Acetylation processes play major part in metabolism. At present their ability to metabolize compounds containing aminogroups, i.e. to detoxity those compounds during Phaze 2 of xenobiotic biotransformations in the organism, are considered genetically determinined.

In recent research, special attention has been directed to the possibility of using acetylation capacity index to determine the predisposition to ecopathologies such as thyroid gland and urinary organs illnesses in the polluted environment.

It is a well-known fact, that one of the most important mechanisms for xenobiotics influence on a human organism is the disruption of activity of N-acetyltransferase enzyme, NAT2 genes production.

Thus, studying activity of N-acetyltransferase enzyme in investigated children is important, especially with ecologically determined diseases. Ivano-Frankivsk region is a typical example of a region with ecopathologies among children caused by the anthropogenic pollution of the environment. The region is one of the ten regions that form ecological situation in Ukraine. The ecological situation in the region is caused by the accumulation of pollutants, especially hazardous solid wastes of industrial and radioactive pollution after the Chernobyl disaster. Therefore, it has been important to study activity of N-acetyltransferase enzyme, NAT2 gene production in children who live in heavily chemically and radiation polluted areas in Ivano-Frankivsk region (Halych, Dolyna, Kalush and Sniatyn areas). The control group has been formed of children from the ecologically clean area of Horodenka, Ivano-Frankivsk region.
The research into activity of N-acetyltransferase enzyme, NAT2 gene production in children with ecologically determined diseases has been the aim of our investigation.

The level of activity of N-acetyltransferase enzyme, NAT2 gene production in those children has been analyzed by biochemical examination.

We have investigated activity of N-acetyltransferase enzyme, NAT2 gene production in 229 children with ecologically determined diseases. 167 children from an ecologically unfriendly region and 72 children from an ecologically clean area have been examined. The children were between the ages of 3 and 18 years, 48, 0% of boys and 52, 0% of girls. All the children were clinically observed, instrumental (ultrasound investigation, ultrasound densitometry) and laboratory diagnostic tests were made.

All the children were recommended to undergo a standard therapeutic course twice a year for three consecutive years (membrane protectors, enterosorbents, as well as calcium preparations in the corresponding are dosage) to remove toxic substances, prevent the development of pathologies and correct calcium exchange disorders.

In the blood of children from chemically polluted regions (EURb, EURd, EURk), “slow acetylation” accounted for 44 %, “moderately slow acetylation” constituted 34 %, and “rapid acetylation” amounted to 22 % of all the cases. It may be indicative of a significant decrease in N-acetyltransferase biochemical activity in the blood of the observed children and of their genetic predisposition to the development of ecopathologies caused by a number of aggravating factors (
both toxic and anthropogenic) of the environment. In the radiologically polluted region (ENRs), “slow acetylation” was observed in 76% of children, whereas “rapid acetylation” accounted for 24% of chemically polluted region.

After the received treatment, “slow acetylation” constituted 50%, and “rapid acetylation” increased from 22% to 50% in the blood of children from EURb, EURd and EURk from Ivano-Frankivsk region. As for EURs from Ivano-Frankivsk region, “slow acetylation” amounted to 76% in 2008 (before the treatment), whereas “rapid acetylation” was only 24% at that time. After the three-years treatment, “slow acetylation” accounted from 24% to 86% in the blood of children from EURs.

The acquired data indicate that the therapy course received by the children from both chemically and radiologically polluted regions has produced the beneficial effect. Moreover, they reflect the adverse effects of xenobiotics that are continuously administered to children from ecologically unfavourable regions where corrective measures are impossible.

To sum up, we can say, that activity of N-acetyltransferase enzyme, NAT2 gene production dates in the blood in children with ecopathologies are very important and informative. They also are sensitive markers of an individual sensitivity of the organism to the anthropogenic pollution of the environment.