HAIR AND WOOL AS AN INDICATOR OF ENVIRONMENTAL POLLUTION BY MANMADE AND GEOCHEMICAL SOURCES

Fotima Sharipovna Nazarova
Samarqand davlat tibbiyot instituti tibbiy biologiya va genetika kafedrasi.

Zuhra Sharipovna Nazarova
Respublika shoshilinch tibbiy tez yordam ilmiy markazi Samarqand filiali shifokori

Abstract

In the human body, the concentration of microelements is very finely regulated. This control is carried out by certain proteins, hormones, and connective systems (bone tissue, hair, cornea, etc.). On the other hand, the bond between metal ions and their binders is so close that changes in the state of the body can be the result of an increase and decrease in metal ions relative to the norm. Therefore, for the composition of elements, the study of tissues and bodily fluids is such an important diagnostic test.

The human body weighing 70 kg contains 1050 g Ca, 245 g K, 105 g N a, 35 g Mg, 700 g P, 100 g Cl, 3 g Fe, 20 mg Mn. Some of the elements are relatively non-toxic to Cs, Rb, Sr, Ni. Others are highly toxic – Sb, As, Ba, Rb, Hg, Ag, etc. The toxicity strongly affects the form in which the metal ion is located. The formation of fat-soluble complexes with organic ligands increases toxicity. A classic example is Minimat's disease, the cause of which under the influence of vitamin B12, which contains microorganisms, turns inorganic mercury into methyl mercury in wastewater, which subsequently enters the body through water or food.

Keywords: Microelements, toxicity, indicator, hair, wool, man-made, geochemical, heavy metals, background concentration, man-made province, metallothionins, ligand systems.

Introduction

Before evaluating changes in the chemical structure of the organism under the influence of external influences, it is necessary to carefully study the background composition of chemical elements in the specific natural and economic conditions of the region. For biological monitoring, the choice of an analyzed indicator or " critical " organ is of great importance . It must meet certain general requirements, that is, easy access , objectively reflect the level of exposure of the organism and its supply of microelements. These requirements, according to a number of authors, can be met by hair and wool. In connection with the above, we investigated the possibilities of using this test in the natural and economic conditions of the region. At the same time, we primarily took on two tasks: to determine the background concentration of microelements in the absence of contamination, and to determine how objectively hair and wool under the studied conditions reflect a person's microelement status.

Purpose of the Study:
To study the composition of microelements in tissues and bodily fluids and to study hair and wool as indicators of environmental pollution by man-made and geochemical sources.

Research Materials and Methods:
Successful biogeochemical investigations require the development of intact methods for obtaining objective data on mineral metabolism reflecting the physiological state of animals and humans, the influence of environmental factors, and nutritional levels. From this point of view, the most promising and practical value are hair and wool, which are convenient for analysis and contain a high concentration of all chemical elements in the body. In order to solve the question of the suitability of epidermal structures as bioindicatives, it was first necessary to establish the dependence of the behavior of more than 40 chemical elements in hair on the main organic components of pigments and proteins. development and existing modifications to new chemical-analytical methods for determining the level of elements in hair, the use of these materials and obtained data for biogeochemical zoning and assessment of man-made environmental loads. To determine the background concentrations of micronutrients in the studies, we selected black hair samples from 7 girls and 12 boys aged 12-16 years who were enrolled in a rural school. Children's hair reflects the body's micronutrient state more than adults' because it is less exposed to various cosmetics.
To determine the effect of the waste from the chemical plant on the state of the microelement, 14 head of animals from the man-made province and 11 in the control zone were kept.
Extraction concentration technique is often combined with atomic absorption technique. For the extraction concentration in atomic absorption, extraction of internally complex compounds is used. The selectivity of atomic absorption allows for extensive use of group reagents, such as diethyl- and pyrrolidine dithiocarbamides , dithysone , oxyquinoline etc.
More extensively, ammonium pyrrolidine dithiocarbamate (APCA) is used for the extraction concentration in atomic absorption. This reagent also interacts with many metals and in solutions it is much more stable than sodium DDC (sodium didididithiocarbamate) .
Atomic absorption detection was carried out on the Saturn and Spectre instruments. The "Spectrum" device has been modified. The change and improvement is due to the introduction of the impulse "furnace-fire" atomizer and related components.
For analysis of the solution, an atomizer with a strictly defined graphite sterlet was used. The absorption signal was recorded using an IO-4 integrator connected to a potentialometer on the KSP-2 potentiometer or compensation circuit. The temperature of graphite rods was measured with an optical instrument.

