Public Abstract
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Title:EFFECTS OF ADRENORECEPTOR ACTIVATION AND AGING ON SKELETAL MUSCLE ARTERIOLES AT REST AND DURING RAPID ONSET VASODILATION

Sympathetic nerve activity (SNA) induces arteriolar vasoconstriction via alpha-adrenoreceptor (alpha-AR) activation. Functional sympatholysis (FS) refers to dilation during SNA in contracting muscle. Whether alpha-AR activation affects the spread of rapid onset vasodilation (ROV) in contracting muscle is unknown. Differential alpha-AR distribution in vascular smooth muscle has been proposed to mediate FS, however the alpha-AR subtype distribution in locomotor muscle is undefined. The purpose of this dissertation was to determine: 1) the effects of constitutive alpha-AR activation on the spread of ROV within contracting muscle, 2) the functional alpha-AR distribution in locomotor muscle of the mouse, and 3) the influence of alpha-AR on ROV during aging. I tested the hypotheses that: 1) adrenoreceptor subtype distribution is heterogeneous in arteriolar networks and 2) adrenoreceptor activation modulates the spread of ROV along arterioles of the gluteus maximus muscle . The left gluteus maximus muscle (GM) of young (3-month) anesthetized C57BL/6 mice were studied using intravital video microscopy. Distinct anastomotic, 1A, 2A, and 3A arterioles were studied at rest and following single muscle contraction in the presence or absence of topical alpha-AR agonists and antagonists. Functional alpha-AR distribution differed between proximal and distal arterioles. Constitutive alpha-AR activation inhibited the spread of ROV between regions of the GM. It also reduced the amount of ROV seen in old (~20-month) versus young male mice. I conclude that functional alpha-AR are heterogeneously distributed in arteriolar networks and serve to modulate regional vasodilation. These relationships appear to be enhanced with aging.