure of the ethnos, which was formed on the ancient genetic background by following multiple migrations waves. To determinate the modern demographic structure of Nanais, we analyzed the information from the household books. 8 villages from 3 districts of the Khabarovsk region were studied (more than 5000 records). The villages in Nanai and Solnechny districts (the initial Nanai-area) are mono-ethnic (80% of their population are ethnic Nanais), while in the villages of the Komsomolsky district the proportion of Nanais is twice lower. However, the level of cross-breeding is low (4–11%) in all villages. The obtained results indicate that Nanai population presents a closed demographic system, and the probability of its miscegenation by mixing with other ethnic groups is not significant. The Nanai surnames emerged from their clan names and therefore represent the patrilinear structure of the population. The present day number of clans (13) is twice lower as compared to the 19th century. In every village about half of its population belongs to six clans: Beldy – 23%, Kiel – 9%, Onenko – 8%, Samar – 8%, Khodzher – 7%, Gayker and Passar– 6%. Clans have clear geographical areas: for example, Beldy is frequent in the 'Upper' Nanais while Samar is frequent in the 'Gorin' Nanais. These demographic data are in agreement with the genetic ones, which we analyzed in the same populations. The four Y-chromosomal haplogroups are the most frequent in the Nanais: C3-M217, C3c-M48, N1c1-M178, O3-M122. The greatest genetic diversity was found in the Beldy clan. It confirms that Beldy is a conglomerate of smaller clans. The gene pools of other clans are so homogeneous that Y-chromosomal haplotype of the clan's ancestor could be reconstructed. The results show that studying the correlation between clan structure and polymorphism of the Y-chromosome is a promising way to reconstruct the Nanai ethnogenesis. This study was supported by RFBR grants 14-06-00384a, 14-06-10026-к, 13-06-00670.

Key words: *Nanais, clan structure, Y-chromosome*

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GENE POOL OF THE SOUTHWEST ASIA: REFLECTION OF GEOGRAPHICAL RELIEF AND LINGUISTIC STRATIFICATION

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Southwest Asia despite the predominance of mountainous and arid landscapes was not only the birthplace of the ancient states – according to the Anatolian hypothesis it was the homeland of the Indo-European language family. How similar are the gene pools of the Indo-European speaking populations of Southwest Asia to those who speak Semitic and Turkic languages? Is the geographical landscape a factor which shaped the genetic landscape? To answer these questions, we studied the Y-chromosomal gene pool of the Southwest Asia for published data (over 4000 individuals) and our new data on five Armenian populations, covering the area of historic Armenia (436 individuals). The multidimensional scaling (MDS) plot revealed two genetically different groups of the populations in Southwest Asia. The first group included mountain-dwelling populations: Turks, Armenians and different populations from Iran. The second group included populations of Syria, Lebanon, Iraq, and Arabian Peninsula, and thus could be called the "plain" group. The hierarchical analysis of the inter-population variability (AMOVA) confirms this pattern. Genetic differences between "highland" and "plain" groups of populations are nine times higher than the differentiation obtained by grouping populations by standard geographic parameters like latitude and longitude. Armenians formed a subcluster within the "highland" group of populations on the MDS plot. Note, that Georgians (geographical neighbors of Armenians) fall into another (the Caucasus) cluster together with the Abkhazians and the majority of the populations of the North Caucasus. The cartographic analysis confirmed that North Caucasus and Georgian populations are genetically distant from populations of "highland" cluster. Analysis of genetic differentiation of Southwest Asian populations under the linguistic stratification revealed significant differences between the gene pools of the Turkic, Semitic and Indo-European speaking groups. Indo-European groups – Armenians and Iranian populations – are clustered together while Semitic-speakers form a separate cluster. This corresponds well with the geographic division into "plain-dwelling" (Semitic) and "highland-dwelling" (other) populations and suggests that the linguistic stratification could be also considered as the possible factor shaping the structure of Southwest Asian gene pool. The research has been supported by The Presidium of RAS programs: "Molecular and cell biology", "Fundamental sciences for the medicine", "Gene pool dynamics", and RFBR grant 13-04-01711.

Key words: *gene pool, Y-chromosome, genetic markers, Southwest Asia, Indo-European language family*

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APOLIPOPROTEIN E AND ACE GENOTYPES MODULATE ALLOSTATIC LOAD

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Over a life span, both failed and successful responses to stressors promote physiological dysfunction, leading eventually to an allostatic load (AL). Adaptive and maladaptive stress responses depend on biology, culture, environment, and previous experience. Additionally, age, sex, occupation, sociocultural factors and self-perceptions affect physiological responses and structure predispositions to non-communicable diseases and mortality. Measurement of AL assesses physiological dysfunction secondary to lifelong responses to stressors. As yet, how genes modulate AL has not been examined. We examined associations of AL with apolipoprotein (Apo) E and H, ACE, and ANP genotypes in 284 American Samoans. AL was measured using seven secondary mediators of allostasis, along with aspects of body habitus and glucose metabolism. AL differed little by Apo H or ANP genotypes. However, significant differences in Al were observed across Apo E and ACE genotypes. Participants with the Apo E 3*2 genotype showed the lowest AL compared to 3*3 or 2*2 genotypes. Women showed the highest AL across all genotypes. Across ACE genotypes, AL was lower in those heterozygous (I/D), than those with the homozygous I/I genotype. Samoan women showed higher AL than men, along with stronger associations of AL with both Apo E genotypes. AL associates significantly with morbidity and mortality across multiple samples, our results suggest these relationships may depend in part on underlying genotypes.

