

## The Effect of a High Fat Meal on Cerebral Vascular Function

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### ABSTRACT

It is well known that a single high fat meal (HFM) causes a robust and transient elevation in serum triglycerides (TG). This elevation in serum TG is a primary contributor to the post-prandial attenuation of peripheral vascular endothelial function, as assessed by flow-mediated dilation in the brachial artery. Whether a similar impairment in vascular reactivity can be observed in the cerebral circulation remains unknown, and was the focus of this investigation. **PURPOSE:** To test the hypothesis that cerebral vascular function is impaired following a HFM. **METHODS:** End-tidal carbon dioxide partial pressure (PETCO<sub>2</sub>), middle cerebral artery blood velocity (MCAV<sub>mean</sub>), calculated cerebral vascular conductance index (CVCI; MCAV<sub>mean</sub>/mean arterial pressure) and cerebral vasodilator response to rebreathing induced hypercapnia (% increase in CVC from baseline at common maximal  $\Delta$ PETCO<sub>2</sub>) were assessed in 6 healthy young men (27  $\pm$  5 years). Measures were assessed during fasted baseline and again at 2 and 4 h post meal consumption (HFM day) or at a similar time point in the fasted state (TC day). The two visits were separated by 2-7 days and were conducted in a randomized order. Blood lipids were assessed at baseline and at the 2 h time point into each respective condition. **RESULTS:** As expected, consumption of the HFM significantly elevated serum TG concentrations relative to TC at 2 h (HFM: 101 $\pm$ 38 to 169 $\pm$ 77mg/dl, TC: 107 $\pm$ 32 to 92 $\pm$ 31mg/dl, P=0.007). However, the HFM had no effect of cerebral vasodilator capacity during rebreathing induced hypercapnia. The maximal increase in %CVC achieved at the highest common  $\Delta$ PETCO<sub>2</sub> during all conditions within each subject was unchanged during 2hr and 4hr post HFM or TC (condition  $\times$  time interaction: P=0.96). Similarly, the slope of the change in %CVC per change in  $\Delta$ PETCO<sub>2</sub> was unaffected by HFM across time (P=0.49). **CONCLUSION:** Contrary to our hypothesis, and unlike the peripheral vasculature, our preliminary data suggest that the cerebral circulation appears to be protected from the acute negative effects of a high fat meal.