

# Effect of hyperinsulinemia on cerebral autoregulation

**Iman N. Lloyd**<sup>1</sup>, B Shariffi<sup>1</sup>, JL Harper<sup>1</sup>, JA Smith<sup>1</sup>,  
CM Manrique-Acevedo<sup>2,3,4</sup>, J Padilla<sup>1,4</sup>, JK Limberg<sup>1,3</sup>

<sup>1</sup>Department of Nutrition & Exercise Physiology, University of Missouri, Columbia, MO; <sup>2</sup>Division of Endocrinology, Diabetes & Metabolism, Department of Medicine, University of Missouri, Columbia, MO; <sup>3</sup>Research Services, Harry S. Truman Memorial Veterans Hospital, Columbia, MO; <sup>4</sup>Dalton Cardiovascular Research Center, University of Missouri, Columbia, MO



# Background

- Hyperinsulinemia has profound vasodilatory effects within the skeletal muscle vasculature in healthy young adults.
- We recently showed hyperinsulinemia in healthy young adults has no effect on cerebrovascular vasodilation.
- We postulate a lack of change in cerebral blood flow during hyperinsulinemia may be due to the importance of autoregulation in the cerebral circulation (*i.e.*, the ability of the cerebral circulation to maintain a constant level of blood flow).

## Aim

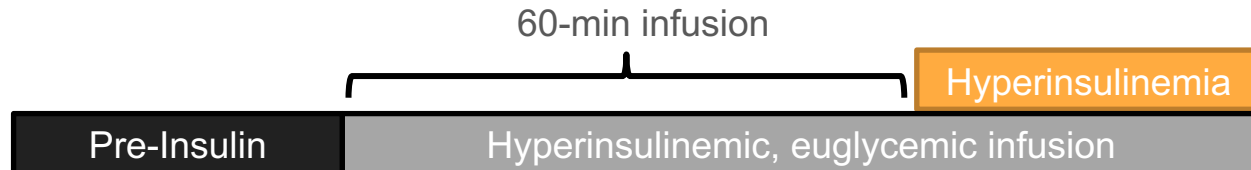
Examine the acute impact of hyperinsulinemia on cerebral autoregulation.

## Hypothesis

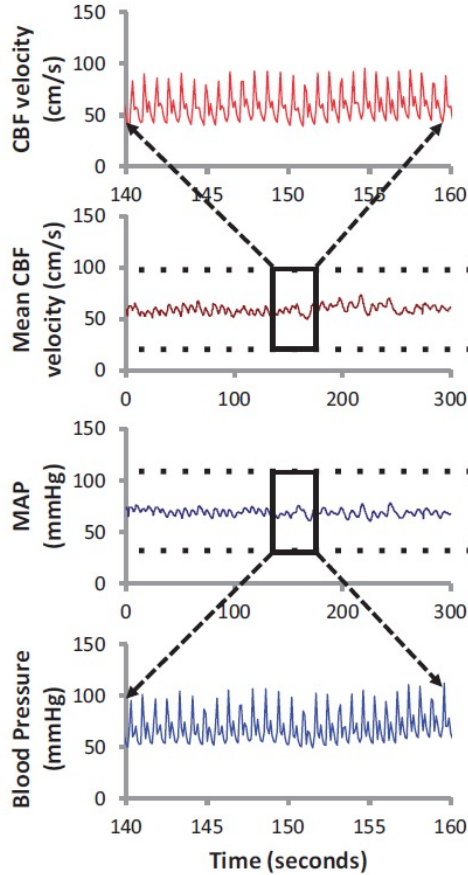
Cerebral autoregulatory gain in the low (0.07 – 0.20 Hz) frequency range will be greater during hyperinsulinemia when compared to baseline.

# Methods

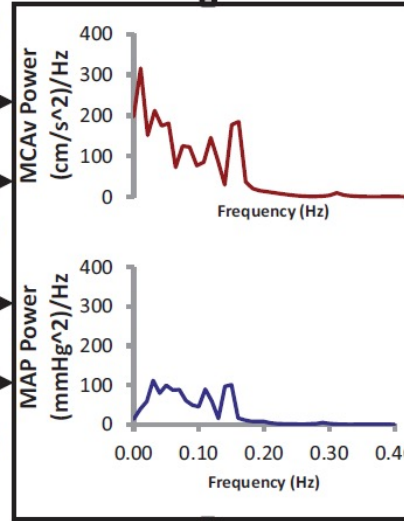
- 11 healthy young adults (5M/6F,  $25 \pm 2$  yrs)
- Measurements:
  - Middle cerebral artery velocity (transcranial Doppler ultrasound)
  - Blood pressure (finger photoplethysmography)
- Insulin infusion:
  - Insulin was infused intravenously at a constant rate.
  - Exogenous glucose was infused to maintain euglycemia.