Key words: *American Samoans, life span, stress, stressors, physiological dysfunction*

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GENETIC DIVERSITY OF INDEGENOUS POPULATIONS OF TUVA REPUBLIC ON SNP – HAPLOGROUPS OF Y-CHROMOSOME

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Studying of the genetic diversity of indigenous populations of the Altai-Sayan Mountains creates an additional historical source for reconstruction of ethnogenesis and ancient migratory ways of the populations of Southern Siberia. Polymorphism of the Y-chromosome in four indigenous populations of Tuva (N=333) was studied: Todzhintsy (N=87), Western (N=75), Central (N=81) and Southeast (N=90) Tuvinians. From 16 revealed haplogroups of Y-chromosomes the most frequent are North Eurasian haplogroups Q-M242, N1b-P43, N1c1a-M178, which have captured 60% of a gene pool of Tuvinians and more than 80% of a gene pool of Todzhintsy. At the western Tuvinians (so-called southern Siberian anthropological type) North Eurasian haplogroups N1b-P-43 and N1c1a-M178 prevail, and each of them cover about one-third of the Y-gene pool. Haplogroup Q-M242 is rare, while at Todzhintsy groups it makes half of the Y-gene pool, and at Southeast and Central Tuvinians groups it covers about a quarter of the Y-gene pool. Frequencies of East Eurasian haplogroup C3c-M48 and West Eurasian haplogroup R1a-M-198 at the western Tuvinians are approximately identical – everyone presents about 10% of the Y-gene pool. At the Northeast Tuvinians-Todzhintsy (so-called Katangsky variant of the Baikal anthropological type) after major haplogroup Q-M242, the second and third places are divided between haplogroups N1b-P-43 and N1c1a-M178 (overall about 40%). Other 10% are presented by West Eurasian haplogroups R1a1a-M198, R1b1a2-M269 and East Eurasian haplogroups C3c-M48 and O3-M122. Gene pools of Southeast Tuvinians (so-called Central Asian anthropological type)

and the Central Tuvinians, are characterized by the maximum range of haplogroups. More than a quarter of the Y-gene pool belonged to North Eurasian haplogroups Q-M242, the fifth part of the gene pool consists of West Eurasian haplogroup R1a1a-M198. Not only haplogroups N1b-P-43 and N1c1a-M178 are presented with frequencies from 2 to 10%, but also haplogroups C3-M217, C3c-M48, C3d-M407, and O3-M122. The genetic structure of the studied populations of Tuvinians and Todzhintsy was computed by the analysis of molecular variance (AMOVA), with Fst=0.085. The cluster analysis of the populations of Southern Siberia on the matrix of genetic distances (average d=0.4) has shown that all Tuvinians and Todzhintsy formed a united cluster together with Khakas-Sagaytsy. Our results indicate the general background in the origin of the populations of Tuvinians and the preservation of an ancient "Siberian" layer (N1b-P-43, N1c1a-M178, Q-M242) in the gene pool of Todzhintsy in the conditions of geographical isolation in mountain and taiga areas. It can be emphasized that the conditions formed a refugium, where the gene pool kept traces of the ancient population of Southern Siberia.

Key words: *Tuvinians, Todzhintsy, ethnogenesis, gene pool, haplogroups*

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INFLUENCE OF GENETIC POLYMORPHISM +1663A/G TNFR2 ON THE DEVELOPMENT OF CHRONIC TRUE ECZEMA

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Among the cases of chronic dermatosis, eczema makes 30 to 40%. The rise of sickness rate, the chronicity of the disease process, the frequent recurrence of its course, insufficient effect of the treatment methods make chronic eczema the most pressing problem in the modern dermatology. At present the leading pathogenic link of eczema development is considered to be a marked immunological disorders. The main role here is played by T-lymphocytes that bear specific receptors to the antigen and discharge a number of proinflammatory cytokines as well as the factors of tumor necrosis and their receptors. In connection with this, the object of this research work is the study of the role of genetic polymorphism +1663A/G TNFR2 in the development of chronic true eczema. 363 persons were examined (58 patients and 305 persons of the control group), all of Russian nationality, natives of the Central Chernozem region of the RF and having no blood relationship. The extraction of genome DNA from peripheral blood is made with the method of phenol-chlorophorm extraction. PCR was made on the amplifier IQ 5 (Bio-Rad) in the real time mode of operation with the use of DNA polymerases Thermus aquaticus and oligonucleotide primers and probes. Genotyping of DNA markers is made with the method of allele discrimination on the base of Tag Man probes. The results of the research revealed the following rates of genotypes among the patients with chronic true eczema: +1663 AA – 6.9%; +1663 AG – 63.8%; +1663GG – 29.3%, and the rates of alleles are as follows +1663A – 38.79%; +1663G – 61.21. The rates of the genotypes in the control group were the following: +1663AA – 21.64%; +1663 AG – 45.24%; +1663GG – 33.12% and the rates of alleles were: +1663A – 44.26%; +1663G – 55.74%. According to this comparative analysis, the statistical significant differences in the concentration of alleles and genotypes of this locus are not revealed in the group of patients and in the control group. This allows us to come to a conclusion that the polymorphism +1663A/G TNFR2 is not associated with the development of chronic true eczema.

Key words: *eczema, genetic polymorphism, natives of the Central Chernozem region of Russia*

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DEEP-ROOTING AFRICAN INFLUENCE IN SOUTHWESTERN EUROPE: A VIEW FROM MTDNA IN THE IBERIAN PENINSULA

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In the past few decades, the gene flow between North Africa and Europe has been a topic of interest for population genetic studies. Key unanswered questions include the timing of migration episodes and their real impact on the European gene pool, the role of physical barriers – as the Mediterranean Sea – and the most plausible dispersal routes for transcontinental crossings. In order to address these topics, different genetic markers have been used. Mitochondrial DNA has shown substantial traces of bidirectional genetic interchange between Africa and Europe, and in a more detailed view between the North of Africa and Iberia. We approached this by analyzing the maternal heritage of the closest Iberian population to North Africa: Andalusia. mtDNA profiles were characterized in two southern Iberian subpopulations, represented by 158 samples from Huelva province and 121 individuals from Granada province. Our results reveal distinctive local histories among Andalusians regarding their maternal legacy, suggesting a role of the westernmost Iberian territory as a noticeable recipient of multiple and diverse human migrations, including relevant African contribution. The African component in western Andalusia was characterized by a high prevalence and diversity of U6 lineage. This finding leads us to further investigate U6 in southern Iberia and northern Africa, by sequencing mitogenomes of 16 U6 Andalusian samples. In order to acquire insight into the other side of the Strait of Gibraltar, we also obtained complete mtDNA sequences from Moroccan Berbers. We then compared these profiles with around 250 U6-genomes reported from literature. The resulting phylogenetic and phylogeographic analyses show that U6 lineage has deep temporal roots in Iberia, revealing old transcontinental human crossings from North Africa to Iberia – and therefore, ancient African traces in Europe.

