Commentary on Viewpoint “Human experimentation: No accurate, quantitative data?”

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To the Editor: Professor Rowell (4) effectively establishes the position that quantitative and precise methods are (and have been) available to assess regional and systemic cardiovascular function in humans. One of many thoughts stimulated by his comments is the remarkable tools we currently possess for studying vascular function in human subjects. A good example is the continuing evolution of the “closed forearm” technique to study function of peripheral arteries. Combining venous occlusion plethysmography measurements of forearm blood flow and brachial artery catheter delivery of compounds that can stimulate or inhibit specific signaling pathways, this technique allows investigators to “pharmaco-dissect” the neural, humoral, and local (endothelial) mechanisms controlling peripheral blood flow under various conditions (2). Recent advances with this model allow the assessment of other peripheral vascular functions such as arterial fibrinolytic capacity via endothelial release of tissue plasminogen activator (6). Another increasingly valuable tool is vascular ultrasonography. Duplex ultrasonography provides continuous measurements of large artery blood flow and, along with arterial pressure, vascular conductance at rest and during acute stress (3). Duplex ultrasonography also provides a means to noninvasively assess endothelium-dependent dilation (EDD) of peripheral conduit arteries using blood flow-stimulated dilation (flow-mediated dilation; Ref. 1). Administration of substances (e.g., vitamin C) provides an opportunity to study mechanisms influencing conduit artery EDD, albeit limited to nonvasoactive compounds that do not affect systemic arterial pressure and baroreflexes. Finally, B-mode ultrasound combined with applanation tonometry-acquired carotid pressure waveformes can be used to measure directly arterial compliance, particularly in the large elastic arteries that exert an important influence on left ventricular function/structure and systolic blood pressure (5). These techniques represent only part of the impressive contemporary armamentarium available to study circulatory physiology in humans.

REFERENCES