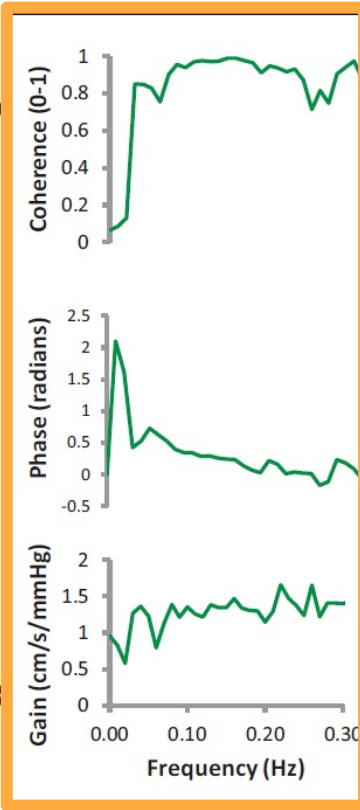
## Time-Domain



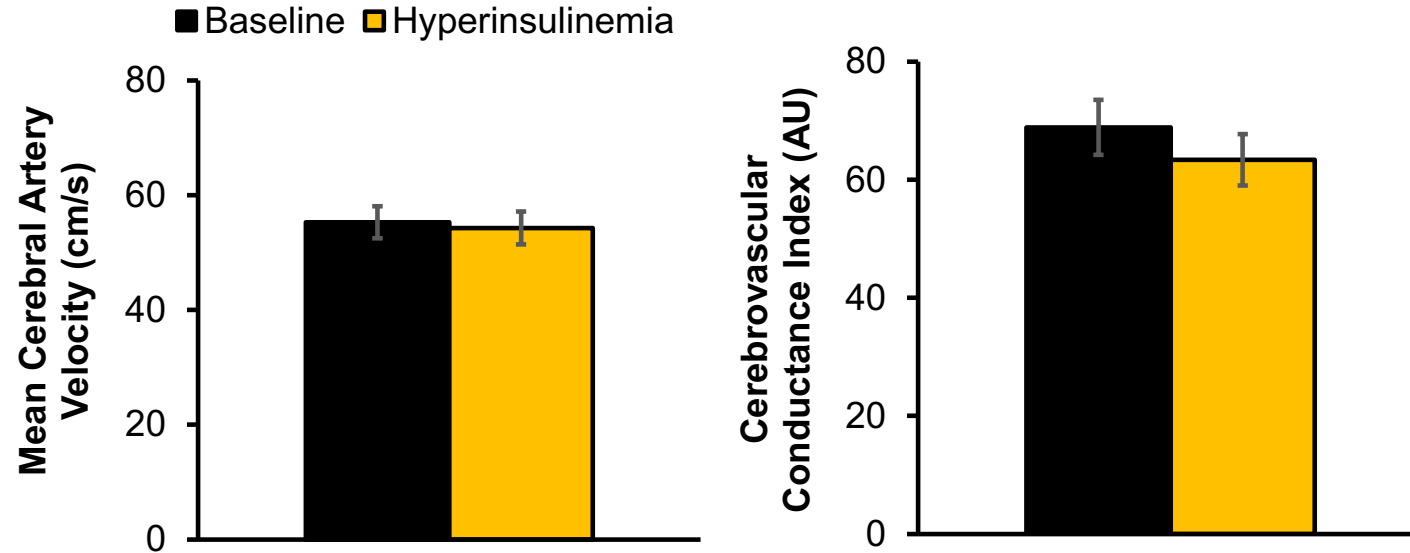
## Spectral Analysis



## Cross-Spectral Analysis

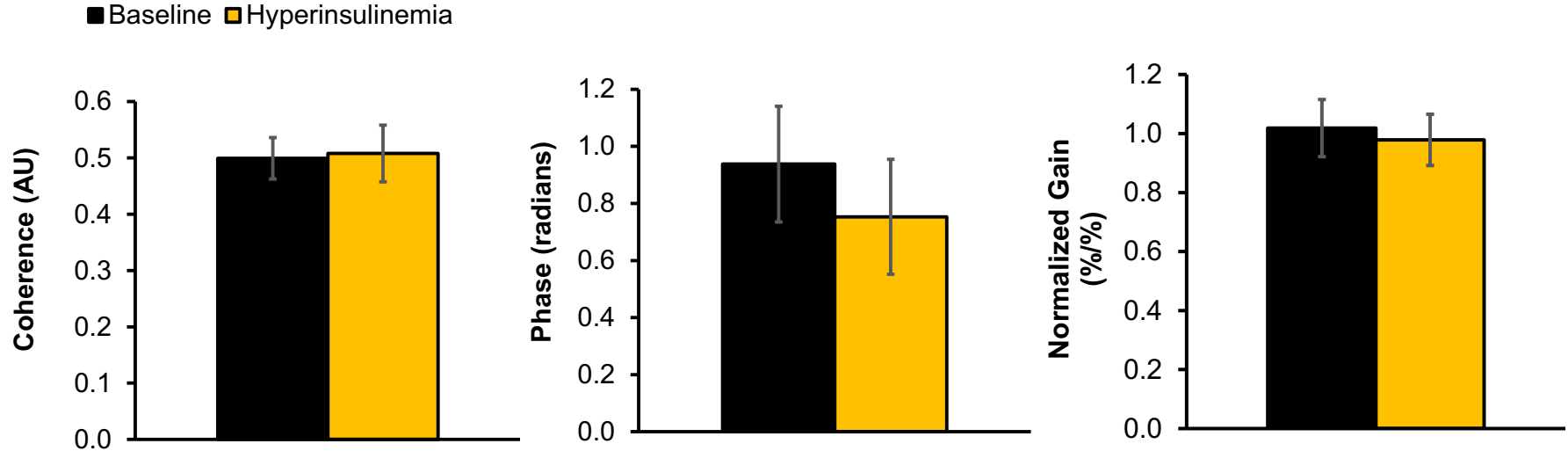


# Results



Hyperinsulinemia had no effect on MCAv or CVCi.

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Coherence, phase, and normalized gain (measures of cerebral autoregulation) were unaffected by hyperinsulinemia.

# Conclusions

- Contrary to our hypothesis, these results indicate that the sensitivity of the cerebrovascular circulation to changes in blood pressure (*i.e.*, cerebral autoregulation) is not altered during systemic hyperinsulinemia.
- Whether these results translate to disease states (*e.g.*, insulin resistance) and the implications for cerebrovascular health will be the focus of future studies.