Key words: *gene flow, migration, haplogroup U6, Mediterranean space, phylogeography, phylogeny*

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NOVEL MODEL OF BIVARIATE ANALYSIS FOR HUMAN GENETIC STUDY. APPLICATION TO MUSCULAR MASS AND METABOLITE LEVEL VARIATION

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We propose a statistical method of bivariate genetic analysis, designed to evaluate contribution of the DNA polymorphisms such as SNP and familial effects (additive genetic, common environment) to variation of two interrelated traits without predefined distribution (i.e. could be quantitative and/or qualitative phenotypes). Our approach is an alternative of the liability-threshold concept (Falconer, 1965), and it is based on the discrete models of genetic and familial effects. In order to take into account additive effect of the other genes on the traits', we introduce three independent binary factors ZX, ZY, and ZXY. In our model they represent genetic factors affecting variation of each trait separately (ZX and ZY) and both traits simultaneously (ZXY), pleiotropic effect. Gene-independent effects, caused by random or common familial effects on the phenotype variation are also taken into account in the model. The model application to analysis muscular mass, metabolomics and genotyping data in a large sample of middle-aged UK female twins is exemplified.

Key words: *muscular mass, metabolomics, GWAS, bivariate analysis, additive genetic and environmental factors*

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GENOME DIVERSITY AND EVOLUTION HISTORY OF ETHNIC GROUPS FROM EUROPEAN RUSSIA AND SUB-ARCTIC TRANSURALIC REGION

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Understanding the genetic structure of the European population is very important from historical and anthropological points of view. Several studies have examined the fine-scale structure of human genetic variation in Europe. But populations of Northern-Eastern European area and Sub-Arctic Transuralic region are less investigated. These territories are inhabited by different indigenous Finno-Ugric peoples and ethnic Russians. To explore genetic structure of the region we analyzed single nucleotide polymorphisms using different versions of Illumina BeadChips. Principal components (PC) analysis, ADMIXTURE clustering and Wright's fixation indices (FST) were used to examine population structure of Khanty, Mansi, Komi, Veps and Russians. Mansi were indigenous inhabitants of Northern European area prior to 17th Century AD. This ethnic group undergone trans-Uralic migration and nowadays inhabits Sub-Arctic Region of Western Siberia. The Khanty, closely related to Mansi by linguistic classification, are the indigenous inhabitants of this region. Both the Mansi and the Khanty peoples have genomic characteristics that differentiated them from all others. Komi are also inhabitants of the territory at Northern-Eastern Europe. Two ethnographic groups of them were included in the study – Izhemski and Priluzski Komi. They formed two neighbored clusters at PC plot. The Veps are the Finno-Ugric minority that is one of the oldest people of northern Europe. They still inhabit some territories of northwest Russia. Veps gene pool reveals similarity with Finns and Komi. Russians are the most abundant people in Northern-Eastern Europe. Principal component analysis showed significant differences between Russians of Northern European region and Russian populations from the central part of Russian Plain. The later Russian populations formed a single cluster on PC plot. In contrast, Northern Russians demonstrated close relationships with Finno-Ugric populations. The results obtained demonstrate distinct ancestry components in the samples from Sub-Arctic Transuralic region, that significantly differs them from all other populations studied.

Key words: *genome diversity, population genomics, Eastern Europe, SNP analysis*

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GENE POOL OF THE TWO GROUPS OF SIBERIAN (TOBOL-IRTYSH) TATARS: ANALYSIS OF THE Y-CHROMOSOMAL SNP-MARKERS

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Gene pool of Siberian Tatars is a “terra incognita” – there is only data on mtDNA of one population, while the variability of the most informative Y-chromosome has not yet been studied. Siberian Tatars include three major ethno-territorial groups of Turkic speaking populations in Western Siberia: Tomsk Tatars, Barabinsk Tatars and Tobol-Irtysh Tatars. Ethnogenesis of Siberian Tatars included mixing of Ugric, Samoyed, Turkic and partly Mongol tribes in proportions, which were different in territorial groups of Siberian Tatars. Later Bukharian Uzbeks, Teleuts, Kazan Tatars, Bashkirs and Kazakhs were also included in Siberian Tatars. Tobol-Irtysh Tatars of Tyumen region is the largest group of Siberian Tatars. They occupy a central region within their natural area, which was historically the center of consolidation of the Turkic groups in Western Siberia. We examined 140 representatives of Tobol-Irtysh Siberian Tatars in Vagayskii and Tobolskii regions of Tyumen Oblast: Isker-Tobolsk (2 populations) and Ishtyaksk-Toguzsk (2 populations) subgroups. One of the traits of the Isker-Tobolsk Tatars gene pool was its high diversity: none out of the 13 identified haplogroups was predominant. Six most frequent haplogroups (R1a-M198, N1c-LLY22g, Q-M242, H-M69, N1b-P43, R2-M124) cover 80% of the gene pool, with the frequency varying from 6% to 25%. Major Y-chromosomal haplogroup Q-M242 has been found in over one third of the Ishtyaksk-Toguzsk Tatars’ gene pool. In Western Siberia Q-M242 is frequent in Selkups (65%) and Kets (90%), and in Southern Siberia it was met in Altaians and Tuvinians (17%). It may indicate a genetic relationship between these ethnoses. Next to them, by their frequencies, haplogroups R1a-M198 and N1c-LLY22g add up to a quarter of the gene pool of both Ishtyaks-Toguzsk and Isker-Tobolsk Tatars, which indicate their common ethnogenetic roots. In general, both the spectrum and frequency of Y-chromosome haplogroups of Tobol-Irtysh Siberian Tatars demonstrate the similarity of their gene pool with those of Turkic peoples of Siberia. For example, haplogroups R1a1a, N1b, N1c1 and Q are typical for Shors, Altaians and Khakases. However, the ratio of these haplogroups varies depending on the population.The basis of this diversity may lie in particular features of ethnogenesis: unequal contribution from different (by origin) tribes. This study was supported by RFBR grants 13-06-00670, and 14-06-00272.

