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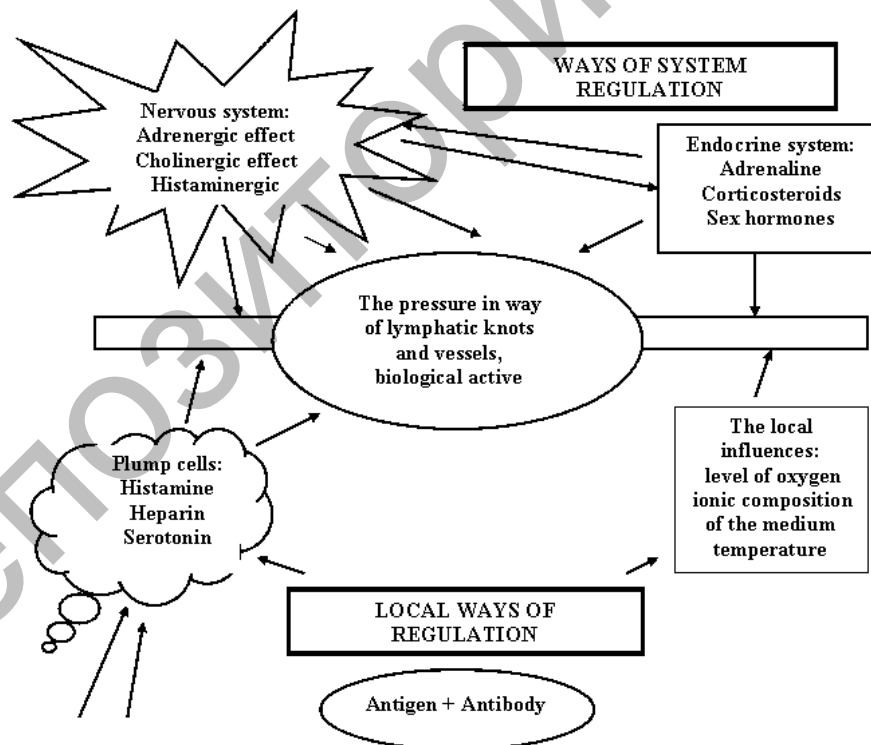
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### THE INFLUENCE OF IMMUNAL ON CONTRACTIVE ACTIVITY OF MESENTERIC LYMPHATIC KNOTS OF THE RATS

*Мақалада егеуқұйрықтылар шарқыжай лимфа бездерінің ырғақты ырықсыз жиырылуының жиілігі мен күшіне имуналдың әсері қарастырылған. Эксперименталды зерттеудің нәтижелері берілген. Орташа мөлшерде зерттелген препараттың әсері белгіленген.*

*В статье рассматривается влияние имунала на сократительную активность брыжеечных лимфатических узлов крыс. Приводятся результаты экспериментальных исследований. Установлено влияние исследуемого препарата в средней дозе.*

The specific particularities of spontaneous contractive activity of the pre and postnatal lymphatic knots of series of farm animals was discovered and registered one of us for the first time [1]. We established the specific differences of frequency and amplitude descriptions of rhythmic spontaneous contractive activities of knots and lymphatic vessels. It was revealed, that relations of the contractions of afferent lymphatic vessels to frequency of the contractions of efferent lymphatic vessels in somatic lymphatic knots was practically equally [1–3] for all species of animals (sheep, cows, pigs). But this correlation increased for the visceral lymphatic knots of cows and sheep (accordingly 1:8 and 1:6) in comparison with pigs. On the strength of experiment we worked out the conception of general vessels and knots system of the lymph transport, and the local and distant scheme of regulation of spontaneous contractive activity of the lymphatic knots and vessels was determined (pic. 1) [4].



Pic. 1. The local and distant regulation of spontaneous contractive activity of the lymphatic knots and vessels

It is known, that new generation of stimulators of immune system such as immunal, which prepares from extracts of *Echinacea purpurea*'s herbs, contains the active substances. These substances, acting as non-specific stimulators, intensify natural mechanisms, increase number of leukocyte and stimulate phagocytosis.

