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# Microscopic Structure of the Pulmonary Trunk Wall in Rabbits

Budowa mikroskopowa ściany pnia płucnego u królika

The interest of researches of many specialities is concentrated on the structure of arterial walls in humans and experimental animals, which is due to the increase in diseases of vascular system (1—7, 9—11). It seems that there are no reports in literature presenting microscopic structure of the wall of pulmonary trunk in a rabbit, which is a model experimental animal in research on vascular system, and therefore this problem has been undertaken.

## MATERIAL AND METHODS

The study was carried out on 40 adult rabbits bred in the Department of Genetics and Methods of Animal Improvement, The Agricultural Academy, Cracow. Both males and females of New Zealand white breed were used (NZ — 10 animals), black bay (CzP — 10 animals) and genetic cross-breds: females NZ × males CzP (NZX — 10 animals) and females CzP × males NZ (CzPX — 10 animals). Rabbits were killed in a traditional way and bled, the pulmonary trunk was prepared and fixed in 10% neutral formalin. Paraffin sections 5—10 μ thick were stained with hematoxylin and eosin, using van Gieson, Fraenkel and Weigert method and alcian blue (8). Thickness of the wall of pulmonary trunk and its middle was measured with the projection microscope MP 3.

## RESULTS

Histological examinations revealed that the pulmonary trunk in rabbits is an artery of elastic type, similarly to aorta. On specimens stained with hematoxylin and eosin (Fig. 1) in interior wall a single layer of endothelial cells situated on interior elastic membrane is visible. Interior elastic membrane is continuous and in folds. The middle coat of pulmonary trunk is built of alternating layers of myocytes (Fig. 2) and lamina of elastic fibres (Fig. 3), which form a continuous external elastic membrane in its circumference. On some specimens dilaminal structure of this membrane is visible in some sections.

External membrane of pulmonary trunk called adventitia (Fig. 4) is built of cells and fibres of connective tissue, both collagen and elastic, and the presence of myocytes has been discovered in it. Adventitia is of considerable width which is not steady in the majority of specimens. In all investigated cases the presence of blood vessels penetrating adventitia has been discovered.

In specimens stained with alcian blue (Fig. 5) the presence of acid polysaccharides in all layers of the wall of pulmonary trunk was demonstrated, the smallest amount in middle coat.

On cross-sections of the terminal part of the pulmonary trunk medially situated intussusception of one of its walls to the lumen of the vessel (Fig. 6) was observed with the visible partition of elastic middle coat into regular unfolded lamina.

The results of measurements of the thickness of middle coat and the whole wall regarding sex and breed of the rabbits are presented in Table 1.

Table 1. The thickness of the middle coat and the whole wall of the rabbit's pulmonary trunk (in micrometers)

| Breed \ Sex | Middle coat | | | Whole wall | | |
|---|---|---|---|---|---|---|
| | ♂ | ♀ | ♂ + ♀ | ♂ | ♀ | ♂ + ♀ |
| NZ | 140.0 ±25.50 | 131.92 ±30.59 | 135.0 ±28.61 | 182.67 ±26.59 | 173.67 ±33.32 | 178.17 ±30.76 |
| CzP | 139.0 ±25.71 | 139.12 ±24.53 | 138.67 ±27.22 | 190.5 ±25.74 | 207.67 ±46.13 | 197.86 ±36.92 |
| NZX | 139.2 ±31.94 | 128.0 ±18.55 | 134.22 ±27.39 | 177.6 ±36.54 | 191.0 ±32.79 | 183.55 ±35.55 |
| CzPX | 129.33 ±4.99 | 130.0 ±29.19 | 129.71 ±22.31 | 176.0 ±14.96 | 179.0 ±36.59 | 177.71 ±29.38 |

As it can be seen from the table the middle coat was the widest in the animals of CzP breed, and the narrowest in animals of CzPX breed. The middle coat was thicker in males than in females of NZ and CzP breeds, but in hybrydis of both sexes the coat thickness was almost the same.

The thickness of the whole wall of pulmonary trunk was the greatest also in animals of CzP breed, and the smallest in CzPX breed. It was greater in females than in males, except rabbits of NZ breed where it was opposite.

The performed studies demonstrate that the pulmonary trunk of the examined breed and cross of adult rabbits have a typical structure of elastic-like type artery.

The examined animals could be used successfully for experimental investigations of vascular system.