Key words: *Siberian Tatars, Tobol-Irtysh Tatars, ethnogenesis, gene pool, haplogroups*

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MOLECULAR AND MORPHOLOGICAL CASE OF POTT'S DISEASE FROM THE ÁRPÁDIAN-ERA

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It is well known that tuberculosis (TB) causes 1.5 million deaths every year and one-third of the world's total population is infected with Mycobacterium tuberculosis (WHO, 2011). These facts give a great importance to paleopathological TB research too. Due to recent development of macroscopic and molecular diagnostic methods in paleopathology and paleomicrobiology, molecular methods for the detection of Mycobacterial ancient DNA (aDNA) have also been developed considerably in the last few years. The osteoarchaeological series of Győr-Pósdomb from the 10-11th century (western Hungary) has already been the subject of preliminary paleopathological studies on TB-related bone lesions, an interesting case with Pott's disease (Grave No. 187) was detected. The total graveyard contains 217 individuals. Skeletal material of this cemetery was chosen for the macromorphological investigation, which focused both on classical/advanced (tuberculous spondylitis, tuberculous arthritis) stage skeletal TB alterations and atypical/early-stage TB lesions (rib lesions, superficial vertebral changes, endocranial alterations, early-stage spondylodiscitis). In addition, the association of possible stress factors (long bone periostitis, cribra orbitalia, cribra cranii) was also considered. Earlier some cases had been detected from the Roman Period Pannonia and the Avar Age by macromorphological methods. Nevertheless the good state of preservation of this case, the important chronological period of the Hungarian history and the fact that the presence of classical TB symptoms from Árpádian-era have never been detected aDNA by molecular methods before encouraged us to carry out an ancient DNA test of TB-related lesions in this skeleton. Paleomicrobiological analysis was used to study the presence of Mycobacterium tuberculosis DNA both in morphologically positive and negative cases. Samples were examined for the repetitive element IS6110 in the M. tuberculosis complex (MTBC). The currently ongoing spoligotyping and sequencing can give a more accurate picture of the infection by different MTBC pathogens. Our future aims include the examination of the total series of Győr-Pósdomb so that we can clarify a certain degree of the infection in this era. This research was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of ТБМОР 4.2.4. A/2-11-1-2012-0001 "National Excellence Program".

Key words: *paleopathology, aDNA, 10-11th century, skeletal tuberculosis, Mycobacterium tuberculosis complex, Hungary*

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RECONSTRUCTING THE HUMAN GENETIC HISTORY OF THE IBERIAN PENINSULA. AUTOSOMAL AND UNIPARENTAL MARKERS YIELD PARALLEL RESULTS ON THE PRESENCE OF AFRICAN SIGNATURES IN THE ANDALUSIAN POPULATION STRUCTURE

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The analysis of contemporary human population structure based on numerous and varied markers in genomic regions, and combined by careful sampling strategies is helping us to answer many important questions on human history. Such studies are performed in different geographic scales. The Mediterranean area – a biodiversity hotspot with well-defined characteristics in its geography, archaeology and anthropology – seems to harbour an important fraction of the world human genetic diversity. The Iberian Peninsula, given its location in the south-western corner of Europe and in the immediacy of Africa, has had a decisive role in Europe peopling. Within Iberia, Andalusia – the southernmost region of Spain – deserves a special attention, as it has been a human crossroad open to numerous and different human populations and cultures from all around the Mediterranean. Here we summarize some key results obtained by our team after surveying western and eastern Andalusian population structure, regarding mtDNA and Y-C variation, along with other informative autosomal markers (e.g. GM and APOE). Our data reveal that certain African maternal (e.g. U6 and L) and paternal (e.g. E-M81) lineages are particularly detectable in Andalusians and neighbouring Atlantic Iberian populations. APOE polymorphism –main Alzheimer's disease susceptibility marker– revealed a somewhat similar landscape in Andalusia and Morocco, thus interrupting its prevalent trend in Europe. The above scenario is consistent with the relatively high incidence of the Sub-Saharan GM 1,17 5* haplotype in south-western Iberia. In conclusion, advances in the knowledge of the genetic structure in western Mediterranean highlight the presence of African genetic signature in the Iberia Peninsula, yet its spatial pattern is not uniform.

Key words: *mtDNA and Y-chromosome variation, Western Mediterranean populations, human migrations, genetic structure*

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MATERNAL AND PATERNAL LEGACIES OF AN EASTERN ADRIATIC GENETIC ISOLATE – AN EXAMPLE OF VARIOUS HISTORICAL AND MICROEVOLUTIONARY FORCES

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This study aimed to clarify the effect that evolutionary forces and historical events have had on the population structure of Mljet, an Eastern Adriatic island, through the analyses of mtDNA and Y chromosome variability and comparison between the two markers. As previously reported, island of Mljet has the lowest mtDNA diversity among the Eastern Adriatic islands. We used 39 Y chromosome samples and previously published 68 mtDNA. For comparison, we also used 179 Y chromosome samples from the mainland city of Dubrovnik together with previously reported 181 mtDNAs. Results of both maternal and paternal haplogroup lineages on the island fit within the south-east European context. But, analysis of the mtDNA haplogroup variability showed very low diversity, which was not expected considering the relative closeness of the mainland city of Dubrovnik, as reported in previous research. After Y chromosome analysis, the variation of paternal lineages showed average diversity as usually expected, but it is not in concordance with the low mtDNA diversity. Both mtDNA and Y chromosome results could tell their own separate stories about the shaping of Mljet's genetic landscape, but combined, they are both an outcome of numerous past demographic and migration processes. Considering very turbulent and unlucky historical events that occurred on the island, severe living environment, the practice of consanguinity and the presence of autochthonous diseases, the island of Mljet serves as an excellent example for studying the interplay of microevolutionary forces and demographic actions that shape the population structure of genetic isolates.

Key words: *Island of Mljet, Y chromosome, mtDNA, microevolutionary forces, historical events, population structure, genetic isolate*

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GENE POOL OF TURKIC SPEAKERS OF THE CAUCASUS IN THE EURASIAN CONTEXT (Y-CHROMOSOMAL PERSPECTIVE)

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The complex ethnogenesis of the Turkic populations of the Caucasus included both the pronounced autochthonous component and influence of the incoming Turkic speakers. This pattern was reflected not only in the high anthropological differentiation of the Turkic populations from the Caucasus but also in their gene pool. We studied Y-chromosomal polymorphism in all Turkic ethnic groups of the Caucasus (N=870): Azerbaijanians, Balkars, Karanogais, Karachays, Kuban Nogais, and Kumyks. We identified 39 Y-chromosomal haplogroups, four of which were the most frequent in the gene pool of Turkic peoples: R1a1a-M198 (24%), G2a-P15 (16%), R1b1a2-M269 (14%), and J2-M172 (12%). The phylogenetic analysis of rapidly mutating STRs markers showed high heterogeneity of the gene pool of Turkic peoples of the Caucasus. A number of phylogenetic networks including STR haplotypes not only from Turkic groups of the Caucasus, but also from multiple Turkic peoples of Eurasia were constructed for the first time. The phylogenetic network of haplogroup R1a1a-M198 showed an ancient genetic links between Turkic speakers of the Caucasus and Altai regions, thus indicating the 'steppe' component. The phylogenetic network of haplogroup N1-LLY22 revealed the proximity of gene pools of Kazakhs and Karanogais, and also the expressed genetic connection between Balkars and Bashkirs. This connection might indicate the Bashkiro-Nogai migration to the North Caucasus. The map of genetic distances from averaged gene pool of Turkic-speaking groups from the Caucasus to multiple Eurasian populations revealed the greatest genetic similarity in steppes near Black and Caspian seas. Some similarities could be also seen Southwest Asia particularly in North Anatolia and Iran. The Eastern European populations, Turkic peoples from Altai-Sayan and Volga-Uralic region are more genetically distant from Turkic populations from the Caucasus. Note, that indigenous populations of East Caucasus are genetically different from Turkic speakers of the region, despite Kumyks and Azerbaijans dwell the East Caucasus. This study was supported by RFBR grants 13-03-31331-mol_a, 13-06-00670_a.

