LYMPH NODES MORPHOLOGY AS PREDICTOR NATURAL AND PREMATURE AGING

Olga Gorchakova[1], Vladimir Gorchakov[1,2], Georgy Demchenko[3]

[1]Research Institute of a clinical and experimental Lymphology – branch of Institute of Cytology and Genetics of the Siberian Branch of the Russian Academy of Science Novosibirsk; [2]Novosibirsk State University, Russia; [3]Institute of Physiology of Human and Animals of Committee of Science of the Ministry of Education and Science of the Republic of Kazakhstan, Almaty, Kazakhstan

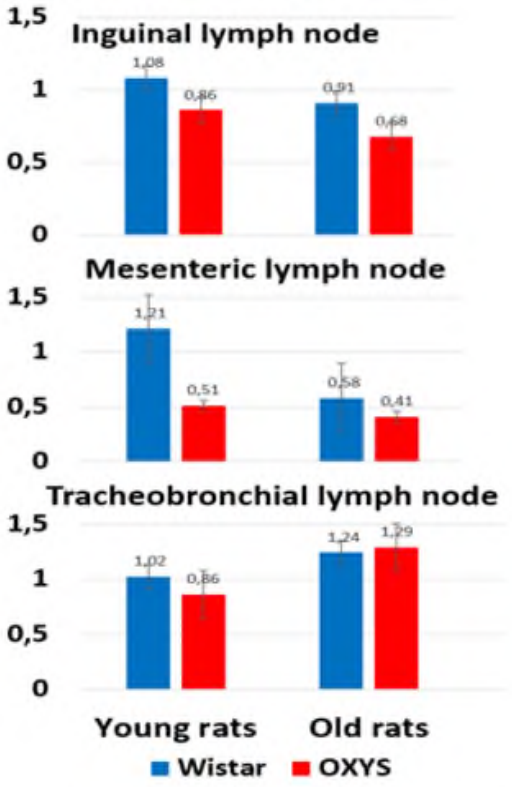

Fig.1. A ratio of T- and B-zones in lymph nodes of young (3 months) and old (1.5 years) white rats of Wistar and OXYS

The purpose of work is a research of age changes of lymph nodes of different localization at OXYS rats with a syndrome of premature aging and Wistar rats with the normal rate of aging.

Work is performed on the OXYS and Wistar rats. N.G. Kolosova is a holder of the license for OXYS rats. These rats have genetically caused defect, it is considered as an accelerated aging syndrome. The experiment was executed on young and old white rats. The age of rats is 3 months and 1.5 years. We investigated by a morphological method of mesenteric, inguinal and tracheobronchial lymph nodes.

The indicator of a ratio of T- and B-zones makes more than unit at three months age of young rats, building a progressive row of lymph nodes: tracheobronchial – inguinal – mesenteric (Fig. 1). Each of these lymph nodes differs with extent of development of structural and functional zones. Involution of lymphoid tissue leads to structural destabilization of regional lymph nodes at old rats of Wistar. The coefficient of a ratio of T- and B-zones less than unit also demonstrates prevalence in structure of lymph nodes a thymus-independent area at of OXYS rats at three-months age (Fig. 1).

So, immunoactive zones have the following changes of Wistar and OXYS rats (Tables 1–3).

Principle of a regional determinant

LYMPH NODES	INGUINAL	MESENTERIC	TRACHEO-BRONCHIAL	P
	1	2	3	
Lymphoid follicles	+	++	+++	$P_{1-2} \geq 0,01$ $P_{1-3,\ 2-3} \leq 0,001$
Cortex plateau	+	++	+++	$P_{1-2,\ 1-3} < 0,001$ $P_{2-3} \leq 0,01$
Paracortex	+++	++	++	$P_{1-2,\ 1-3} \leq 0,01$ $P_{2-3} \geq 0,05$
Medullary cords	++	+	++	$P_{1-2,\ 2-3} \leq 0,01$ $P_{1-3} \geq 0,05$
Lymphatic sinus	++	+++	+	$P_{1-2,\ 2-3} < 0,001$ $P_{1-3} \leq 0,01$

TABLE 3. STRUCTURAL AND FUNCTIONAL ZONES OF **THE TRACHEOBRONCHIAL LYMPH NODE** OF OXYS AND WISTAR RATS DURING THE DIFFERENT AGE PERIODS, %

Structures	WISTAR (n=40)		OXYS (n=40)	
	3 months	*1,5 years*	*3 months*	*1,5 years*
	1	2	3	4
C	1.93±0.22	3.51±0.50*	2.52±0.24	3.68±0.35*•
Ss	1.68±0.14	1.68±0.14	1.58±0.16	1.32±0.16*
Cp	5.07±0.36	4.26±0.29	4.06±0.27	5.23±0.38•
Lf	3.86±0.19	0.86±0.10*	1.14±0.14*	0.24±0.03*°•
P	9.22±0.82	6.82±0.29*	6.89±0.42*	5.67±0.51*
Mc	8.17±0.36	6.54±0.31*	10.8±0.71*	7.78±0.27•
Ms	1.77±0.17	1.79±0.21	1.81±0.10	1.96±0.16

Note: in Tables 1-3 *$P_{1-2,3,4} < 0,05$; °$P_{2-4} < 0,05$; •$P_{3-4} < 0,05$ – the level of statistical significance of differences between rats of different age. C – capsule; Ss – subcapsular sinus; Cp – cortical plateau; Lf – lymphoid follicles with germinative center; P – paracortex; Mc – medullary cords; Ms – medullary lymphatic sinus

Wistar (3)

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Wistar (1,5) = OXYS (3)

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OXYS (1,5)