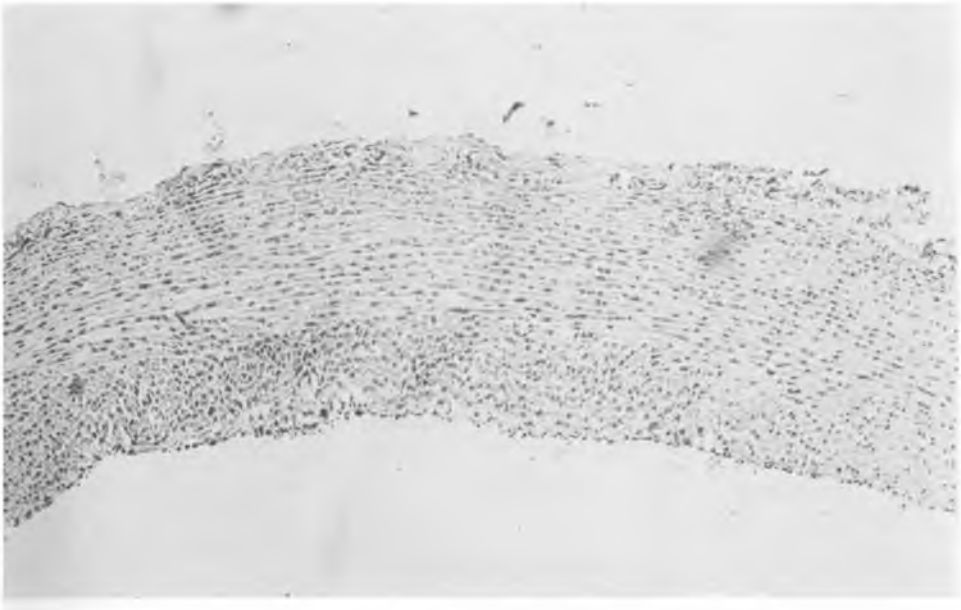

Fig. 1. A transverse section of the pulmonary trunk wall of the rabbit. H + E, magn. 100 ×

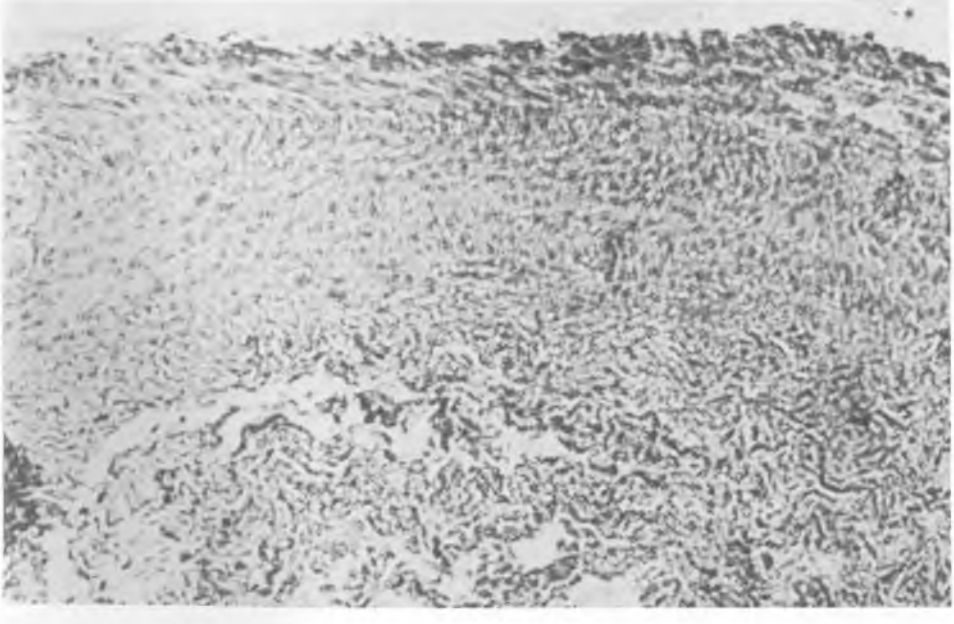

Fig. 2. A transverse section of the pulmonary trunk wall of the rabbit. van Gieson, magn. 200 ×

