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DEMOGRAPHIC CHARACTERISTIC of the HUMAN POPULATION in DIFFERENT ECOLOGICAL REGIONS of PRECARPATHIA

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The present paper is a fragment of scientific theme “Genofond of the population of the Precarpatian region: the influence of ecological, geographical, social and economical factors on its structure formation of human’s healthy”, the number of state registration 0108U008811.

Background. In the recent decade the quantitative and qualitative state of environmental mutagenic factors has altered significantly. Their negative impact on the gene pool of all living creatures has increased, which can result in the augmented mutagenic pressure on human populations [5]. Provided that unrestrained environmental pollution takes place, the future unfolds a new genetic disaster along with an ecologic one. This requires elaboration and implementation of the environmental ecological monitoring, which aims to organize systemic observation of the biosphere changes. Taking into account the abovementioned, the urgent problem of ecological genetics is spotlighted, that is systemic observation of the genetic aspects of environmental pollution and forecasting far-reaching effects of the mutagenic pressure influence on the living nature state and human genetic apparatus. These changes of the human genetic apparatus cause cell function impairment, which could trigger rapid ageing of the organism on the whole. Overwhelming majority of countries have reflected a tendency towards prolonged life expectancy of their population, which leads to increased number of senile people, who aspire to protract the normal physical, social and psychological activity span as much as possible [3].

Therefore an anti-ageing campaign elaboration, based on profound knowledge of life expectancy and longevity formation mechanisms is an absolute medical priority. Contemporary notions imply ageing is a deceleration, depression and loss of physiological functions of the organism in concomitance with an increased frequency

of oncologic and degenerative diseases [4]. On the cellular level ageing is based on the cellular impairment accumulation, survival mechanisms depression, cell and tissue regeneration abatement. Molecular mechanisms of ageing comprise mutations, DNA replication and repair impairment, protein glycolysis, transverse macromolecular sutures formation, oxidative stress, methylation, etc [1].

Results of twins’ longevity investigation proved that life expectancy inheritance is of 30-40% [9]. Centenarians’ descendants were four times more likely to live up to 85 years and more, than those whose progenitors died in the age of 73 [11]. Though longevity is to a large extent predisposed by genetic features, the role of exogenic ones, such as mode of life and nutrition, is of a vital importance. For that reason identification of the genes responsible for life expectancy and development of age-related diseases is essential as well as identification of genes and environmental factors interrelation [2]. It is required that genetic polymorphism of various populations is taken into account [10]. Contribution of genetic divergences proportions on all levels of citizens of the Globe hierarchy structure investigation of portion data indicate that its lion’s share is due to intrapopulation variability level. This explains considerable divergences in people’s response to the pressure of the same environment [7]. Thus variability level inside the group is essential to absolutely optimal to define genetic differentiation of population according to environmental factors influence.

Aim of the research. To define the long-livers’ apportionment combined with age-related populace structure in various ecologic-geographical areas of Ivano-Frankivsk region.

Materials and methods of investigation. In the course of conducted research we applied set of methods (population-statistical, questionnaire, clinico-genealogical, statistical), which comply

with the aim and meet the required integration principle of several approaches in analysing physical and genetic health of long-livers population. Primarily, data of the regional administration of statistics reports within 1995-2005 was processed. By means of questionnaire a representative sample of regional long-livers has been created. Questionnaires comprised three chapters: 1-passport data and anamnesis vitae; 2- anthropometric and clinical examination data; 3- genetic investigation results. Undivided attention was focused on the residence duration in the given district (considering the fact that senile people involved into research could possibly resettle or move to relatives), working and living conditions, pernicious habits, occupational hazards, etc.

Basic systems and organs functioning indexes, disease occurrence at present and in the past, blood groups of the ABO system and RH-/ + were taken into consideration. Genealogical method facilitated identification of long-livers among propositus relatives.

