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Impaired vascular responses of insulin resistant (IR) rats after mild subarachnoid hemorrhage (SAH).

Institóris, Á.^{1,2*}; Snipes, J. A.¹; Katakam, P. V.¹; Domoki, F.²; Bari, F.³; Busija, D. W.¹

1: Department of Physiology and Pharmacology, Wake Forest University Health Sciences, Winston-Salem, NC,

2: Department of Physiology, School of Medicine, University of Szeged, Szeged, Hungary

3: Department of Medical Physics & Informatics, School of Medicine, University of Szeged, Szeged, Hungary

IR impairs cerebrovascular responses to several stimuli in Zucker obese (ZO) rats. However, cerebral artery responses after SAH have not been described in IR. Hemolysed blood (300 μ l) or saline was infused (10 μ l/min) into the cisterna magna of 11-13 week-old ZO (n=25) and lean (ZL) rats (n=25). One day later, dilator responses of the basilar artery (BA) and its side branch (Br) to acetylcholine (ACh, 10⁻⁶ M), cromakalim (10⁻⁷ M, 10⁻⁶ M) and sodium nitroprusside (SNP, 10⁻⁷ M) were recorded with intravital videomicroscopy. The baseline diameter of the BA was increased in the ZO but not the ZL rats 24h after the blood injection. Saline injected ZO animals showed reduced dilation to ACh (BA=7 \pm 4% vs. 21 \pm 5%; Br=20 \pm 5% vs. 37 \pm 8%) compared to ZL rats. Blood injection blunted the response to ACh in both the ZO (BA=4 \pm 3%; Br=11 \pm 3%) and ZL rats (BA=7 \pm 2%; Br=16 \pm 4%). Dilation to cromakalim (10⁻⁶ M) was significantly reduced both in the blood injected ZO rats vs. the saline control (BA=11 \pm 3% vs. 27 \pm 5%; Br=23 \pm 7% vs. 43 \pm 11%), and in the blood injected ZL rats vs. their saline control (BA=24 \pm 4% vs. 29 \pm 3%; Br=39 \pm 3% vs. 58 \pm 9%). No difference in SNP reactivity was observed. Western blot analysis of the BA showed a lower baseline neuronal nitric oxide synthase expression and higher cyclooxygenase-2 levels in the blood injected ZO animals. In summary, endothelium- dependent and independent responses are worsened by IR in SAH.

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