It was established that immune answer by the stress develops on background of powerful proliferation of lymphogenous tissue, marked as immune and morphological mobilization [5 — 8]. The cellular shifts in the lymphogenous tissue appear not only as a result of cytolysis and proliferation's alteration but also in consequence of mobilization and redistributions of lymphocytes (leukocytes) [5] that define the quality of immunity and maintenance of cellular homeostasis in considerable extent [8].

It was proved, that lymphatic knots serve as peripheral organ of immunogenesis [9]. Exactly in these organs occur the structural and functional changes which are answers to active irritations. It is accepted to separate the functional zones of lymphatic knots and spleen on T- and B-dependent. The lymphoid follicles of lymphatic knots and spleen belong to B-dependent zones. The paraproctical zone of lymphatic knot and area, which located around a central artery of spleen belong to T-dependent zones. T-dependent zones are presented by T-lymphocytes [10].

In spite of significant achievements in the field of immunomorphology of peripheral organs of immunity, many questions of the cellular structure and functional adapting of lymphatic knots on influence of different preparations remain are not realized. V.K.Demidova [3] has shown that separate medical substances cause the different changes of cellular complement of the white rat's lymphatic knots.

As mentioned above, if the role of immunal in transformation and mobilization of lymphoid tissue is comparatively known, and it is valued as positive influence upon shaping of immunity and cellular homeostasis, but action of immunal on contract activity of lymphatic knots is unknown. The subject of the investigation was study of immunal's influence on contractive activity of mesenteric lymphatic knots of laboratory rats.

#### *Materials and methods of the study*

The experiments were conducted on white laboratory rats both sex with average weight 220 grams. After ethereal and chloroform anesthesia we opened abdominal cavity on white line of belly and under magnifying glass prepared single (solitary) mesenteric lymphatic knots. The knots were cleaned from incidental tissues and by means of fine threads were fixed to still lever on bottom of the camera and mobile lever of mechanotron [8]. The preparation was supported by the constant volume (5 cm<sup>3</sup>) of Kreps' oxygen-containing solution, the temperature became stabilized at rate of 37°C with the aid of ultrathermostat. Registration of contractions of the knot was produced by mechanotron (type 6 MX1C) with the aid of writer (type И-338-4И). The composition of the nourishing solution was consisted: NaCl — 124,0; NaH<sub>2</sub>PO<sub>4</sub> — 1,2; KCl — 5,2; MgCl<sub>2</sub> — 1,2; NaHCO<sub>3</sub> — 15,5 and C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> — 11,5 mmol/l of distilled water. pH of the solution varied between 7,2–7,3. Altogether 30 records of 10 mesenteric lymphatic knots were made and amount and amplitude of tone and phase contractions was determined during 10 minutes. The digital material was processed statistically.

#### *The results of the study and their discussion*

The results of experiments were provided in table № 1, 2.

Table 1

#### **The influences of immunal on amount phase and tone of contractions of mesenteric and lymphatic knots (average given on 10 experiments)**

