

ROLES OF SEX AND INSULIN ON
MICROVASCULAR EXCHANGE FUNCTION

Rie Sasaki

Dr. Virginia Huxley, Dissertation Supervisor

ABSTRACT

A characteristic of endothelial dysfunction, which is observed in the beginning stages of type 2 diabetes, is the alteration of the microvascular barrier, affecting the microvascular permeability. We measured the venular leakage and clearance of albumin in response to suffusion with high-dose insulin (10^{-7} M) in the autoperfused mesentery in the adult male (AM), adult female (AF), and juvenile male (JM) rats. Insulin suffusion lead to increased venular albumin leakage by 63% in AM rats. Albumin and total protein clearance decreased with insulin treatment. In the JM rats, venular albumin leakage was increased by 103% with insulin suffusion. The total protein clearance in JM was unchanged, while the albumin clearance increased with insulin suffusion. In the AF rats, venular albumin leakage was unchanged with insulin suffusion. Insulin decreased the total protein clearance, but not the albumin clearance. We demonstrated novel data that not only can insulin result in changes in macromolecule exchange in intact, mesenteric microvasculature, but that these changes were dependent on the sex and the sexual maturity of the animal.