

REGIONAL HETEROGENITY OF ADVENTITIAL ELASTIN IN THE ARTERIOLAR WALL REFLECTS DIFFERENCES IN THE MECHANICAL ENVIRONMENT

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ABSTRACT

Adventitial elastin provides structural and mechanical support for arterioles. While elastin quantities are known in arterioles, the structure of elastin fibers and distribution of elastin throughout the vessel was unknown. This project aimed to develop an imaging technique using numerous dyes and 3D confocal imaging to further understanding of arteriolar elastin. Elastin content was stained with Alexa 633 (ex 633nm) and an elastin antibody (ex 488nm). Cell nuclei were stained with Yo-Pro Iodide (ex 488nm). Arterioles from the cremaster muscle of rats were imaged first and showed elastin in the internal and external elastic laminas (IEL and EEL respectively) as well as a vast network of adventitial elastin fibers. In comparison to these vessels, small arteries were isolated and imaged from the cerebral tissue. There was a complete absence of elastin content throughout the vessel, except for the IEL. Finally, small arteries were imaged from the mesentery. The elastin content in the mesenteric vessels was similar to that from the cremaster arteriole. There was an expansive network of adventitial elastin as well as significant elastin content in the IEL and EEL. The difference in adventitial elastin may be due to the mechanical environment that each vessel was isolated from. Using the imaging protocol developed, vessels can be imaged while focusing on age or disease to further understanding about the physiological changes that occur in these states.