Results and their Discussion:
The results of the analysis of children's hair in the control zone show that the amount of copper in the hair of girls aged 6-10 years in the zone not affected by industrial waste is 21 years old, while the amount of copper in boys is 24 mg/kg. Interestingly, in the hair of a female already at the age of 11-12 years, the copper content is indicated at the age of 15 years, and in the hair of the male it is twice - 37 mg / kg. In our study, the background levels of copper in boys' hair

were higher than those of girls, but the difference was not significant. We also observed higher levels of lead and manganese in girls' hair than boys. We found no differences in arsenic levels in the hair of children of different genders. According to the level of manganese, it is 1.0 mg / kg for girls and 1.1 mg / kg for boys. Data on the concentration of lead in the hair of children living in an industrial area covers a wide range - from 10.7 to 112.3 mg / kg.

Our results correspond to the average values given for the above elements for human hair, they are copper - 19, zinc - 220, manganese - 0.25-5.7, lead - 3-70, arsenic - 0.60-3.7 mg / kg.

Table 1.7

The composition of microelements in the hair of children from man-made provinces

Location of elements for sampling, gender	**Put**	**Ruh**	**Qo'rg'oshin**	**Manganese**	**Qorgoshin**
Man-made region (n=32)	23	190	8.8	1.3	1.2
Girls (n = 16)	22,5±1,2	182±11	9,2±0,4	1,3±0,1	1,3±0,2
O'zi'il Balalar (n = 16)	23,5±1,5	198±8	8,4±0,2	1,3±0,1	1,1±0,1
Orqa fon (n=32)					
Girls (n = 16)	25,0±0,7	232±6	2,3±0,1	1,3±0,1	0,3±0,1
O'zi'il Balalar (n = 16)	29,0±1,0	208±10	2,1±0,1	1,1±0,2	0,3±0,1

Table 1 shows that the level of copper and zinc in the hair of children aged 7-12 years in the area affected by the waste from the chemical plant is lower than that of children in the control zone. By the content of these elements in hair, the picture remains the same as in the wool of agricultural animals and yellow earth squirrels, also in the concentration of these elements there is a flattening of sex differences. There were no noticeable differences in the composition of manganese in the hair. The hair of the children from the technogenic province was 3 times richer with lead and 4 times more enriched with arsenic compared with controls.

To determine the impact of waste from the chemical plant on the micronutrient state of yellow earth squirrels, 14 head animals were caught from the man-made provincial area and 11 head animals in the control zone. The results of the detection of microelements in the organs and tissues of terrestrial squirrels are presented in Table 2. The table shows that in the man-made province, the content of copper in the organs and tissues of animals is significantly lower than the background values. The largest difference (2 times or more) was noted for the brain, wool, and liver. In other organs and tissues, the differences are from 10 to 38% and are not always statistically significant.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

Table 1.5

The content of microelements in the organs and tissues of yellow earth squirrels

	Organs and elements	**Jigar**	**Kidneys**	**O'pka**	**Mushaks**	**Jun**	**Bosh miya**	**Bone**
Orqa fon (uy) (n=11)								
1	**Put**	6,7±0,68	14,8±4,16	1,8±0,4	1,3±0,2	5,3±1,1	9,4±2,72	0,9±0,3
2	**Sink**	16,3±1,23	13,6±0,7	11,7±2,3	12,2±3,2	39,6±2,7	19,3±2,4	24,7±4,1
3	**Manganese**	3,5±0,3	1,7±0,6	0,3±0,03	0,1±0,03	4,8±0,7	0,3±0,07	1,3±0,2
4	**Qo'rg'oshin**	0,2±0,06	0,2±0,08	0,1±0,6	0,1±0,11	1,3±0,4	0,1±0,09	1,5±0,4
Technogenic region (n=14)								
1	**Put**	3,9±0,3	10,4±1,2	1,5±0,3	0,8±0,2	2,4±0,4	3,7±1,4	1,0±0,2
2	**Sink**	11,7±1,1	9,8±0,7	9,6±1,1	7,9±1,4	26,4±1,2	15,6±2,2	13,1±2,3
3	**Manganese**	3,3±0,1	1,6±0,7	0,2±0,04	0,1±0,02	5,2±0,6	0,3±0,02	1,6±0,3
4	**Qo'rg'oshin**	0,4±0,09	0,4±0,08	0,1±0,04	0,2±0,06	6,2±1,1	0,2±0,22	3,3±0,7

Thus, the reduction of the organism with copper under the action of phosphate production emission is fully observed in rodents and is not associated with structural features of the digestive tract.

