

August - a September. The survey at competitive period was performed at November - February. The survey at transitional period was performed at March - a May.

The electroencephalogram was carried out with 21-channels electroencephalograph on standard method. The monopolar electrodes were mounting using 10-20 scheme with separate ear's referential electrodes. The statistical analysis includes the descriptive statistics, simple linear correlation (Pearson), non-parametric methods (sign test and Wilcoxon's matched pairs test), the t-test for dependent samples.

#### Results

The significant changes of the EEG alpha index in sportsmen were finding under F<sub>3</sub>, F<sub>4</sub>, T<sub>5</sub>, P<sub>3</sub>, P<sub>4</sub>, O<sub>1</sub>, O<sub>2</sub> electrodes from starting-up to competitive period of training year. The alpha index increased from 0,5% to 4,3% in F<sub>3</sub> point and from 2,1% to 8,0% in F<sub>4</sub> point. On the contrary the alpha index decreased from 12,3% to 3,2% in T<sub>5</sub>, from 21,4% to 13,5% in P<sub>3</sub>, from 24,0% to 3,1% in P<sub>4</sub>, from 17,0% to 4,1% in O<sub>1</sub>, from 24,7% to 2,5% in O<sub>2</sub> points. The value of alpha index returned to the former level from competitive to transitional period.

The positive correlation of alpha index had power at rate of +0,9 between the EEG electrodes in standard locations Fp<sub>2</sub>, F<sub>z</sub>, F<sub>4</sub>, F<sub>8</sub>, and in locations C<sub>4</sub>, P<sub>z</sub>, P<sub>4</sub>, T<sub>6</sub>, O<sub>1</sub>, O<sub>2</sub>, and in locations P<sub>3</sub>, P<sub>z</sub>, P<sub>4</sub>, T<sub>6</sub>. The negative correlation of alpha index had power at rate of -0,8 between the EEG electrodes in standard locations C<sub>4</sub>, Fp<sub>2</sub>, F<sub>8</sub>, and in locations O<sub>2</sub>, Fp<sub>2</sub>, F<sub>8</sub> at the begin of the training year. The correlation of alpha index had only positive direction over the entire convex surface in the competitive period. The negative direction of correlation was not found in the competitive period.

The correlation of alpha index had both positive and negative directions again over the entire convex surface in the transitional period. Two pleiades of neuronal ensembles had formed with positive direction of correlation with power at rate of 0,6 to 0,9 in the transitional period. The largest pleiade merged occipitalis, parietalis, temporalis and some centralis neuronal ensembles (O<sub>1</sub>, O<sub>2</sub>, T<sub>5</sub>, P<sub>3</sub>, P<sub>z</sub>, P<sub>4</sub>, T<sub>6</sub>, T<sub>3</sub>, C<sub>4</sub>). The second one merged frontalis neuronal ensembles (Fp<sub>2</sub>, F<sub>7</sub>, F<sub>z</sub>, F<sub>4</sub>, F<sub>8</sub>). The negative correlation with power at rate of -0,6 to -0,8 had formed between rostral and caudal pleiades.

#### Conclusions

The EEG alpha index in sportsmen under frontal electrodes increased, and under some temporalis, parietalis and both occipitalis electrodes decreased from the starting-up to the competitive period of the training year. The value of alpha index returned to the former level from the competitive to the transitional period.

The number, direction and power of correlation between the neuronal ensembles under 19 standard electrodes had changed from starting-up to com-

petitive period of training year. The negative correlation between rostral and caudal neuronal ensembles became small in number and cease detecting at all in some categories of athletes. The positive correlation between neuronal ensembles under 19 standard electrodes became small in number. The recovering of number and direction of correlation was finding after 2 – 4 weeks of the transitional period passed.

It is supposed that certain QEEG factors characterized functional condition of athletes. The QEEG factors changing during large circle of training process make actual searching for additional facility for the athlete's functional condition regulation.

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#### COMBINED ACTION OF REMOTE EFFECTS OF RADIATION IN THE DOSE OF 2 GR AND ASBEST DUST ON ACTIVITY OF ENZYMES OF PURINE NUCLEOTIDES CYCLE

Ilderbayev O.Z.

*Semipalatinsk state medical academy  
Semey, Republic Kazakhstan*

**Purpose:** Is a study of combined influence of gamma-radiation in the remote period in the dose of 2 Gr and chrysotile-asbest dust on activity of enzymes of the purine's nucleotides metabolism – 5'-nucleotidasae (5'-NT), adenosindesaminasae (ADA), adenilatdesaminasae (AMF-asae) in different organs and tissues in experiment.

**Material and methods:** For achievement of the present aim we execute experiments on 45 out-breed sexually mature white male rats, which were subdivide on 3 groups: I intact group (n=15), II groups persecute chrysotil-asbestos dust (n=15), III group – combined influence of radiation and asbest dust (n=15). In the II and III groups at animals was simulated the black-lung disease (dust disease) to methods of E.N.Gorodetskaya (1954). The animals of the III d group were irradiated 90 days up to research on the radiotherapeutic installation Teragam <sup>60</sup>Co in a dose 2 Gr unitary. We used for the research lymphocytes of peripheral blood and prepared masses from the cells of liver, spleen, thymus and lymphatic nodes of small intestine, adrenal medulla. The results of research were processed by the standard methods of variational statistics with calculation of criteria by t-Student. Estimated the activity of 5'-NT, ADA, AMF-asae.

