

## Section 2. Medical science

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### THE RESULTS OF STUDIES OF MACRONUTRIENTS (MAE) IN THE HAIR OF PATIENTS WITH PSORIASIS, DEPENDING ON THE CLINICAL FORM

**Abstract.** Psoriasis is accompanied by a pronounced imbalance of micro- and macro elements both in erythrocytes and blood plasma, and in the parakeratotic stratum corneum. Studies of the macronutrients sodium, chlorine, calcium and potassium in patients with psoriasis living in the territory of the Aral Sea region were carried out. The imbalance of macronutrients Na, Cl, Ca, K depending on clinical forms was revealed.

**Keywords:** macronutrients of hair, psoriasis, clinical forms, types, Aral Sea region.

Psoriasis is one of the most common chronic dermatoses of a multifactorial nature, in the most severe cases leading patients to various variants of psychological maladaptation and disability [1]. According to literature data, up to 5% of the world's population suffers from psoriasis [2].

Normally, micro- and macro elements are in a balanced state in the body, participate in the regulation of metabolism, ensuring the activity of many enzymes, and in intracellular bioenergetics processes. All immunological reactions are based on biochemical processes caused by mineral-containing enzymes. The assessment of the elemental status of a person is the main issue of determining the impact on human health of deficiency, excess or violation of the tissue distribution of micro- and macro elements [3].

Aspects of the violation of essential structural elements in psoriasis are also poorly studied, and therefore, we conducted a study of some macro in the hair of patients with psoriasis.

**The purpose of the study:** The study of the content of sodium, chlorine, calcium, potassium in the hair of patients with psoriasis living in the Aral Sea region.

**Materials and methods:** We examined 74 patients with psoriasis, aged 18 to 65 years, who were treated at the Republican Skin and Venereological Dispensary of the city of Nukus. Among the surveyed men there were 28 (38%), women – 46 (62%). All patients were examined clinically and laboratory (general blood test, enzymes, bilirubin, blood sugar, immunoglobulin E). The study of macronutrients in hair was carried out at the Institute of Nuclear Phys-

ics of the Academy of Sciences of the Republic of Uzbekistan by neutron activation method.

The results of clinical studies of patients living in the Aral Sea region found that 89% had a vulgar form of psoriasis and 11% - palm-plantar shape. Among the severe forms: psoriatic arthritis was detected in 12%, erythroderma in 8% of the examined patients. The majority of the examined patients had a progressive form of psoriasis (in 85% of cases). The stationary stage is established in 15% of cases.

The course of psoriasis is characterized by seasonality. The analysis of types taking into account seasonality showed that in patients with psoriasis living in the Aral Sea region, the mixed type was established in 31 patients, which was 42%, the autumn-winter type in 29 patients (39%), the spring-summer type was established in 14 patients (19%).

Thus, among all the patients examined for macronutrients, women prevailed, of which the largest number (89%) were patients with a vulgar form. When distributed by seasonality, the largest number of patients were of mixed type (42%).

When studying the elemental composition of the hair of patients with psoriasis, an imbalance of MaE of varying severity was revealed, which had its own characteristic distinctive features in each individual clinical form.

Nagornaya N. V. and co. [4] found that sodium, potassium, calcium and magnesium play an extremely important role in maintaining acid-base balance, osmotic pressure in the cytoplasm and other biological fluids (blood, urine, gastric juice), in the blood clotting system and are crucial in creating and maintaining the constancy of the internal environment of the body [4; 5].

When analyzing the results of the study, it was revealed that in all clinical forms of psoriasis, the content of Ca, K was significantly reduced. It is known that potassium participates in maintaining the constancy of the internal environment of the body in a certain ratio with sodium and chlorine, and deviations of its content from the norm, both in the direc-

tion of excess and deficiency, can equally adversely affect the health of people [3]. We found a significant decrease in K in the general group of patients with psoriasis, a decrease in the content of more than 2 times was detected in the vulgar ( $370 \pm 60$ ) and palmar-plantar form ( $360 \pm 110$ ), as well as in the control group ( $340 \pm 120$ ); the greatest decrease in potassium by 4 times was noted in erythroderma ( $200 \pm 75$ ), psoriatic arthropathy ( $197 \pm 63$ ). Potassium is the main cation providing the membrane potential of cell rest, the revealed violations indicate a change in the cell rest potential in all clinical forms of psoriasis. Hypokalemia is also manifested by disorders of the cardiovascular system [6]. Chronic hypokalemia may be manifested by dysfunction of the central and peripheral nervous system [7; 8].

Sodium is also responsible for preserving the bioelectric potential of cell membranes, which affects vascular tone. Thanks to this trace element, the effect of adrenaline is enhanced. Sodium also has a positive effect on digestive enzymes, which contributes to the formation of hydrochloric acid, which means it improves digestion. Sodium is also a conductor of glucose into cells [9]. In our study, the Na content was normal in all patients with psoriasis and in the control group.

Chlorine participates in the metabolism in the body, together with potassium and sodium regulates the water-electrolyte balance, participates in maintaining the pH balance of cells and promotes the elimination of toxins and toxins from the body. In our study, the Cl content exceeded the permissible values in vulgar ( $2300 \pm 280$ ) and palmar-plantar ( $2800 \pm 510$ ) forms of psoriasis, and in psoriatic arthropathy ( $1900 \pm 440$ ), erythroderma ( $1570 \pm 350$ ) and in the control group ( $1700 \pm 360$ ), the Cl content had a normal value.

A significant decrease in calcium content was revealed in all clinical forms, the greatest decrease in the palm-plantar form (2.5 times), erythroderma (2 times), psoriatic arthropathy (1.8 times), vulgar form (1.6 times), and in the control group a normal Ca val-

ue was revealed ( $1200 \pm 340$ ). A decrease in calcium in all clinical forms of psoriasis indicates impaired calcium metabolism, which is associated with other important metals and anions: potassium, sodium, magnesium, iron, cobalt, which affects the processes of homeostasis and metabolic processes of the body, which are interrelated with the immune system [10].

One of the factors of the pathogenesis of psoriatic arthritis is considered to be a violation of calcium homeostasis. A decrease in calcium absorption in the intestine was detected in 98.3% of patients with psoriatic arthritis. One of the reasons for the violation of calcium metabolism is a decrease in fat absorption and a change in protein metabolism [11].

The normal functioning of the body is ensured by the constancy of the internal environment. At the same time, along with proteins, nucleic acids, lipids, carbohydrates, minerals play an important role, the lack and

excess of which cause various pathological conditions. The minerals necessary for the normal functioning of the body include sodium and potassium [12].

**Conclusion:** Thus, studies have shown that in the hair of patients with psoriasis, there is an imbalance of such macronutrients as: Na, Cl, Ca, K. Various changes in macronutrients have been revealed depending on the clinical forms. They were found in all clinical forms of psoriasis and in the control group the sodium content was normal. An increase in Cl concentration was observed in the vulgar form ( $2300 \pm 280$ ) and palmar-plantar form ( $2800 \pm 510$ ) of psoriasis, and in psoriatic arthropathy ( $1900 \pm 440$ ), erythroderma ( $1570 \pm 350$ ) and in the control group ( $1700 \pm 360$ ) it was within the reference values. In all clinical forms of psoriasis, the concentration of CIS was significantly reduced by 2–3 times in comparison with reference values ( $P < 0.01$ ).

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