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Kierownik: prof. dr hab. n. med. Stanisław Załuska

Zbigniew WÓJTOWICZ

The Activity of Lysosomal Enzymes of the Basilar Artery Wall on Rabbits of Different Breed

Aktywność enzymów lizosomalnych ściany tętnicy podstawnej u królików różnych ras

During the tests of morphology and some biochemical indexes of the peripheral artery wall of a classical experimental animal like rabbit at the Chair of Normal Anatomy of the Medical Academy in Lublin, differences between the activity of lysosomal enzymes connected with age, sex and breed of animals were observed. They concerned both elastic arteries — pulmonary trunk (3), iliac arteries (4) and muscular arteries — renal artery (5). That is why we decided to observe the activity of lysosomal enzymes of the basilar artery wall of different breed rabbits, which as a vessel supplying central nervous system has a different wall structure in comparison with other arteries.

MATERIAL AND METHODS

Testings were carried out on 41 sexually mature rabbits at the age of 140 days (21 males and 20 females) of black bay race (BB) — 15 animals and cross: female BB and male white newzealand race (BBX) or the opposite (NZX) — each time 13 rabbits. Principles of determination of the lysosomal activity of acid phoshatase, β-galactosidase, N-acetyl-β-D-glucosaminidase, lipase, sulphatase and methods of statistical calculations were presented in the previous works (1, 2).

RESULTS OF TEST AND THEIR DISCUSSION

In Table 1, the means of the least squares of tested lysosomal enzymes of internal and middle coat of basilar artery wall of the rabbit were presented.

From this table we can see that the greatest activity is that of N-acetyl-β-D--glucosaminidase, about 3 times lower — that of lipase and acid phosphatase, and the lowest — that of sulphatase and β-galactosidase. Only the activity of β-galactosidase showed statistically highly essential differences between black

Table 1. Means of least squares of activity of lysosomal enzymes of the internal and middle coat of the basilar artery in rabbits

	Mean *SE*		Breed			Sex	
			CzP	CzpX	NZX	♂	♀
Number of rabbits Enzyme	41		15	13	13	21	20
Acid phosphatase	0.4052	±0.055	0.4943	0.2886	0.4327	0.3167	0.4937
β-galactosidase	0.1123	±0.015	0.1804^{AB}	0.0916^{A}	0.0651^{B}	0.0983	0.1263
N-acetylo-β-D-glucosaminidase	1.4095	±0.147	1.9456^{ab}	1.0367^{a}	1.2462^{b}	1.1899	1.6291
Lipase	0.5465	±0.089	0.7112	0.3755	0.5527	0.2962^{A}	0.7967^{A}
Sulphatase	0.1949	±0.026	0.2710^{a}	0.2163^{b}	0.0962^{ab}	0.1602	0.2288

The numbers with the same letters are highly significantly different ($p \leqslant 0.01$) — capital letters, or significantly different ($p \leqslant 0.05$) — small letters.

bay race rabbits and mongrels, while N-acetyl-β-D-glucosaminidase and sulphatase showed essential differences. However, the activity of aid phosphatase and lipase of the internal layer and middle coat of the basilar artery of the tested animals were approximate.

The activity of the majority of lysosomal enzymes of the rabbits of both sexes did not show fundamental differences, except for lipase, whose activity was essentially greater with the females than with the males. These observations prove the necessity of selection of the animals of one race and sex, for experimental research of the blood vascular system.

As the previous tests have showed, in white newzealand race rabbits the greatest activity among the lysosomal enzymes of the basilar artery wall is also that of N-acetyl-β-D-glucosaminidase, however slightly lower is that of acid phosphatase, clearly lower — that of β-galactosidase and lipase, and minimal — that of sulphatase (1). Higher activity of lipase in black bay race rabbits and mongrels can be connected with larger accumulation of fatty tissue of these animals.

In Table 2, there are shown phenotypic correlations between activities of the tested lysosomal enzymes of internal and middle coat of the basilar artery wall after eliminating instabilities caused by test factors. This chart shows that there are statistically highly essential correlations between the activity of acid phosphatase and lipase and N-acetyl-β-D-glucosaminidase as well as between the latest enzyme and lipase and β-galactosidase. On the contrary, in white newzealand race rabbits statistically essential correlations between the activity of

Table 2. Phenotype correlations between activities of lysosomal enzymes of the internal and middle coat basilar artery in rabbits

Enzyme	Acid phosphatase	β-galacto-sidase	NAGL	Lipase	Sulphatase
Acid phosphatase	—	0.2229	0.8299**	0.8010**	0.1319
β-galactosidase		—	0.4375**	0.2200	0.2804
N-acetylo-β-D-glucosami-nidase			—	0.5642**	0.1962
Lipase				—	0.1486
Sulphatase					—

** Highly significantly differences ($p \leqslant 0.01$).

the majority of the tested enzymes of this artery wall, except for lipase, acid phosphatase and β-galactosidase were confirmed.

The presented results of determination of the activity of lysosomal enzymes of the basilar artery wall in rabbits do not coincide with data concerning the renal artery, which is also the muscular vessel, which can prove the difference of metabolic process taking place in the walls of these vessels.

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STRESZCZENIE

Badania przeprowadzono na 41 królikach obu płci rasy nowozelandzkiej białej, czarnej podpalanej oraz ich krzyżówkach obukierunkowych. Wykazano, że występują statystycznie istotne różnice aktywności glikozydaz i sulfatazy związane z rasą zwierzęcia, a w przypadku lipazy — z płcią. Obserwacje te wskazują na konieczność doboru do badań doświadczalnych układu naczyniowego zwierząt jednej rasy i płci.