Results of investigation and discussion. In order to evaluate environmental ecological state of the Precarpathian region, we have carried out a comprehensive analysis of the indexes, included into the Ivano-Frankivsk region ecological certificate. In addition to region general characteristics (population quantity, physical and geographical characteristics of the production complex, the list of ecological hazards) we have also analysed atmospheric air indexes of the water and land stocks. Aspects of waste disposal and dangerous chemical substances handling as well as radiation safety indexes were considered in the course of investigation. On the basis of obtained data we have suggested nature conservation planning measures within the region and drawn attention to the region vital ecological problems.

To identify dynamics of Ivano-Frankivsk region populace structure, a special analysis was performed based on demographic indexes within 1995-2005 years (**chart**). It has been identified that an overall populace number in Precarpathian area in 2005 equalled 1million 386.22 thousands. The age-related apportionment was the following: 1)246.3 thousands were under able-bodied age; 2) 936.20 thousands were of the able-bodied age;

3) 203.71 thousands were above the able-bodied age. Surprisingly, a positive correlation between overall populace reduction and people 0-14 and 25-44 years of age reduction was registered. Conversely, senile people portion has increased. This suggests a tendency towards ageing of Ivano-Frankivsk region populace. Therefore investigation of endogenic and exogenic factors in life expectancy and longevity formation was a consistent sequel.

We have stated that Precarpathian area comprises 4566 long-livers, whose age is 90 years and more. Comparative analysis of their quantity in different region's districts proved their majority in Kalush and Kolomyia district, 568 and 503 long-livers respectively (**fig.**). Minority of the long-livers was registered in Verkhovyna(108) and Bohorodchany(189) districts. However, absolute numbers do not reflect long-livers' portion among the region populace, therefore a relative index of the long-livers in the whole populace has been investigated. Concomitantly, the majority of long-livers was proved in Kalush district (0.84%), which belongs to chemically polluted area. Further analysis indicated that 71 % of long-livers of this district have their residence in rural area, mainly in relatively ecologically friendly villages (regarding to the data of our previous ecogenetic investigations) [6]. On the whole, rural long-livers portion in the region also prevailed but equalled only 60%. Besides, pedigrees of 71% of Kalush district long-livers displayed relatives of the I-II degree of kinship, which lived up to 90 years and more. The average regional index of people, hereditary predisposed to longevity ranges in the vicinity of 50%. Considering the fact that different people discerning sensitivity to environmental factors depends on the individual hereditary features, which promote adaptation process or, conversely, lead to maladaptation, we performed sampling of the material for studying metabolism genes, in particular II phase of detoxication system genes, which are responsible for interaction between genotype and environmental factors [8]. Presumably, adequate activity of the biotransformation process, which comprises enzyme transformation of heterogeneous inclusions or xenobiotics, is typical for long-livers of separate Precarpathian districts.



Figure. Apportionment of the Ivano-Frankivsk region long-livers.

Similar situation, regarding long-livers' quantity was registered in Rohatyn, Dolyna and Kolomyia districts 0.78%, 0.65% and 0.61% respectively. Surprisingly, abovementioned areas, except Rohatyn district, are characterized as ecologically unfriendly. This proves hypothesis, which implies biotransformation genes significance in the support of active ageing and longevity.

In the recreation area (Verkhovyna and Kosiv districts) relative quantity of long-livers was 1.5 and 1.9 times less than that of Kalush area. While studying pedigrees it was identified that half of examined people didn't have relatives, who have lived up to 90 years or couldn't recollect their progenitors. Historic events, which took place within last century on the given territory, should be taken into consideration during obtained data analysis. The overwhelming majority of interrogated people's relatives have died or vanished. Indisputable influence of harmful factors on the life expectancy of examined populations while manufacturing wooden and wool products, which is the main output in mountain areas, was proved. Pernicious habits (smoking and excessive alcohol consumption) are typical for 5 and 0.5% of all long-livers, compared with 1.4 times higher index among mentioned mountain areas

