

# **REPRODUCIBILITY OF LOCAL THERMAL HYPEREMIA, POST OCCLUSIVE REACTIVE HYPEREMIA AND SODIUM NITROPRUSSIDE IONTOPHORESIS ASSESSED WITH LASER DOPPLER FLOWMETRY IN HUMAN SKIN**

Matthieu Roustit<sup>1,2</sup>, Sophie Blaise<sup>1,2</sup>, Jean-Luc Cracowski<sup>1,2</sup>

<sup>1</sup>*Inserm CIC3, Grenoble Clinical Research Center, Grenoble University Hospital, France*

<sup>2</sup>*Inserm ERI17, Grenoble Medical School, France*

The study of microvascular function can be routinely performed in humans using laser Doppler flowmetry of the skin. Postocclusive hyperemia, local thermal hyperemia, and sodium nitroprusside iontophoresis are used as tools to investigate endothelial or non-endothelial microvascular function. However, there is no consensus over their reproducibility and variation with room temperature, prandial status, and stress. The main objective of this study was to test the one-week reproducibility of those techniques on the finger and on the forearm. Secondary objectives consisted in testing their variations in different physiological conditions.

We performed local heating up to 44°C and 5 min postocclusive hyperemia in twelve healthy volunteers, at day 0 and day 7. We also tested the impact of a standard meal, of variations of room temperature, and of a psychological stress (STROOP test). Cutaneous blood flow was recorded with laser-Doppler probes. Data are expressed as cutaneous vascular conductance (CVC) in mV/mmHg.

Post-occlusive peak conductance was reproducible on all sites, except on the finger when room temperature varied. In the same way, room temperature had a major influence on recorded local thermal hyperemia parameters, especially on the finger pad. Although not significantly, prandial status tended to influence thermal hyperemia. One week reproducibility of thermal peak on the finger pad was good within the same subject.

In conclusion, One-week reproducibility was good for both tests, especially for digital thermal hyperemia. However, room temperature (especially when elevated) influenced both PORH and thermal hyperemia responses on the finger pad, highlighting the need for temperature-controlled conditions while performing these tests.

Keywords: iontophoresis; thermal hyperemia; microcirculation; laser Doppler.