

Stereological analysis of the smooth muscles cells and elastic fibers in the tunica media of the thoracic aorta of diabetic rats and in aged rats

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Many of the chronic complications of diabetes mellitus involve changes to the connective tissue. Such alterations typically involve collagen and elastin. Diabetes mellitus is accompanied by changes throughout the vascular system, resembling those that take place during aging. Age-related vascular alterations can be caused by early-onset (or extremely severe) atherosclerosis, hardening of the large arteries (arteriosclerosis), capillary thickening and cardiovascular diseases in general. It is well known and accepted that arterial elasticity is reduced in diabetic subjects, atherosclerosis being the major determinant of the loss of arterial elasticity in these vessels. The objective of this study was to compare the blood vessels of male Wistar rats with alloxan-induced diabetes to those of aged male Wistar rats presenting no evident pathologies. Stereological aspects of the tunica media of the thoracic aorta were evaluated under light microscopy. Twenty-four male Wistar rats were distributed into three groups: control, diabetic and aged. We determined the numerical density of smooth muscle cells. In the smooth muscle and elastic fiber components, we assessed volume density and area density. It was determined that the aortic tunica media is composed of six to seven concentric elastic layers arranged cylindrically around the vessel, with smooth muscle cells and collagen fibers in each layer. In diabetic rats and aged rats, many variations in smooth muscle cells and elastic fibers were seen (Table 1 and 2). Comparing the three groups, there were fewer smooth muscle cells and elastic fibers in the aortic tunica media of the diabetic rats and the aged rats than in those of the controls. This phenomenon was most pronounced in the aged rats (Table 1 and 2). We can conclude that diabetes and aging correlate with variations in smooth muscle cells and elastic content of the aortic tunica media.

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