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# Health Condition, Molecular Genetics and Biochemical Markers of Individual Sensitivity to Xenobiotics in Children

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In the articleanalyzed factors which are the informing markers of inclination to forming of the ecologically determined pathology. The prospects of application of these markers are considered for prognostication of clinical motion of ecodetermined diseases. It is shown that knowledge of markers of inclination and individual sensitiveness of organism to influencing of xenobiotics allow to conduct the timely correction of violations which arise up at forming of the ecologically determined pathology and to put on the brakes its subsequent development.

*Keyword:* To Put, Genetic Markers, Ecodetermined Diseases

## 1. Introduction

To protect mothers and child health is the main priority problem of modern medicine in Ukraine. State of health of children today is characterized by high level of morbidity, and by significant increase in the number of cases of chronic diseases of internal organs and systems. Numerous epidemiological studies indicate that practically all well-known diseases in one way or another connected with the negative external factors. Depending on the characteristics of the genome, different individuals can maintain stability or, on the contrary, show increased sensitivity to damaging agents[1,2,4,5,6,8,9].

Despite numerous studies in eco pathology of children detection of ecologically dependent variations in the state of their health remains a difficult task due to both a large variety of environmental factors on children's health in human population and the complexity of calculation of cause-effect relationships[2,3,4,6,7].

Therefore the aim of our study was to investigate the health of children living in ecologically unfavorable areas.

## 2. Materials and Methods

At the first stage of work were examined 348 children from 6 to 16 years old who reside from birth in conventionally ecologically clean region (ECR) selected by random sampling. All children conducted general clinical examination, which included medical history (including genealogical), the study of primary documents (medical form 112 / y), clinical examination, blood pressure measurement, ultrasound of internal organs and thyroid gland. According to the requirements in bioethics "About the laboratory studies of biological material" written consent to the study of biological material from each child's parents was received. In addition to clinical examination, to all children was conducted a series of laboratory tests in particular the distribution of alleles of the gene GSTM1 and GSTT1 (using the method of multiplexed

polymerase chain reaction), the activity of alcohol dehydrogenase (ADH by using E.M Belokon, Chernik Y.I, Bodnar L.S), the activity of glutathione -S-transferase (GST, the method of Habig WH).

Statistical analysis of the results of research was carried out by the generally accepted method using a personal computer in software package "Statistica".

## 3. Results

Analysis of complaints which examined children were presenting showed that children often were disturbed by frequent abdominal pain (q = 0,30), decreased appetite (q = 0,30), fatigue (q = 0,19), frequent nausea (q = 0,18), ie the non-specific signs of general intoxication. Such complaints as allergic skin rash and bedwetting were in 11% of the examined children.

We have analyzed a number of adverse ante-and postnatal nonspecific risk factors of pathology formation that lower the body's defenses and may compose premorbid background for the occurrence of any pathology. Toxicosis of the first half of pregnancy in mothers of surveyed children was quite common (30% of the patients), anemia of pregnant and the thread of miscarriage was in 15% and 14% of women, respectively. With a frequency of 27% in children were recorded frequent (more than 5 per year) acute respiratory infections, one in five children was on an early artificial feeding, and in 10% of the patients were observed in the past manifestations of atopic diathesis.

On the basis of anamnestic, clinical, ultrasound and laboratory data was established the presence of some diseases: in 38% of patients - hyperplasia of the thyroid gland, or goiter of I - III degree, 98% had dental caries and its complications in 15% of children was present enamel hypoplasia of teeth of III degree (HET) dentoalveolar deformations found in 58% of children, 13% - nocturnal enuresis and chronic tonsillitis, 11% - state of neurosis and various ophthalmological disorders. In 14% of the surveyed children were diagnosed chronic pyelonephritis and in 10% - dysmetabolitic oxalate nephropathy. It should be noted that to all examined children were provided recommendations on treatment and prophylaxis of relapses of revealed diseases that has significant practical importance. Consultation was provided by specialists with higher medical categories in different specialties and PhD.

Definition of features of the distribution of alleles of GSTT1 and GSTM1, which are responsible for body's ability to detoxify processes showed that in the group of children with ECR null allele GSTT1 0/0 recorded in 33% of individuals. Allele GSTM1 0/0 was found in 30% of individuals. The presence of both null alleles - GSTT1 0/0 and GSTM1 0/0 was found in 11% of children. Combination of null alleles of two genes responsible for the detoxification process in Phase 2 of biotransformation of xenobiotics in the body proved of value in diseases of children by nephropathy - the frequency of this combination in children with nephropathy was 3.6 times higher than in healthy children. Determination of alcohol dehydrogenase, the enzyme that causes the Phase I biotransformation and hlyutationtransferazy, Phase 2 biotransformation enzyme showed high enough their activity in children from ecologically clean district of Ivano-Frankivsk region.

For children with ECR characterized by low enzymatic activity the gene-trigger NAT-2, the products of which are involved in phase II detoxification, resulting in low capacity for acetylation in 88% of children and creates the basis for the formation of eco pathology, and primarily - kidney disease.

## 4. Conclusion

As a result of this project will be offered new, methodological approaches to the early diagnosis, prevention, treatment and medico-genetic prediction of environmentally determined diseases, including dental, through the correct learning of the main genes propensity in the formation of the pathology.

As a result of implementation of such developments will significantly reduce rates of child morbidity, disability and mortality on environmentally contaminated area by early diagnosis of eco pathology at the stage of preexisting diseases, more correctly pathogenetic

approach to preventing and treating symptoms of disease and medical genetic forecasting of possible effects of xenobiotics on the organism of children.

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