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Edward F Adolph distinguished lecture: Skin-deep insights into vascular aging

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The skin is an accessible model of circulation for studying vascular function and dysfunction across the lifespan. Age-related changes, as well as those associated with disease progression, often appear first in the cutaneous circulation. Further, impaired vascular signaling and attendant endothelial dysfunction-one of the earliest indicators of cardiovascular pathogenesis- occurs in a similar fashion across multiple tissue beds throughout the body including the skin. Because micro-vascular dysfunction is a better predictor of long term outcomes and adverse cardiovascular events than is large vessel disease, understanding age-associated changes in the control of the human cutaneous microcirculation is important. This review focuses on (1) the merits of using skin-specific methods and techniques to study vascular function, (2) micro-vascular changes in aged skin (in particular the role of the endothelial-derived dilator, nitric oxide) and (3) the impact of aging on heat-induced changes in skin vasodilation. While skin blood flow (SkBF) is controlled by multiple, often redundant, mechanisms, our laboratory has used a variety of distinct thermal provocations of this model circulation to isolate specific age-associated changes in vascular function. Skin-specific approaches and techniques such as intradermal microdialysis coupled with laser Doppler flowmetry (*in vivo*) and biochemical analyses of skin biopsy samples (*in vitro*) have allowed for the targeted pharmaco-dissection of the mechanistic pathways controlling skin vasoreactivity and studying the impact of aging and disease states. Aged skin has an attenuated ability to vasodilate in response to warm stimuli and to vasoconstrict in response to cold stimuli.

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