**Results:** It is estimated that the activity of 5'-NT and ADA in the spleen in the animals of III group in the remote period reduces to 0,136±0,026 nmol/s mg protein (p≤0,001) and to 1,121±0,071 nmol/s mg protein (p≤0,01) accordingly. The activity of 5'-NT in the lymphatic nodes of small intestine in animals of II

and III group was reduced (to  $0,036\pm 0,004$  and to  $0,094\pm 0,007$  nmol/s mg protein ( $p\leq 0,001$ )). The activity of AMF in the spleen of animals in III group was increased more than in 1,6 times ( $p\leq 0,05$ ). I combined action of radiation and dust in the immune-responsible organs decreasing of 5'-NT activity occurred, which caused accumulation of adenosine with following changes of adaptive mechanisms. There are changes in purine metabolism in the thymus. The activity of 5'-NT of III group animals reduces to  $0,102\pm 0,007$  nmol/s mg protein, the activity of AMF-asae in the III-d group of animals reduces to  $0,310\pm 0,009$  nmol/s mg protein ( $p\leq 0,05$ ). Results of research showed combined influence of chrysotile dust and ionizing radiation in the remote period causes increasing the activity of 5'-NT, ADA, AMF-asae in the liver. In combine action the activity of 5'-NT, ADA, AMF-asae increases in 1,6; in 2,5 and in 6,0 times ( $p\leq 0,01$ ) accordingly. The activity of 5'-NT, AMF-desaminasae in adrenal medulla and lymphocytes of peripheral blood in the animals of III group reliable increased. The activity of ADA did not change. On the base of obtaining results we can say, that adrenal medulla tissues and lymphocytes of blood in combined action of radiation and dust responses considerable intensification of the processes of anabolism and catabolism in the remote period, which marked on the secondary character of changes.

Therefore, the combined action of radiation and asbest dust causes considerable interruption of enzymes of purine metabolism, which characterized the strain of adaptive-compensate mechanisms of an organism on influence of dust-radiative factor. The relative activation of catabolic processes occurs, that allows to assume opportunity of reparation of metabolic processes of an organism in the remote period at the expense of compensate possibilities of an organism.

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#### **IMMUNOMODULATORY CHANGES IN THE LYMPH NODES MEDIATED BY STRESS DURING EARLY POSTNATAL DEVELOPMENT**

Kapitonova M.Yu., Gupalo S.P., Degtyar Yu.V.  
*UiTM Medical Faculty, Shah Alam, Malaysia*  
*Volgograd State Medical University, Russia*

Stress is thought to be immunosuppressive but paradoxically exacerbates inflammatory and autoimmune diseases (K.Viswanathan et al., 2005). Many aspects of the stress-induced immunomodulation remain controversial especially in terms of the age-related aspects of the problem. Growing body in

known to be particularly vulnerable to the stress exposure but the details of the stress-mediated immunosuppression are mainly investigated at the level of the central lymphoid organs which is described as an accidental thymic involution, while the involvement of the peripheral immune organs remains underestimated (Q.Li et al., 2005; R.G.Tseng et al., 2005).

The links among the stress-associated increased level of plasma glucocorticoids, catecholamines and immunity were examined in a number of studies. As peripheral blood is generally the only "window" available through which the human immune response can be studied, it is difficult to assess the mechanisms by which neuroendocrine responses affect either the inductive or effector phases of immunity, as both generally occur in tissues and not in the blood, hence immunohistochemical methods of the tissue-specific changes evaluation are invaluable in getting information regarding the stress-associated immunomodulation at the level of the peripheral lymphoid organs (J.K. Kiecolt-Glaser et al., 1995; D.A. Padgett et al., 2003; J.Diao et al., 2006; M.E. Truckenmiller et al., 2006).

The objective of the present investigation was to reveal the stress-induced immunomodulatory changes in the growing body evaluated at the level of the secondary lymphoid organs (lymph nodes).

Prepubertal Sprague-Dawley rats aged 21 and 30 days corresponding to the weaning and infant periods accordingly, were exposed to the severe chronic (restraint) stress (R.Kvetnansky et al., 1970) with 7 daily 5-hour sessions. Each age group of the experimental animals contained 8 rats with another 8 rats serving as an age-matched control, with total number of the animals equal to 32 species.

After the last session of stress the animals were sacrificed, their thymus, spleen and inguinal lymph nodes were sampled, weighed, fixed in formalin and embedded in paraffin. Histological sections of the lymph nodes were stained with hematoxylin-eosin for routine histological examination and immunohistochemically processed for CD8 (T-suppressor/cytotoxic lymphocytes) and CD20 (B-lymphocytes) markers using streptavidin-biotin-peroxidase method with subsequent quantitative evaluation of the volume density and the numeric density of the immunopositive cells using NIKON image analyzer with Image Pro Plus 4.5 software.

It was demonstrated that chronic stress induced prominent immunosuppressive changes in the lymph nodes of the prepubertal rats of both age groups. They included considerable reduction of both T- and B-zones in the lymph nodes with increased number of apoptotic cells mainly in the B-zones. The diameter of the primary and secondary lymphoid nodules and the number of the secondary lymphoid nodules was reduced in the senior age group of the experimental animals while the width and the volume density of the