

*Medical Sciences*

## **Interrelation of Nervous and Immune Systems of the Organism and Protective Manifestation of the Cell**

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**ABSTRACT.** Heterogeneous interest of blood corpuscles, taking place in protective manifestations, points to the existence of the immune centre in the cortex, the function of which is broken at the moment. Clinical observations connected with the “suddenly” recovered patients, whose diagnosis inclines to pessimo, also prove the immune centre in the cortex to be present. The role of the immune centre is undisputable and it should be located close to the stress centre. © 2009 Bull. Georg. Natl. Acad. Sci.

**Key words:** *cortex, immune centre.*

Whereas uncontrollable growth is the first and basic indicator of a tumour, atypicality is its second peculiarity, to which the structure of the cell, metabolism, function differentiation, etc., belong [1, 2]. To the characteristics of tumour according to our data the third, quite important property should be added. It is protection, i.e. how and in what way the cell of antigen protects itself, as the way of protection and type of virus are in absolute correlation. As our observations show, the latter is specific for each tumour.

The aim of the work was the investigation of blood corpuscles by the method of light and electron microscopy in patients with flat cell (epidermal) cancer. 30 cases are investigated. In each individual case anamnesis of disease, complaints on the state of the mucous membrane of the mouth cavity, duration of the disease, its form, localization have been studied. For laboratory use was made of: oroscopy, fibroscopy of mesopharynx. To determine the level of leukoplakia invasion into surrounding tissues echoscopy was used by means of apparatus “Echo-21”. The depth of affection by leukoplakia tissues was measured by echoscopy at several places (in

the centre and in the peripheries of the affection focus. Based on the data obtained for each individual patient the map of the depth of the affection of the mucous membrane was drawn in order to choose the necessary regime for laser therapy or to define the depth of freezing the tissues of the mouth cavity. Cytological (histological) investigation was carried out on all the patients by means of light microscopy. Microscopic study of the material made it possible to obtain information about the structural peculiarities of leukoplakia. It also helps to establish cellular and nuclear polymorphism in epithelial tissue the level of colour intensity of chromatin, definition of nuclear-cytoplasmic relation, mitotic activity, the level of differentiation of the cell and keratinization of tissue in each individual case.

In order to define the forms of leukoplakia the classification proposed by A.Mashkilason was used [3]. Before the beginning of special treatment the sanitation of mouth cavity was done to all the patients, the necessity of correction of the wrongly made prosthetic dentures and the change of nonuniform metals into uniform ones were considered. At the first stage of treat-

ment all the patients were subjected to conservative therapy in maximally admissible doses, hormonal therapy was prescribed locally. In some cases adaptogens were applied. These preparations possessed specific combined property of protectors and regulators of cell differentiation; they all had antiblastogenic and antimutagenic properties.

Blood was taken from finger and vein. Material was fixed in neutral fixator and 1% osmium solution on buffer. The samples were studied with photomicroscope-III and electron microscope BS-500.

The obtained data show that in patients with flat cellular form of cancer there must be present cytopathogenic effect of virus character of antigen, according to the data in [4-7]. At flat cellular cancer the nuclei in white blood corpuscles are repressed, the nucleus segments in neutrophils have different areas, the correlation between the nucleus and cytoplasm is disturbed.

In nuclear membrane, mainly its inner lamina, is broken (it becomes of "plumose" character). This fact is especially marked at sites where heterochromatin adjoins to the inner nucleus membrane lamina. In cytoplasm agranular endoplasmic reticulum pointing to the growth of detoxication prevails. Lysosomes are not big, well contoured. Mitochondria are broken. There is no clasmatosis.

The data show that coordination between nucleus and cytoplasm is broken. The edge of the erythrocyte is of plumose character and not smooth, which could have provided it with good rheological indices. The ratio of normocytes and micro- and macrocytes is broken, no pathologic pseudopodia in thrombocytes, which means their low adsorptive property; the number of gigantic forms of thrombocytes grows, there is no "biological net" created by thrombocytes.