representatives. Exhausting work, frequent malnutrition, unavailability of contemporary medical aid did not facilitate healthy ageing as well. Geographic living conditions, which triggered population homozygote formation ensuing from inbreeding, should be taken into account as well. Thus, defined environmental factors complex combined with genetic apparatus features could effect sample formation of the mountain areas long-livers. The smallest percentage of long-livers in the regional centrum was a natural phenomenon. Concurrently with questionnaire analysis it was identified that only 95% were permanent urban residents, 42.5% stated unsatisfactory living conditions. Concomitantly, the latter were twice less registered among rural resident. Occupational hazards were stated by 61%, pernicious habits-by 6%. Undoubtedly, urbanized environment has a negative impact on social health. Unfavourable impact on the urban residence duration is exacerbated by industrial, domestic and automobile refuse, low quality potable water, etc. For that reason, despite medical aid availability improvement, we observe shortening of life expectancy combined with negative population growth in the cities of Ukraine, Ivano-Frankivsk in particular.

To evaluate life expectancy association with presence of certain erythrocyte antigens, an apportionment of different blood groups in ABO and Rh-/+ systems among various regions populace was investigated. It was stated that Rh+ with I (O) and II (A) blood groups in ABO system prevailed among the examined. However, no statistical plausibility in the mentioned divergences was detected. Simultaneously, the number long-livers with IV (AB) blood group was the least, which correlates with average population indexes.

Lon-livers health investigation proved 21% belongs to the first health group. The lion's share of all diseases, diagnosed in long-livers, comprise cardio-vascular disorders (78%), a bit less-respiratory system disorders (21%). It's worth emphasizing that none of the long-livers suffered from obesity but was characterised by normosthenic type physique.

Obtained data could possibly serve as a basis for further investigations of the role of genetic factors, in particular of xenobiotic detoxication genes polymorphism, biochemical system of non-specific defense, which would promote modern conception of longevity elaboration and methods of healthy ageing potential implementation.

Chart

Age-related apportionment of the Ivano-Frankivsk region populace

Years of investigation	Quantity of people	Age-related groups				
		0-14 years	15-24 years	25-44 years	45-64 years	65 years and more
1995	1439059	332307	209277	413034	306728	177713
1996	1434937	326748	209521	412517	304809	181342
1997	1430336	320448	209257	412993	301438	186200
1998	1424683	311302	210680	414341	297952	190408
1999	1418278	300676	213271	413777	297325	193229
2000	1412655	291185	215945	411795	297678	196052
2001	1406129	280253	219018	409890	297837	199131
2002	1400933	269779	222645	407799	300307	200403
2003	1395096	260706	224088	404320	304596	201386
2004	1390890	253383	225233	400702	310090	201482
2005	1386221	246303	224891	398173	313144	203710

Conclusions.

1. Environmental ecological state of the Precarpathian region on the basis of the Ivano-Frankivsk region ecological certificate has been investigated,

2. The dynamics of age-related structure of the Ivano-Frankivsk region populace within 1995-2005 years has been investigated: 29% reduction in the number of people under able-bodied age, insignificant frequency ranges of the able-bodied people, 14.6% increase of the senile people portion.

3. There has also been identified an interdependence of long-livers' apportionment through the region and geographic, ecologic, social factors. The negative impact of urbanization and pernicious habits on the life expectancy and longevity has been proven as well.

4. Genealogical analysis results indicate hereditary predisposition to longevity formation (from 50 to 75% in different populations).

Further perspective. Considering population approach, xenobiotic detoxication genes polymorphism and biochemical system of non-specific defense will be juxtaposed with quantitative evaluation of environmental factors. Profound study of the ageing genetic fundamentals enables elaboration of the methods, which are likely to improve quality of the senile people's life.

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ДЕМОГРАФІЧНА ХАРАКТЕРИСТИКА ПОПУЛЯЦІЇ ЛЮДЕЙ В РІЗНИХ ЕКОЛОГІЧНИХ ЗОНАХ ПРИКАРПАТТЯ

Ковальчук Л.Є., Козовий Р.В., Малофій Л.С. Савчук Р.М.