Key words: *Y-chromosome, SNP markers, STR markers, Turkic peoples of the Caucasus, gene pool*

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GENOMIC VARIATION OF CATECHOL-O-METHYL TRANSFERASE (COMT), DOPAMINE D4 RECEPTOR (DRD4), DOPAMINE D2 RECEPTOR (DRD2) AND MONOAMINE OXIDASE A (MAOA) GENES IN HADZA AND DATOGA MALES

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The study of genetic basis of aggressive behavior is one of the leading directions of modern behavior genetics. Here we examine the variability of four candidate genes, associated with aggressive behavior – COMT, DRD4, DRD2 and MAOA, in two traditional African groups (the Hadza, egalitarian hunter-gatherers and the Datoga, pastoralists and warriors) different by the level of culturally permitted in-group and out-group aggression. The functionally important polymorphisms, VNTRs in promoter region of the MAOA gene, VNTRs in promoter region (DRD4Pr locus) and in the third exon (DRD4E3 locus) of the DRD4 gene, SNP in the COMT (rs4680) and DRD2 (rs1800497) genes, supposedly associated with violent aggressive behavior were detected. The DNA of the Hadza (n=199) and the Datoga (n=230) were tested, using locus specific PCR. It was demonstrated that these two groups differed significantly by the frequency of distribution of genotypes COMT M/M and COMT V/V: in Hadza (COMT M/M – 0.231 and COMT V/V – 0.287) and in Datoga (COMT M/M – 0.107 and COMT V/V – 0.433). The difference in allele frequency of DRD4E3 VNTR with 7 repeats (in Hadza – 0.,093 and in Datoga – 0.213) and in distribution of homozygous genotypes 7/7 (in Hadza – 0.010 and in Datoga – 0.061) was found. Other loci studied haven't showed any significant differences between these two populations. We suggest that the differences in distribution of COMT and DRD4E3 genotypes in Hadza and Datoga are due to the different adaptations for in-group and out-group social competition. This study was supported by the RAS Program "Molecular and Cell Biology", RFBR (project # 13-04-00858), RFHR (project no. 12-01-00032),and the President RF Program (# 2501.2014.4).

Key words: *COMT, DRD4, MAOA, DRD2, allelic polymorphism, African populations Hadza and Datoga, aggressive behaviour*

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POLYMORPHISM OF THE Y-CHROMOSOME IN KAZAKH POPULATIONS FROM THE PERSPECTIVE OF "SHEZHIRE" STRUCTURE

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In the perspective of the heritage of the steppe nomads – Shezhire – the genealogy of Kazakh population represents a complex system of tribal structure. Shezhire is based on the patronymic tradition memory. Names of "clan" or "tribe" are inherited like the genetic information on Y-chromosome. This enables to trace the connection between social (Shezhire) and biological (Y-chromosomal) relationships and verify the hypotheses of the origin of some tribes. These data on the fine structure of the gene pool of Kazakh population provides also information about historical migrations. We studied the genetic variations of Y-chromosome in three ethno-territorial units of 14 clans and 20 tribal groups of the Kazakhs in the perspective of hierarchically organized tribal structure. A total of 1407 samples were analyzed by 40 Y-chromosome SNP and 17 STR markers. Summary statistics of haplotype variation were calculated, genetic relationships between subpopulations were estimated, and the phylogenetic tree of microsatellites haplotypes was constructed. It was revealed that there are nine dominant haplogroups in Kazakhs: C3 (xC3c)-M217(xM48), C3c-M48, G1a-P20, J2-M172, N1c1a-M178, O3a3c1-M134, Q-M242, R1a1a*-M198(xM458), and R1b1a-P297. The genetic diversity in the Kazakh population was estimated to be 0.869 ± 0.004. "Genetic portraits" of each tribe and clan were created. The phenomenon of dominance of an individual haplogroup in each clan was revealed. It suggests that in many Kazakh clans most of their members trace their origins to one biological founder. Thus genetic data largely agree with the genealogical structure of "Shezhire". Note, that the generic (clan) level of organization of the Kazakh population most accurately characterizes the gene pool structure based on Y-chromosome polymorphisms that the "tribal" or "regional" levels. This study was supported by RFBR grant 14-06-31331, Presidium RAS program "Molecular and cell biology" and Targeted funding of Ministry of Education and Science of Republic Kazakhstan.

Key words: *Y-chromosome, Kazakh population, population genetics, genealogy*

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Section PHYSIOLOGICAL ANTHROPOLOGY

OXYTOCIN RECEPTOR GENETIC VARIATION, FERTILITY AND DESIRE FOR PARENTING IN RURAL KHANTY AND MANSI OF WESTERN SIBERIA

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There is a growing evidence of the role of oxytocin receptor gene polymorphism in attachment, pair-bonding and cooperation (Bakermans-Kranenberg, van Ijzendoorn, 2008; Feldman et al., 2010; Gordon et al., 2010). The goal of this study was to test how a SNP polymorphism (rs53576) of the oxytocin receptor gene relates to fertility and parental efforts in rural sample of Khanty and Mansi from Khanty-Mansijsky Autonomous District, Berezovsky and Belojarsky regions. Demography, anthropometry, psychological data and buccal smears for DNA extraction were collected among a traditional fishermen population of Khanty and Mansi. The sample size consists of 182 adult individuals (95 men and 87 women) with the age range from 17 to 70 years (median 38 years). The SNP polymorphism for rs53576 was genotyped, using TaqMan SNP Genotyping Assays. The distribution of genotypes in our sample was: 35.7% AA; 45.1% AG; 13.7% GG. At first, we tested the association of these genotypes with the number of children born in both sexes, but found no significant result. Next, we examined a female sample exclusively and conducted linear regression analyses with the number of pregnancies and abortions as dependent variables, and age and genotype as independent variables. Significant effects were revealed for both predictors. Women, carriers of the AA genotype had significantly more pregnancies ($R2= 0.479$, $\beta =0.202$, $t= 2.471$, $p<0.016$), as well as abortions ($R2= 0.305$, $\beta =0.238$, $t= 2.530$, $p<0.013$), compared to the AG and GG genotypes. These findings are discussed in line with the data on the role of oxytocin in empathy and stress reactivity. Supported by RFBR, grant 13-06-00393a.