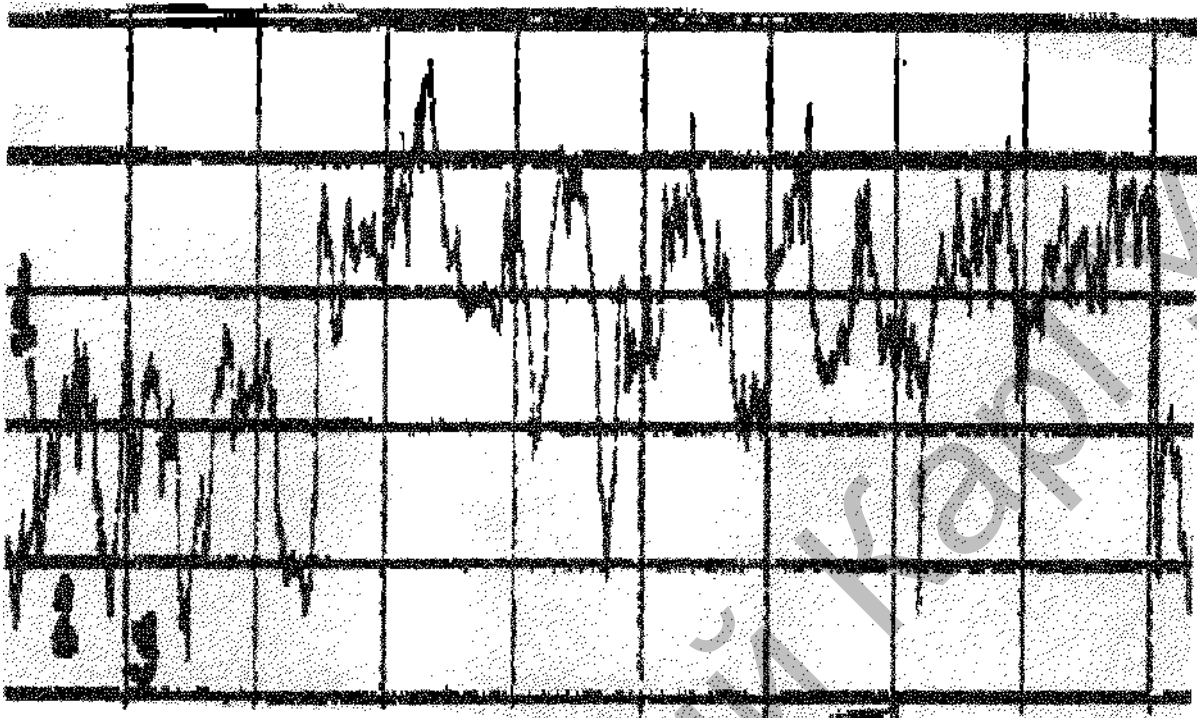
Name of the lymphatic knots	The dose of immunal	Amount of tone contractions			Amount of phase contractions		
		Background	At action of the preparation	After washing	Background	At action of the preparation	After washing
Mesenteric n-10	10 <sup>-9</sup> (small)	0,7	0,5	0,7	10	12*	11
Mesenteric n-10	10 <sup>-7</sup> (medium)	0,8	0,6	0,9	9	14**	12*
Mesenteric n-10	10 <sup>-5</sup> (high)	0,7	0,6	0,6	12	12	13

\* level of validity >0,5;

\*\* level of validity >0,01.

As we can see from table 1 influence of immunal on tone of contractive activities were not revealed under all tested dose (small, medium, high) of the preparation. The action of the preparation on amount of phase contractions of mesenteric lymphatic knots were shown distinctly. As follows: under small dose of the preparation positive effect on criterion of the length was discovered reliable, but less than 0,5 levels on crite-

tion of Student. Under medium dose of immunal clear intensification of amount phase contractions was noted ( $r < 0,001$ ).



Pic. 2. The influence of immunal on contractive activity of mesenteric lymphatic knot of the rats

The high doses of the preparation did not result to noticeable changes, that was well seen on graphics of registrations of contract activity of mesenteric lymphatic knot (pic. 2). On this graphic is clearly seen nearly one and half multiple intensification of phase activities of the knot at action of the medium dose of immunal.

As we can see from table 2 the general functional shifts in reaction of mesenteric lymphatic knot is similar with changes of frequency features of contractive activity of the lymphatic knots.

It was not revealed influence of immunal on amplitude of tone contractions of knots under all tested dose of the preparation, but imperceptible shifts of amplitude phase contractions of the knots was significant under influence of the preparation.

