Sex differences in the flow-mediated epidermal fluorescence during forearm ischemia and reperfusion.

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Background/Introduction:
The excitation by ultraviolet of the reduced form of nicotinamide adenine dinucleotide (NADH) generates emission of the fluorescence light at the length of 460 nm. In this way, dynamic changes in the NADH amount can be detected in the skin at rest, during ischaemia, and reperfusion by the flow-mediated skin fluorescence (FMSF). Although NADH is metabolised both in cytoplasm and mitochondria, it participates in the aerobic energy metabolism mostly within mitochondria. The substantial sex differences in the energy production and consumption suggest that mitochondria function might differ between men and women. This study aimed to study sex differences in the FMSF changes induced by ischaemia and reperfusion.

Methods:
The FMSF was measured continuously during a 3-minute rest, a 100-second forearm ischaemia triggered by inflation of the brachial pressure cuff to the pressure 60 mmHg above systolic blood pressure, and a 3-minute reperfusion in 55 women (22.1+/−2.2 years old) and 44 men (23.8+/−4.6 years old). The following changes in FMSF were compared: (1) the ischaemia magnitude (IschM), (2) the reperfusion magnitude (RepM), (3) the contribution of the ischaemia to the total change in FMSF (IschCon), (4) the half-time of the increase of fluorescence during ischaemia (tIsch), and (5) the half-time of the recovery of fluorescence to the baseline during reperfusion (tRep). The paired t-test compared results which are presented as a mean and standard deviation.

Results:
Men, in comparison with women, presented a significantly higher skin fluorescence during ischaemia (IschM: 11.9+/−8.00 vs 7.6+/−5.4%; p=0.0022) and the contribution of ischaemia to FMSF (IschCon 38.5+/−17.3 vs 30.7+/−12.7%; p=0.0118), and longer half-time time to normalization of the skin fluorescence during reperfusion (tRep: 37.8+/−21.2 vs 27.9+/−15.4 s; p=0.0083). Neither RepM nor tIsch was statistically different between men and women.

Conclusions: Men, compared to women, are less resistant to the effects of arterial blood pressure occlusion on the epidermal NADH accumulation during ischaemia and the NADH reconstitution during reperfusion. Our results suggest the existence of sex differences in mitochondria function in response to ischaemia and reperfusion. The mechanisms responsible for these findings are unclear, and it is possible that sex hormones
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