Key words: *oxytocin receptor gene polymorphism, parenting, Khanty–Mansi, reproduction*

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2D:4D RATIO AND HORMONAL STATUS IN SCHOOL CHILDREN FROM THREE REGIONS OF RUSSIA: SEX AND AGE DIFFERENCES

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The relevance of 2D:4D ratio to prenatal level of androgenization has been currently in the center of attention. The data on association between 2D:4D and testostosterone in adult males are highly inconsistent. In this paper we present the data on 2D:4D ratios on both hands, saliva testosterone and cortisol levels in the sample of 1545 boys (mean age: 13.49 ± 2.18 years) and 1716 girls (mean age: 13.56 ± 2.16 years) from three regions of Russia (Central, Volga-river and Northern Caucasus regions). Mean 2D:4D ratio differed significantly in boys and girls (0.97 and 0.98 respectively) on both hands. There was no correlation between 2D:4D and age with control for sex and the region of study. Both saliva testosterone and cortisol levels were higher in boys, compared to girls. The effects of the region and age were significant as well. No association between testosterone level and 2D:4D ratio were found for both sexes. We discuss our data in the light of previously publish data on testosterone and the digit ratio. Supported by RFBR, grant 13-06-00393a.

Key words: *2D:4D, saliva testosterone and cortisol, sex, age*

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ASSOCIATION BETWEEN CIRCADIAN PHASE AND LIGHT BEFORE BEDTIME IN JAPANESE CHILDREN AND THEIR PARENTS

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It has been pointed out that the children have short sleep time and late bedtime in some countries. Since we have already reported that photosensitivity to light in children is larger than that in adults, exposure to artificial light at night may be a cause of delayed circadian rhythm in children. In this study, association between lighting condition before bedtime and individual difference in circadian phase in children were examined. Twenty children (9.2±1.9 years) and seventeen of their parents (41.7±5.0 years) volunteered to participate in this study. The study was approved by the local Ethics Research Committee in Kyushu University. Firstly, in an accommodation facility, salivary samples were collected every 30 min from 19:00 to habitual bedtime under dim light (< 15 lx) to measure salivary melatonin concentration. Timing of dim light melatonin onset (DLMO) was determined as a marker of circadian phase. The DLMOs in children and their parents were 20:58 ± 42 min and 21:58 ± 96 min, respectively. The DLMO in children was significantly correlated with that in their parents. This suggests that circadian rhythm of parents can affect that of children. Next, the illuminance level and color temperature of light was measured at home in each participant by themselves. The average and standard deviation of vertical illuminance level at their eye level and color temperature of light was 140.0 ± 82.7 lx and 3862.0 ± 965.6 K, respectively. Interestingly, there were significant positive correlations between DLMO and color temperature in adults and children although illuminance level was not significantly correlated with the DLMO. These results suggest that circadian phase of children is affected not only by circadian rhythm of parents but also by color temperature of light before bedtime in Japan.

Key words: *circadian rhythm, melatonin, sleep, children, light at night*

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COMPARISON OF CEREBROVASCULAR AND CARDIOVASOCULAR RESPONSES TO DYNAMIC ORTHOSTATIC STRESS USING SINUSOIDAL LOWER-BODY NEGATIVE PRESSURE

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In the evolution of human bipedalism, gravity is one of the essential environmental factors to which humans had to adapt. The high metabolic demand of the human brain necessitates the upward delivery of a large proportion of the cardiac output (CO), and the relatively large length of human legs causes blood pooling in the legs along with orthostatic stress. The ability of cerebral vasculature to maintain relatively steady blood flow in the face of changing mean arterial pressure (MAP), termed cerebral autoregulation (CA), is critical to adapt to gravity. Although CA is an integral component of the systemic circulation system, little is known about the relationship between cardiovascular regulation and dynamic CA in response to transient changes in MAP, such as during changes in posture. We examined the cerebrovascular and cardiovascular responses to dynamic orthostatic stress using sinusoidal lower-body negative pressure (SLBNP), which can simulate orthostatic blood shifts. We measured the middle cerebral arterial blood flow velocity (MCAv) and cerebral blood oxygenation (OxyHb), MAP and CO in 13 adult male subjects. Two different periodic changes (18- and 90-sec of 0 to −40 mmHg) of SLBNP were provided. The transfer function of gain to MAP (that is, vascular conductance during the 90-sec period) was significantly larger than that of the 18-sec period in all parameters (MCAv, OxyHb, and CO), but the conductance ratio between 90-sec and 18-sec was significantly larger in CO compared to MCAv. These results suggest that the systemic regulatory system including CA could be responsive to the slow fluctuations of MAP and that CA is relatively stable over a wide range of MAP fluctuations in frequency. The unique characteristic of CA could also include the ability to maintain relatively steady blood flow in the face of changing frequencies of MAP fluctuation.

Key words: *cerebral autoregulation, whole body coordination, gravitational stress*

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SEASONAL VARIATION IN BASAL METABOLIC RATE AND THERMOGENIC RESPONSE TO COLD

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The purposes of this study were to clarify a seasonal variation in basal metabolic rate and thermogenic response to cold environment. Twenty healthy men attended to this study, including cold exposure test, measurements of maximal oxygen intake, vascular function, basal metabolic rate, daily activity, and air temperature surrounding them in daily life, in winter and summer. In cold exposure test, subjects were remained supine rest in the climatic chamber for 90 min, where air temperature was gradually declined from 26°C to 5°C in 90 min, with measuring rectal and skin temperatures, oxygen intake, skin blood flow, and blood pressure.