TABLE 1. STRUCTURAL AND FUNCTIONAL ZONES OF **THE INGUINAL LYMPH NODE** OF OXYS AND WISTAR RATS DURING THE DIFFERENT AGE PERIODS, %

Structures	WISTAR (n=40)		OXYS (n=40)	
	3 months	*1,5 years*	*3 months*	*1,5 years*
	1	2	3	4
C	1.46±0.24	2.37±0.18*	2.32±0.25	3.05±0.26*
Ss	1.06±0.22	0.62±0.05	1.13±0.12	1.43±0.11°
Cp	2.01±0.17	2.46±0.16	3.78±0.13*	3.23±0.21*°
Lf	2.36±0.21	1.26±0.18*	0.70±0.08*	0.33±0.05*°•
P	7.46±0.55	6.54±0.51	5.20±0.42*	3.74±0.38*°•
Mc	5.21±0.29	7.64±0.80*	8.62±0.43*	9.41±0.59*
Ms	2.17±0.22	3.05±0.22*	2.49±0.16	3.61±0.30*•

TABLE 2. STRUCTURAL AND FUNCTIONAL ZONES OF **THE MESENTERIC LYMPH NODE** OF OXYS AND WISTAR RATS DURING THE DIFFERENT AGE PERIODS, %

Structures	WISTAR (n=40)		OXYS (n=40)	
	3 months	*1,5 years*	*3 months*	*1,5 years*
	1	2	3	4
C	5.47±0.57	5.33±0.62	5.54±0.62	5.47±0.52
Ss	3.50±0.30	1.38±0.30*	2.65±0.26	1.45±0.25*•
Cp	7.63±0.45	3.97±0.20*	4.34±0.36*	4.00±0.17*
Lf	5.06±0.25	1.25±0.11*	1.52±0.08*	0.41±0.06*°•
P	16.1±1.26	9.17±0.76*	5.66±0.31*	5.37±0.46*°
Mc	10.7±0.96	19.6±1.01*	15.7±0.93	21.7±0.81*•
Ms	7.00±0.48	4.45±0.40*	4.69±0.88*	3.17±0,14*°•

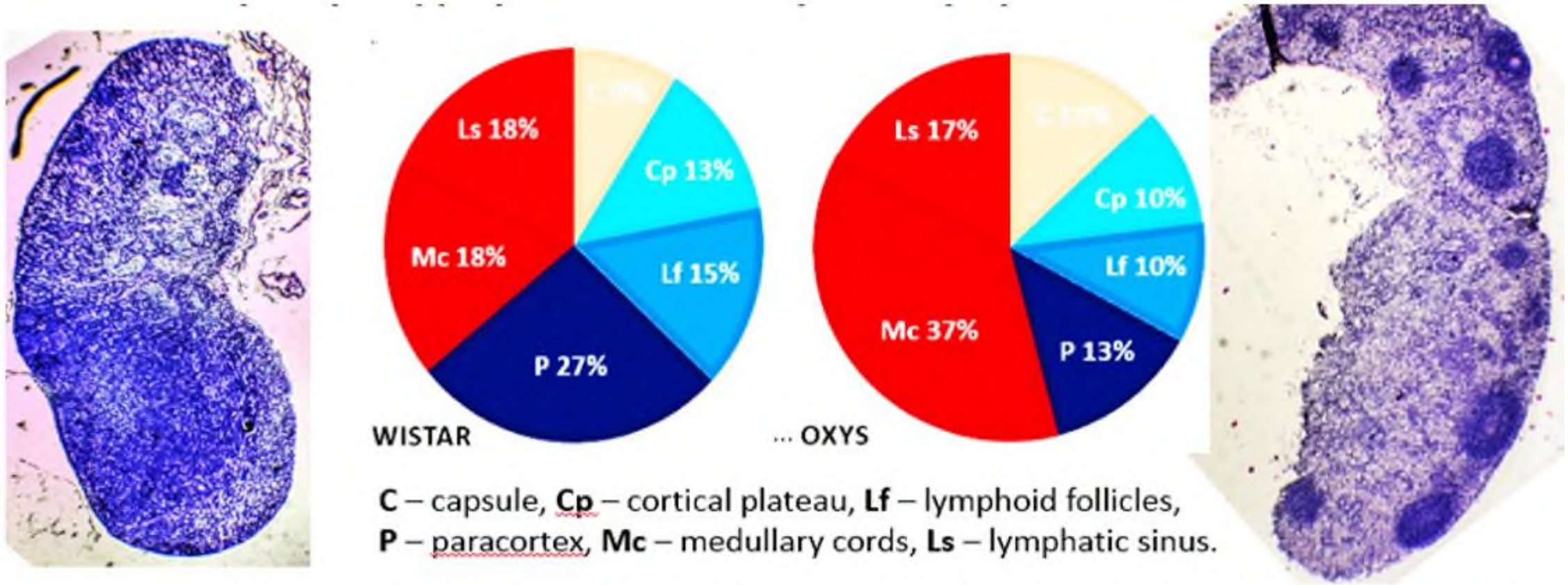

Fig. 2. The structural organization of the mesenteric lymph node of Wistar and OXYS rats

Conclusion. Morphodynamics of compartments of lymph nodes of different localization has distinctions at natural and premature aging. At the same time at rats of OXYS the aging happens the accelerated rates and regressive changes of lymphoid tissue are available already for young animals. The age-caused imbalance of compartments of a lymph node can be considered as a predictor of premature aging and as risk of developing pathology. Features of morphology of lymph nodes give the grounds to consider of OXYS rats as universal model of immune insufficiency for studying pathogenesis and development of correction methods.