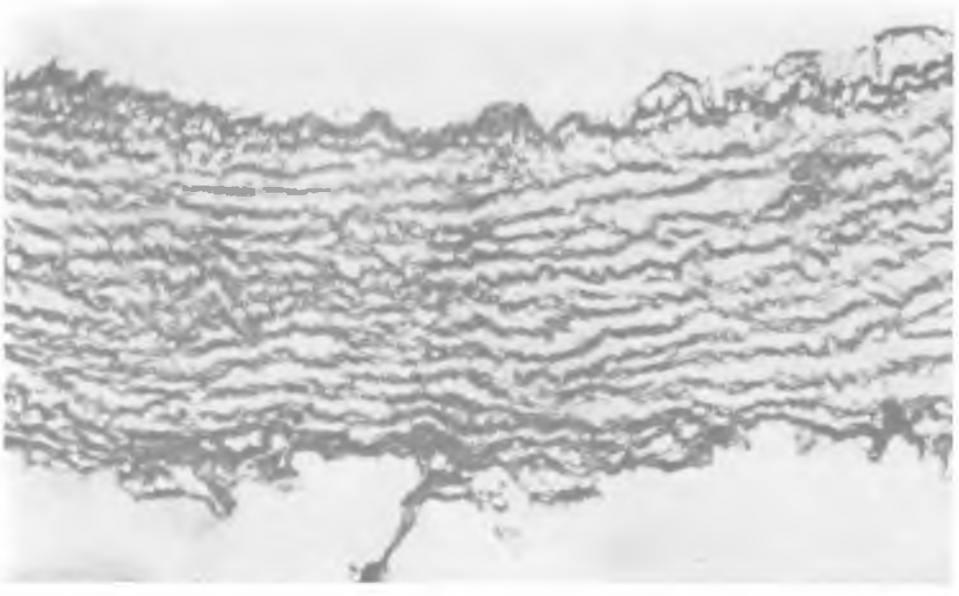

Fig. 3. A transverse section of the pulmonary trunk wall of the rabbit. Weigert, magn. 200×

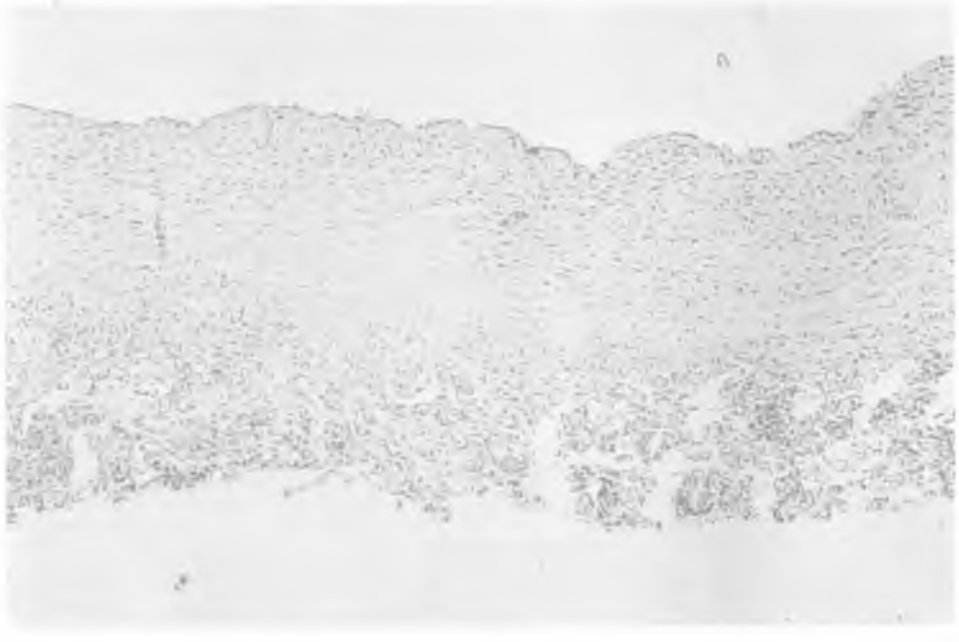

Fig. 4. A transverse section of the pulmonary trunk wall of the rabbit. H + E, magn. 200×