Interestingly, in waffles, unlike ruminants and humans, the kidneys are richer in copper than in the liver. Such a picture is observed both in the conditions of the physiological norm and in the

man-made province. A similar condition is observed in rats, with copper content in the kidneys reaching 22 mg / kg, and new liver tissue - 7.6 mg / kg. This phenomenon is associated with an increase in the ability of the rat organism to synthesize metallothiones. Metallothionines are low molecular weight proteins that do not have enzymatic activity. Sulfihydryl contains a significant amount of groups and a very high resistance to certain metal ions (zinc, cadmium, copper, lead, mercury, gold, and vismuth). As in clutch animals, the levels of zinc in the organs and tissues are significantly reduced in the fists of the man-made biogeochemical province. The largest differences in the composition of this element are observed for bones and wool, but for less significant, but statistically significant differences - for the liver and kidneys. Studies of other organs and tissues also show a downward trend, but this does not reach the first statistical threshold of importance.
The wool of the fist-pitters, as well as other species of animals, objectively reflects the level of copper and zinc in their bodies, which is evidenced by the high coefficient of correlation between the wool and the content of these elements in the indicator organs.
No significant differences in manganese content were found between manganese and control animals, while at the lead level, the differences were very large. They are noticeable, especially for wool, the level of this element is almost 5 times greater than control, and for bones, liver and kidneys (2 times). A similar increase in lead content was recorded in rats that received 20 mg of lead per kilogram of live weight for 14 days. In the liver, the concentration of this element increased 3.3 times, in the kidneys - 2.5 times, in the brain - 2 times, the levels of copper and zinc in these organs simultaneously decrease. Thus, the level of copper and zinc in the organisms of animals in the man-made province is affected not only by sulfur compounds, but also by lead.
Thus, the hairline of different animals and individuals can be considered an indicator of the composition of a number of essential elements in the body. The level of composition of the elements depends on the condition and age of the individual and animal, as well as on the chemical influence of various environmental factors.

Conclusions

Based on the understanding of the interaction between hard and soft ligands and complex metals, new data have been obtained on the coordination of metal ions by the major ligand centers of hair and wool, which allows us to distinguish between the three main groups of metals: the emelanin , pheomelanin and caratin groups . The content of copper, manganese, zinc and lead in the content of animal hair and wool objectively characterizes the state of the microelement in animals. According to the composition of copper, the closest relationship is established with the liver and brain, for zinc - with muscles and skeleton, for manganese - with the kidneys and liver, for lead - with the skeleton. In this regard, the analysis of animal hair and wool makes it possible to assess the conditions of their mineral nutrition and apply it in combination with other indicators in biogeochemical studies and assessment of environmental pollution with heavy metals. For the accuracy of the assessment, it is necessary to compare the results of the analysis of hair and wool of the same color obtained from healthy organisms from a specific part of the body.

REFERENCES

1. Akramov S.T., Kiyamitdinov F.Yunusov S.Yu. The study of plant alkaloids.
2. Afanaseva I.S. Anthropological aspect of the study of hair pigment pheomelanin .
3. Betekhtin A.G. Minerology
4. Britton G.B. Biochemistry of Natural Pigments
5. Gavrilova LG Synergistic effects in obtaining some intracomplex compounds.
6. Grim R.E. Minerology and Practical Use.
7. Georgievsky V.I., Annanenkov B.N., Samoxin V.T. Mineral nutrition of animals.- M.
8. Kabysh A. Endemic osteodystrophy of the South Urals.
9. Kruglova E.K. Methodology for determining the existing forms of microelements in soil and plants.
10. Lapin L.N., Rish M.A. Application of difinyl to carbonose for photometric macrodetermination of copper in plant material.
11. Nazarov Sh.N., Rish M.A., Shukurova D. Application of Wool Chemical Analysis in Biogeochemical Zoning on a Large Scale.
12. Nazarova F.SH.,Dzhumanova N.E.Features of the use of bentonite as mineral nutrition of the group of Montmorillonite group.
13. Nazarova F.SH., Dzhumanova N.E. Biological significance of microelements and their decomposition in epidermal derivatives.