At the same time single white blood corpuscles appear on electron diffraction pattern, which are adhesive with erythrocytes. In these cases membrane of the erythrocyte does not bear plumose character and clasmatosis is well presented in neutrophils and lymphocytes, the nuclei are weakly repressed, mitochondria are not broken, lysosomes' number is great. Single ripe thrombocytes with well expressed pseudopodia are marked out.

If we connect all the obtained data with those in [8-10], pointing at the compulsory interrelation of the immune system with the endocrine and nervous systems, it follows that the changes found by us on the side of blood corpuscles must be connected with the shifts

taking place in the cerebral hemispheres. From this it follows that it is necessary to look for the reason not at the level of discoordination of red and white blood corpuscles, but in the CNS, namely in the cerebral cortex. The latter, regulating the functional abilities of erythrocytes, leucocytes, thrombocytes, strives to ensure stable homeostasis of the whole organism.

This is indicated by heterogeneous manifestations of protective reaction of the blood corpuscles. Against the background of wrong protection, single cells are noted, revealing absolutely correct protection from antigen.

Heterogeneous interest of blood corpuscles taking place in protective manifestations must first to all point of the existence of an immune centre in the brain, the function of which is disturbed. Clinical observations of the patients with sudden recovery point to the function to the immune centre which must be located near the stress centre in the brain.

The immune system is involved in the nervous and endocrine mechanisms, which was described in detail by H.Selye back in 1956 [11]. Both systems - nervous and endocrine - consist of quite a large number of phenotypically different cells, which form rather complex structures and act by the feedback principle. Macrophages which are capable, while being stimulated, to secrete important immunoregulatory peptides, interleukins, act as mediators between the neuroendocrine and immune systems [12]. Stress reactions can also activate macrophages. Neurons of the brain are involved in the formation of macrophage activity. As shown by investigations nervous cells can synthesize immunopeptides similarly to macrophages [13]. Neurons in the brain can behave in certain conditions as macrophages, e.g. in cancer [14, 15].

Thus, there exists a similarity between the nervous and immune systems [16]. This fact is confirmed also from the position of the evolution theory [17]. The cell coexisting with its environment and receiving the information from it must adapt to it and secrete hormones. It should avoid damaging impact and acquire an ability to defend itself, i.e. phagocytosis. During its active life the cell must copy different functions and create complexly organized functional systems. The imprinting in the nervous cell of the brain of the organization and functioning abilities of both immune and endocrine properties in the regulation of homeostasis, is proved once more, which is important in the pathology of oncodiseases.

სამედიცინო მეცნიერებანი

## უჯრედის დაცვითი გამოვლინებანი ორგანიზმში ნერვული და იმუნური სისტემის ურთიერთკავშირში

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თბილისის სამედიცინო სახელმწიფო უნივერსიტეტი

(წარმოდგენილია აკადემიკოს ს. ხეჩინაშვილის მიერ)

შესწავლილია სისხლის ფორმიანი ელემენტები 30 ავადმყოფის კლინიკურ მასალაზე. მასალა დამუშავებულია სინათლის და ელექტრონული მიკროსკოპის საშუალებით. ნაჩვენებია, რომ დაცვითი ფუნქციები სისხლის ფორმიან ელემენტებში დარღვეულია. შრომაში ნაჩვენებია, რომ იმუნური ცენტრი მოთავსებულია სტრესის ცენტრის გვერდით და აღინიშნება მათი ურთიერთმოქმედება. კლინიკური მასალა გვიჩვენებს, რომ ძირითადად ონკოლოგიური დაავადებების დროს იმუნური სისტემის დაცვა მინიმალურად არასწორად, რაც განაპირობებს ავადმყოფის პესიმას. ამავდროულად ავტორები აღნიშნავენ, რომ ყველა შემთხვევაში მასალის შესწავლის დროს მოინახება უჯრედები, სადაც კარგად ჩანს დაცვის სწორი მიმართულება. ასეთი უჯრედების რაოდენობა მცირეა, აქედან შეიძლება გაკეთდეს დასკვნა, რომ იმუნური და ნერვული სისტემების კავშირი დარღვეულია.

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