Basal metabolic rate in winter, compared with summer, increased in 13 subjects (increase BMR group) and decreased in others (decrease BMR group). In the increase BMR group, oxygen intake, rectal and finger skin temperatures during cold exposure, and daily physical activity were significantly higher in winter than summer. In the decrease BMR group, there were no seasonal difference in oxygen intake, rectal temperature, and daily activity. In winter, oxygen intake and rectal temperature during cold exposure, and daily physical activity were significantly higher in the increase BMR group. Furthermore, an onset of increment in oxygen intake during cold exposure was observed earlier in the increase BMR group than in the decrease BMR group in winter. These results suggest that cold-induced thermogenesis is affected by seasonal variations in basal metabolic rate, and that a person with increase in basal metabolic rate from summer to winter has a calorigenic type of cold adaptation especially in winter, resulting in improved cold tolerance.

Key words: *thermogenesis, cold tolerance, thermoregulation, seasonal variation, basal metabolic rate, oxygen intake*

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INDIVIDUALLY-TYPOLOGICAL PREDICTORS OF RESISTANCE TO THERMAL STRESS

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The purpose of this study was to investigate the influence of different individual-typological indicators for resistance to thermal stress (heat stabilization). 38 well-trained athletes and soldiers were surveyed twice before and after the heat load in a special heat chamber. A survey of one person was held for two days and took an average of 4 hours a day. The heat load to +40 degrees Celsius, at 85% humidity was simulated in a heat chamber. The hardware control via remote sensor and humidity sensor was provided. The load represented 60-min stay in the cell. The subjects were not allowed to sit, or drink the water. During all time of staying in the cell they quietly walked or stood. All participants signed a voluntary agreement to participate in the experiment. Over 200 different indicators were taken from each participant prior and after the heat load. As criteria of stability to thermal stress the following conditional indices of physical disability were taken: the difference of average work power on a bicycle ergometer in Wingate Anaerobic Test before and after a stay in the heat chamber, and others. The differences were taken into account. Individuals with maximum differences were seen as less resistant to the thermal stress. Among proposed indicators of physical disability, the impact of different individual-typological indicators and their complexes, such as morphological features, personal and psychological traits, visimetrics indicators, indicators of psychomotoric system, cognitive index, fingerprint dermatoglyphics, electroencephalographic portrait (profile), biorythmological characteristics, astrological portrait, as well as the combination of all those indicators were studied. Some predictors are selected, and the decision rules are developed, allowing in laboratory conditions to predict what individually-typological characteristics will limit physical capacity of a person in the conditions of heat stress.

Key words: *individually-typological characteristics, physical capacity, thermal stability, prediction*

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INFLUENCE OF ADAPTIVE PRESSING ON ANXIETY PARAMETERS AND CORTISOL LEVEL IN STUDENTS FROM MOSCOW AND OTHER CITIES OF RUSSIA

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One of the most important directions of medical anthropology is an investigation of reactions to stressors characteristics for the contemporary "modernized" society. 490 university students from Moscow (Lomonosov Moscow State University, 1st place in the rating of Russian universities, including the level of demand for graduates among employers); from the city of Perm (Pedagogical University, 42nd place in the ranking of 213 pedagogical universities); and from the branch of this university in the town of Kudymkar, an administrative center of agricultural region, (126th place in the rating) were examined. Moscow population is 11,5 mln. people, Perm – 1,026000,00; Kudymkar – 30,500. Moscow students are characterized with high anxiety levels and low levels of cortisol in saliva. These reactions are typical for the dwellers of a megalopolis, which are developed under the feeling of external threat at constant gathering of large amounts of people and cause the appearance of chronic tension syndrome. At the same time, in Moscow sample, the lowest levels of situational anxiety are registered. It can be suggested that students receiving their education in a prestigious university are sure in their professional perspectives and less worried about the future place of work. The students from demonstrate the highest levels of situational anxiety, uncertainty and cortisol levels. It can be a manifestation of serious concern about their future life: education in a not very prestigious university with relatively low ratings does not guarantee a successful carrier. But relatively high level of aspirations causes significant emotional load expressed in the increase of anxiety and cortisol levels. The lowest levels of cortisol, uncertainty and anxiety are registered in the students from a small town. It means that the graduates even from a low-rating university can regard themselves as quite competitive in their low urbanized region with small number of people with the university degree. This positive illusion perception of their own qualities and an exaggerated self-evaluation are associated with reliably lower cortisol levels (Taylor et al., 2003), during the period of time when this illusion is being supported. This study is performed within the frames of project # 2684 of the Ministry of Education of the RF.

Key words: *urbanization, stress, cortisol, anxiety*

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POPULATION STRUCTURE OF THE ISLAND OF RAB ESTIMATED BY THE ANALYSIS OF BIOCHEMICAL TRAITS

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Island population isolates are best for investigating theoretical hypotheses about microevolution by applying holistic approach. Anthropological and genetic research of the inhabitants on the Adriatic coast, particularly of the island populations, was started in 1972 by Academician Pavao Rudan. Biochemical traits are good indicators of the microevolutionary influence on the biological structure of the population. The aim of this research was to study the population structure of the island of Rab by the analysis of biochemical traits. This research contributes to anthropological investigations of microevolutional trends that have shaped the present genetic structure of the population of Rab. The sample collected in 2002 is comprised of 600 adult individuals from five island settlements. Biochemical traits (creatinine, urate, cholesterol, triglycerides, HDL cholesterol, LDL cholesterol, glucose) were analyzed using multivariate biostatistical methods in order to determine the degree of heterogeneity among the populations of the island settlements and the pattern of their variation. Heterogeneity among subpopulations of the island of Rab in biochemical traits was determined by blood glucose and LDL cholesterol. Biochemical variability among the populations corresponds to that of previously established for morphological traits of head and body and most likely reflects genetic differences, given the fact that those populations have been exposed to a homogenous physical environment. The results on biological variability within the population of the island of Rab are in line with the historical data on settlers from different areas from the mainland and in different time periods, and with the data on their reproductive isolation.