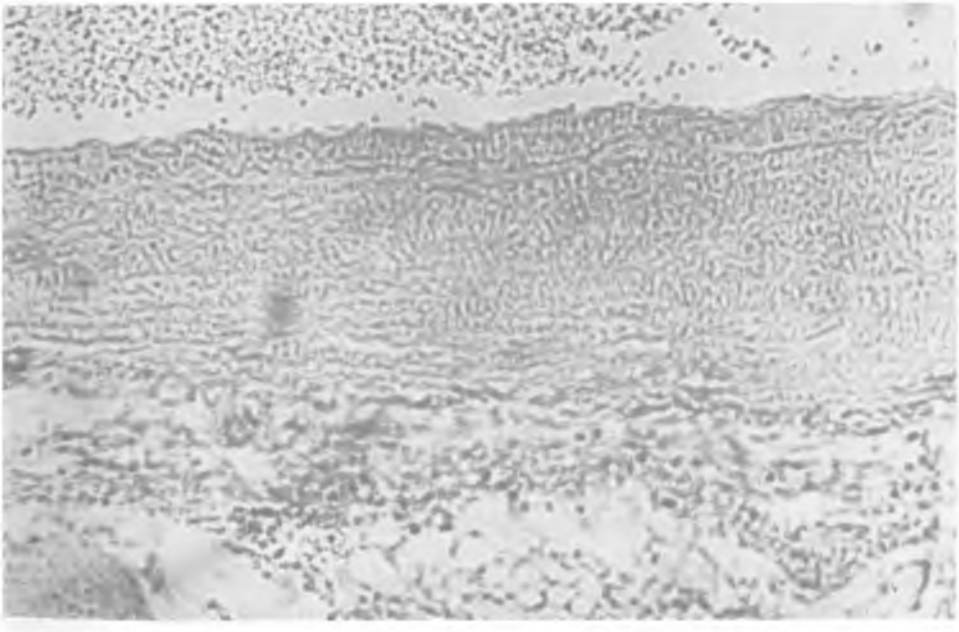

Fig. 5. A longitudinal section of the pulmonary trunk wall of the rabbit. Alcian blue, magn. 200×

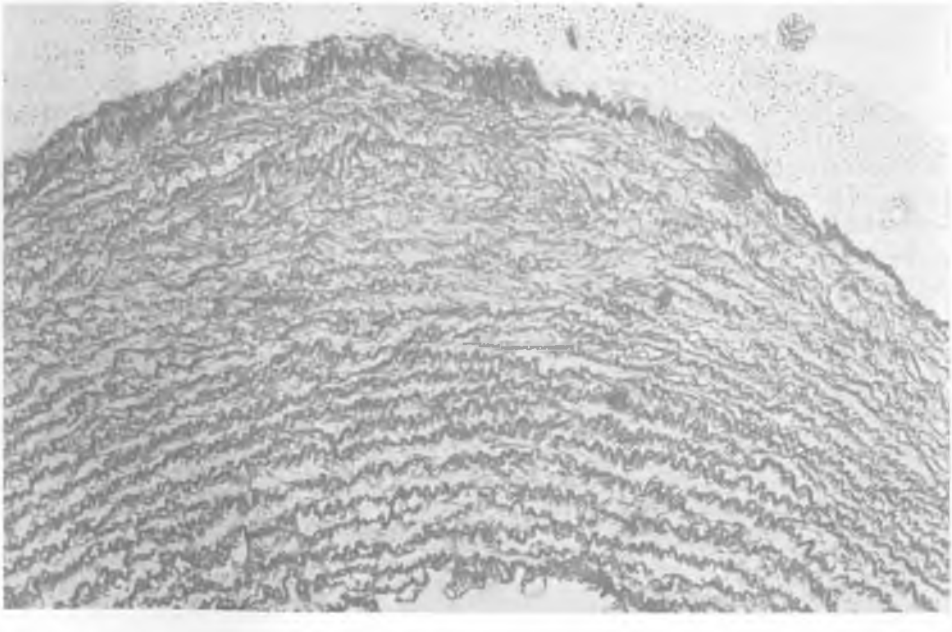

Fig. 6. A transverse section of the pulmonary trunk wall of the rabbit. Weigert, magn. 400×

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## STRESZCZENIE

Badania przeprowadzono na 40 królikach, dojrzałych płciowo, różnych ras i obojga płci. Budowę ściany pnia płucnego prześledzono na skrawkach parafinowych barwionych metodą H + E, van Giesona, Weigerta, Fraenkla i błękitem alcyjanowym. Obserwacje wykazały, że u dorosłych królików badanych ras i obu płci pień płucny ma typową budowę tętnicy typu sprężystego. Na całej długości pnia płucnego oraz w obrębie jego rozdwojenia nie stwierdzono zmian uważanych za wczesne objawy miażdżycy. Z tych względów zwierzęta te mogą być używane do badań doświadczalnych układu naczyniowego.