

Public Abstract

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Title:Endothelial Phenotype Differs by Both Sex and Vessel Function

Endothelial cells (the cells that line our blood vessels) were once thought to be an inert cellophane-like wrapper separating flowing blood from tissue. However, as our understanding of the human body has progressed, we have come to know that the endothelium is actually an incredibly important, metabolically active organ. Endothelial dysfunction appears to be an early hallmark of multiple disease states, including, but not limited to, cardiovascular disease, type II diabetes, and atherosclerosis. While it is often presumed that all non-specialized endothelial cells are the same, and thus will have the same response to various pharmacological agents, disease states, and stimuli, this may not be true. Our goal is to understand if endothelial cell phenotypes (characteristics expressed by the cell) vary based on their origin (the blood vessel they come from), or by sex, and if so, to what degree. Specifically, our research focused on primary cultures of aortic (a conduit vessel) endothelial cells and of skeletal muscle microvasculature (exchange vessels) endothelial cells from both male and female rats, then compared them to one another, after being grown under identical conditions.

Our results strongly suggest that endothelial cells vary in size, growth rates, and protein expression, based on their origin and their sex. The implication is that medicines could affect different parts of our bodies in different ways, as well as affecting males and females differently. When studying functions mediated by vascular endothelium, it is important to use cells from an anatomical/functional location that best describes the question under investigation (or multiple locations if looking systemically), AND both sexes, as both characteristics determine the phenotype.