Key words: *population structure, island isolate, Rab, Croatia, biochemical traits*

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THE LINEAR GROWTH: PROGNOSIS CRITERIA IN GROWING UP CHILDREN

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The linear growth is an important indicator of health and harmonious development of child. It is known that dimensions of skeleton depend on content of calcium in bones. Until now, it was considered that only dual-energy x-ray absorptiometry made it possible to determine amount of bone mineral in skeleton bones. However, application of dual-energy x-ray absorptiometry for evaluation of growth processes in children is not recommended. The implementation of qualitative ultrasound analysis of bones in pediatrics permitted to establish that this method reflects content of calcium in cortical layer of tubular bones. During last 10 years it is proved that linear growth of children of early and preschool age depend on content of calcium in cortical layer of tubular bones. The original national standards of bone strength in children from birth to 16 years were developed to implement qualitative ultrasound analysis into pediatric practice. The sampling included 2854 examined children from period of newborn to 16 years. The study used ultrasound device Sunlight Omnisense (Israel). The indicators of bone strength were determined according speed of sound - SOS (m/sec) passing along cortical layer. The speed of sound is an integral value characterizing content of mineral in bone, structure of cortical level and its thickness. This method is distinguished by its high sensitivity and specificity, rapidity of application and low cost. The analysis provides values of bone strength and integral value (Z-score) expressed in units of standard deviation (SD) towards middle-aged standard of bone strength for children of the same age and gender. The original standards of bone strength (M±m) with regard to age and gender were developed. On the assumption of standards, children with decrease of speed of sound less than -1SD are referred

to risk group with decreasing of growth rate, skeleton size and insufficient content of mineral in cortical layer. The application of national standards made it possible to establish insufficient mineralization of tubular bones in 9.8% of newborns, 10.2% of children of first year of life, 10.8% of two-year-old children and in 12.5% of three-year-old children. Besides, it is proved that under value of speed of sound less than -1SD significantly more frequent low physical development and body height less than 10th percentile were observed ($p<0,05$). This pattern is observed in older age and especially in children with severe chronic pathology effecting linear growth. Therefore, monitoring of age-related mineralization of bones using method of quantitative ultrasound examination makes it possible to form risk group with disorders of physiological processes of mineralization of skeleton and linear growth for benefit of practical significance.

Key words: *children, quantitative ultrasound examination, mineralization of skeleton, linear growth.*

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BROWN ADIPOSE TISSUE IN HUMANS: PRESENCE AND ACTIVITY

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Over the past 7 years the interest in brown adipose tissue (BAT) has increased dramatically due to several bright publications in which it was shown that active BAT is found not only in infants but also in 70–80% of adults. In animal models, the efficiency of BAT in the prevention of the obesity and type 2 diabetes has been proven. Therefore, when in January, 2012, a hormone IRISIN was discovered, which is produced by muscles during their activity and stimulates transformation of white fat cells into BAT cells or similar ones ("beige"ones), expectations have been raised on the use of certain therapeutic techniques for the increase in the amount of active BAT in adult humans. It is shown that the production of irisin in muscles occurs both at movement, and at thermogenic shivering in cold conditions. To date, it became apparent that there are at least three varieties of BAT, differing in origin (from different progenitor cells), in the ratio of active biochemical mechanisms and methods of activation. Moreover, it is clear that the amount of BAT in the body itself and even the content and activity of specific for BAT protein UCP1, uncoupling oxidation and phosphorylation, do not reflect the real functionality of the normalization of metabolic processes. It is likely (and this possibility has been widely discussed in the literature of the past two years) that, despite the unified mechanisms for energy dissipation, known today as 3 options BAT fundamentally differ in their function. According to one hypothesis, the original version of BAT, available in neonates and continuing in a small number of adults, provides thermal homeostasis; "Beige" version of BAT, formed under the influence of a muscle hormone irisin, is far more widespread and is involved in the maintenance of carbohydrate homeostasis and thus is a factor in the prevention of obesity and diabetes. The third option – "brite" – also, apparently, depends on the irisin influence, but is intended to solve the problem of homeostasis during intense muscular activity due to its ability to oxidize lactic acid. As far as the functioning of these options overlap and whether they can be compatible solutions for such different homeostatic problems is an issue to the further studies.

Key words: *brown adipose tissue; irisin; homeostasis; adult humans; functional activity*

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PHYSIOLOGICAL RESPONSES TO REPEATED INHALATIONS OF TREE ODORS IN INFANTS

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We investigated the physiological responses to inhalations of odorous components of coniferous trees in infants. The participants were 57 infants of 1-3 months old whose parents gave a written informed consent. Each infant was exposed for two or three minutes to three different odors of α-pinene, limonene and a control (air). Two or three minutes of rest were taken before and after the exposure to odors. During this rest-inhalation-rest course, cerebral activity (NIRO200, Hamamatsu Photonics KK.) and an electrocardiogram (Polymate II AP-216, TEAC) were continuously measured. Heart rate and heart rate variability were calculated from the electrocardiogram. The measurements were repeated with a 2-week interval until the infants became 3.5 months old. The data was analyzed excluding the cases where the infants fell asleep or cried. The cerebral activity was enhanced in response to all three odors including the control. The heart rate significantly decreased in response to α-pinene ($p<0.05$), but not to limonene and the control. The heart rate during the inhalations of the odors decreased as the number of repetition increased ($p<0.01$). The sympathetic and parasympathetic nervous activities, which were assessed by heart rate variability analysis, did not show significant changes. We consider that the measurement system we have built for assessing infants' physiological responses to odors is useful, but further investigations are still necessary as there were many missing data accompanying infants' crying or sleeping.

Key words: *near infrared spectroscopy, heart rate, heart rate variability, olfactory stimulation*

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EFFECT OF SINUSOIDAL LOWER-BODY NEGATIVE PRESSURE ON CEREBRAL BLOOD FLOW AND EVENT-RELATED POTENSIALS

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A decrease in central venous pressure caused by orthostatic stress reduces the cerebral blood flow. Lower-body negative pressure is used as a perturbation to the cardiovascular system and has been applied to simulate the gravitational stress of orthostatic blood shift in humans. However, little is known about how dynamic changes in the cerebral blood flow affect brain activity. Using sinusoidal lower-body negative pressure (SLBNP) as a postural blood shift simulation and event-related potentials (ERPs) extracted from electroencephalograms (EEGs) of subjects engaged in an oddball task, we assessed whether mild blood pressure fluctuations disturbed brain activity. The middle cerebral arterial blood flow velocity (MCAv) and cerebral blood oxygenation (OxyHb) were measured in 11 healthy male adults. Two different periodical changes (18- and 90-sec of 0 to −40 mmHg) of SLBNP were provided. We observed that the fluctuations of MCAv and OxyHb coincided with the SLBNP. We found that the N100 amplitude evoked by standard stimuli at 18-sec was significantly decreased compared to the 90-sec SLBNP and to the one without-SLBNP condition, but there was no significant effect of SLBNP on the P300 amplitude. These results indicate that SLBNP affected the cerebral blood flow, whose fluctuations affected brain activity. Our findings suggest that there is a relationship between mild fluctuations of cerebral blood flow and brain activity.

Key words: *cerebral blood flow, event-related potentials, lower-body negative pressure*

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