

## **Effect of irregularities of vessel cross-section on vascular resistance**

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Irregularities of the vessel luminal geometry affect resistance to blood flow in microvessels. In the present study, the effect of the protrusion of endothelial cell nuclei into the vessel lumen on vascular resistance is numerically evaluated. It is assumed that nuclei of endothelial cells protrude regularly into the vessel lumen, which has an otherwise circular cross-section. The flow of an incompressible Newtonian fluid in these vessels is numerically analyzed by a finite element method applied to the Stokes equations, and the relationship of the flow rate and the pressure drop between upstream and downstream is used to calculate vascular resistance. It is found that the vascular resistance is constantly elevated compared to that for vessels without protrusions. The vascular resistance increases as the area of the vessel cross-section decreases, its shape is more distorted from the circular, or its variation along the vessel axis is more significant.

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