Table 2

**The influence of immunal on amplitude of phase and tone contractions of mesenteric lymphatic knots  
(average given on 10 experiences)**

Name of the lymphatic knots	The dose of immunal	Amplitude of tone contractions, mEv			Amplitude of phase contractions, mEv		
		Background	At action of the preparation	After washing	Background	At action of the preparation	After washing
Mesenteric n-10	$10^{-9}$ (small)	5,3	5,8	5,6	6,2	6,1	6,7
Mesenteric n-10	$10^{-7}$ (medium)	5,6	5,9	5,4	6,3	9,1	7,0
Mesenteric n-10	$10^{-5}$ (high)	5,7	5,3	5,9	6,1	6,2	6,3

Thereby, we discovered that immunal rendered essential influence upon spontaneous contractive activity of mesenteric lymphatic knots under medium dose of the preparation. Herewith it renders most influence on parameters of frequency and phase of contractive activity of mesenteric lymphatic knots, materially not changing tone part of contractive activity of the knots. On the base of literary dates it is possible to conclude that action of immunal on mobilization, redistribution immune cells, which circulates in lymphatic system rather have not activate, but modulating nature. Apparently, such influence of the preparation provides identical homeostasis of cells' and lymph's circulations shifts in lymphatic knots, which defines the elective characteristics of the preparation as one of the effective modern immune stimulator.

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## MUTAGENIC EFFECT AND PRODUCTION FACTORS

*Қарағанды облысы кеншілерінің ағзасына мутагенді эффектiлердiң және шаң-тозаңның әсерi туралы мәліметтер эксперименттi және табиғи зерттеулер нәтижесінде алынып сарапталды. Мутагенді әсерді анықтау үшін өндірістік ортаның микроядродөңгейінің ұлғаюы мен бөлу айналымының бұзылуын қабылдайтын тест, ДНК-ң ролі көрсетілген. Бұл кеншілер әйелдерінің құрсақтарындағы ұрықтың өлуін көрсететін талдау, яғни, кеншілердің ағзасына мутациялық процестердің белсенді түрде әсер ететіндігін дәлелдейді.*

*Издаются полученные оригинальные данные по изучению в динамике роли мутационного эффекта при воздействии сочетанных факторов вибрации и пыли на организм как в эксперименте так и в натуральных исследованиях у шахтеров-угольщиков Карагандинской области. Для выявления мутагенного действия сочетанных факторов производственной среды установлено увеличение уровня микроядер и нарушение веретена деления, который является достаточно чувствительным тестом. Показана роль ДНК. Анализ внутриутробной смертности плода у жен шахтеров-угольщиков подтверждает и косвенно указывает на активизацию мутационного процесса у шахтеров-угольщиков.*

Due to the rapid development of technology, industry, today the problem of the impact of ecology became important, and in particular, the impact of production with its factors on the genetic apparatus of an organism. Therefore, great importance takes the assessment of genotoxicity of the industrial environment with the subsequent development of activities to protect heredity of the person [1–7].

We, in experimental conditions during modeling of a vibratory pathology (depending on terms of influence of vibration on the background of coal rock dust), studied the micronucleus analysis in polychromatocytes, which has shown that in 3 days of influence of vibration and dust there was observed significant increase of 38 % in frequency of cells with macronucleuses on average of  $0,47 \pm 0,04$  ‰,  $P < 0,05$ ; in comparison with the control  $0,34 \pm 0,03$  ‰ (Table 1 Figure 1). Basically, these changes occurred at the expense of micronucleuses (acentric fragments), the level of which has averaged  $0,43 \pm 0,04$  ‰,  $P < 0,01$ ; that is 40 % more than in the control  $0,31 \pm 0,02$  ‰. Violation of maturation spindle, as evidenced by the presence of macronucleuses, increased by 67 % to  $0,05 \pm 0,004$  in comparison with the control —  $0,03 \pm 0,001$  ‰,  $P < 0,01$  (Table 1, Figure 1.2). On day 7 of vibratory and dust impacts the quantity of cells with macronucleuses continued to raise with high degree of reliability in 2 times in comparison with control values, reaching  $0,70 \pm 0,05$ , as well as micronucleuses, which also increased in 2 times on average to  $0,62 \pm 0,03$  ‰, that considerably differed from the indicators of 3-day exposition — on 44 %,  $P < 0,001$ . The num-