Резюме. Вивчено фізико-географічні та хімічні характеристики довкілля Прикарпаття. Встановлено динаміку вікового складу населення Івано-Франківської області за 1995-2005

роки: зменшення кількості людей молодших за працездатний вік на 29%, незначні коливання частоти осіб працездатного віку та зростання частки людей похилого віку на 14,6%. Виявлено залежність розподілу довгожителів по районах області від географічних, екологічних та соціальних умов, доведено негативний вплив урбанізованого середовища, шкідливих звичок на тривалість життя та довголіття. Результати генеалогічного аналізу засвідчили спадкову схильність до формування довголіття (від 50 до 75% у різних популяціях).

Ключові слова: екологія, довголіття, спадковість, спосіб життя.

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ДЕМОГРАФИЧЕСКАЯ ХАРАКТЕРИСТИКА ПОПУЛЯЦИИ ЛЮДЕЙ В РАЗНЫХ ЭКОЛОГИЧЕСКИХ ЗОНАХ ПРИКАРПАТЬЯ

Ковальчук Л.Е., Козовый Р.В., Малофий Л.С., Савчук Р.М.

Резюме. Исследовано физико-географические и химические характеристики внешней среды Прикарпатья. Изучено динамику возрастного состава населения Ивано-Франковской области за 1995-2005 годы: уменьшение количества людей моложе трудоспособного возраста на 29%, незначительные колебания частоты людей трудоспособного возраста и увеличение пожилых на 14,6%. Установлена зависимость распределения долгожителей по районам области от географических, экологических и социальных условий, доказано негативное влияние урбанизированной среды, вредных привычек на продолжительность жизни. Генеалогическим анализом определено наследственную предрасположенность к формированию долголетия (от 50 до 75% в разных популяциях).

Ключевые слова: экология, долголетие, наследственность, образ жизни.

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М.М. Федоряк, Л.В. Брушнівська

ПРО ДОЦІЛЬНІСТЬ ЗАСТОСУВАННЯ ІНДЕКСУ ЧАСТОТИ ЗУСТРІЧАЛЬНОСТІ ПРИ ДОСЛІДЖЕННІ АРАНЕОКОМПЛЕКСІВ ТЕХНОГЕННО ЗАБРУДНЕНИХ ПРИМІЩЕНЬ

Чернівецький національний університет ім. Юрія Федьковича (м. Чернівці)

Дане дослідження є фрагментом планової кафедральної науково-дослідної роботи «Біоіндикація промислових зон міста Чернівці», номер державної реєстрації 0106U003612.

Вступ. Проблема боротьби зі шкідливим впливом промислового виробництва на природне середовище залишається актуальною. Разом з викидами промислових підприємств у навколишнє середовище потрапляють шкідливі сполуки, пил, забруднюючи всі компоненти екосистем та згубно впливаючи на живі організми. Попри те, що антропогенне навантаження на довкілля наразі має тенденцію до зменшення, загалом нинішню екологічну ситуацію не можна назвати задовільною [8]. Так, лише у повітряний басейн Чернівецької області стаціонарними джерелами забруднення, останніми роками, викидається в меж-

ах 5000 т шкідливих речовин, в тому числі в м. Чернівці – 1400-1800 т [9].

Відомі фізико-хімічні методи, що визначають забруднення природних об'єктів, не дають чіткої картини техногенного впливу на живі організми. Відтак все більшої актуальності набувають методи біомоніторингу. Виявлення загальних закономірностей у змінах тваринних угруповань є одним із важливих завдань біомоніторингових досліджень на антропогенно порушених територіях, однак лише незначна кількість систематичних груп тварин застосовується у якості біоіндикаторів антропопресингу [1-3,5-7,10,11,15]. Павуки належать до перспективних компонентів біоценозів, які щойно починають знаходити своє застосування у біоіндикаційних дослідженнях [4,12-14].