Effect of acute intermittent hypoxia on the systemic vascular response to sympathetic activation in healthy men and women

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Background

- Activation of the sympathetic nervous system causes vasoconstriction of peripheral blood vessels.
- Acute intermittent hypoxia (AIH) elicits persistent increases in sympathetic nervous system activity.
- Previous data from our group found the persistent increase in sympathetic activity following AIH occurs simultaneously with blood pressure increases in men, but not women.

Aim

- Examine vascular responsiveness to sympathetic activation before and after acute intermittent hypoxia (AIH) in healthy young men and women.

Hypothesis

- The vascular response to sympathetic activation will be preserved following AIH in men.
- The vascular response to sympathetic activation will be attenuated in women following AIH.

Methods

- **Participants:**
  - 13 men
  - 13 naturally cycling (NC) women
  - 11 women taking oral contraceptives (OCP).

  Women were studied during the late follicular or active pill phase.

Arterial blood pressure (finger photo-plethysomography) was measured and cardiac output and total vascular conductance were calculated.

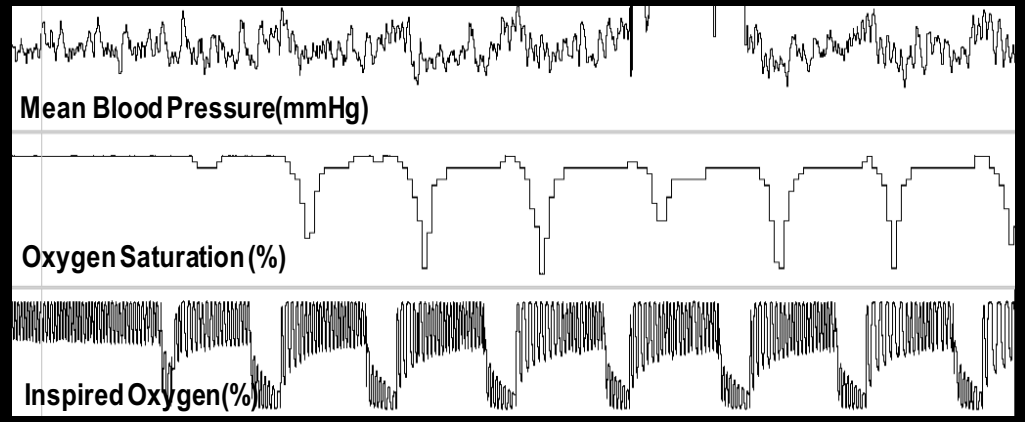
Methods

- **Participants:**
  - 13 men
  - 13 naturally cycling (NC) women
  - 11 women taking oral contraceptives (OCP).

  Women were studied during the late follicular or active pill phase.

Cold Pressor Test: Participants completed a 2-min cold pressor test [CPT, foot submerged in ice water].

Methods



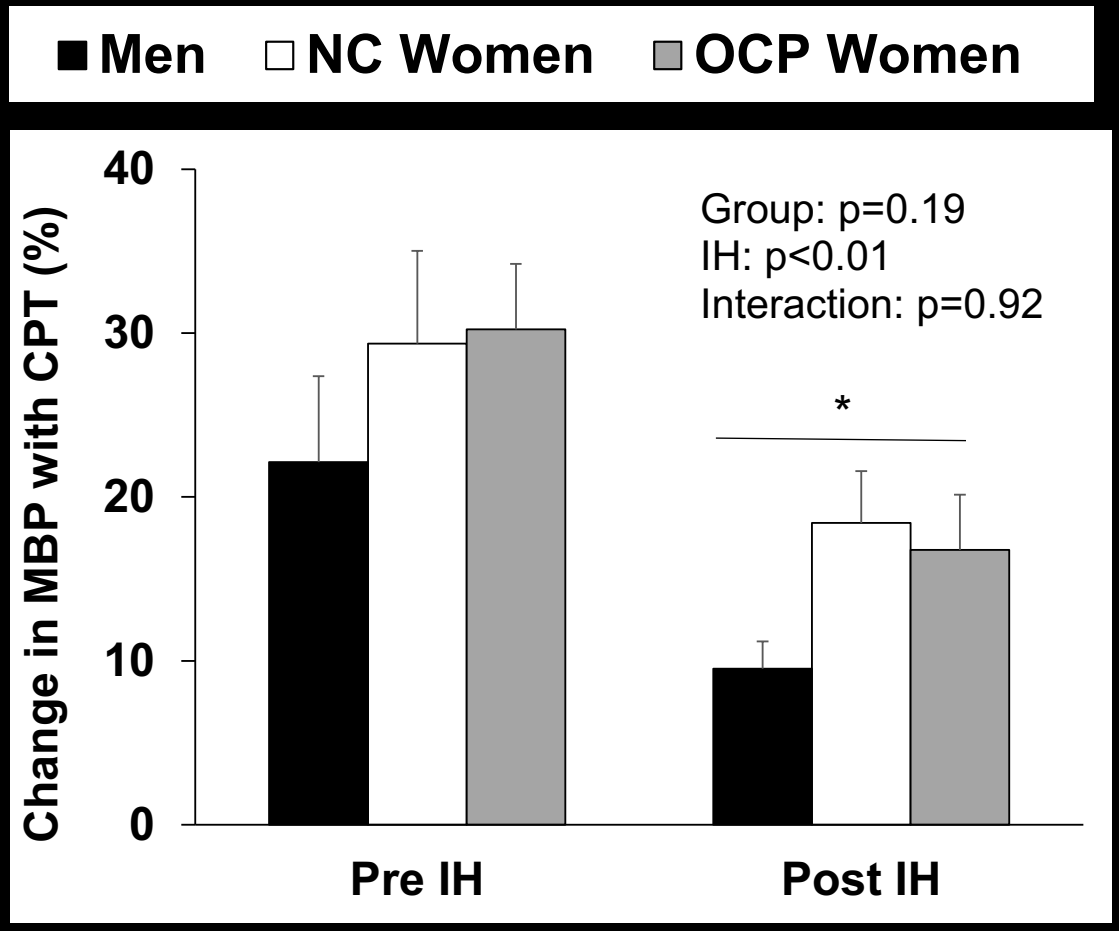
- **Acute Intermittent Hypoxia (AIH):** Individuals alternated between hypercapnic hypoxia (3% CO_2, 5% O_2) and room air (21% O_2) to target 15 hypoxic events over 30-min

Results

After acute intermittent hypoxia, blood pressure increases less in response to sympathetic activation - independent of sex or hormone(s).

MBP = mean blood pressure
CPT = cold pressor test
IH = intermittent hypoxia

NC = naturally cycling
OCP = oral contraceptive



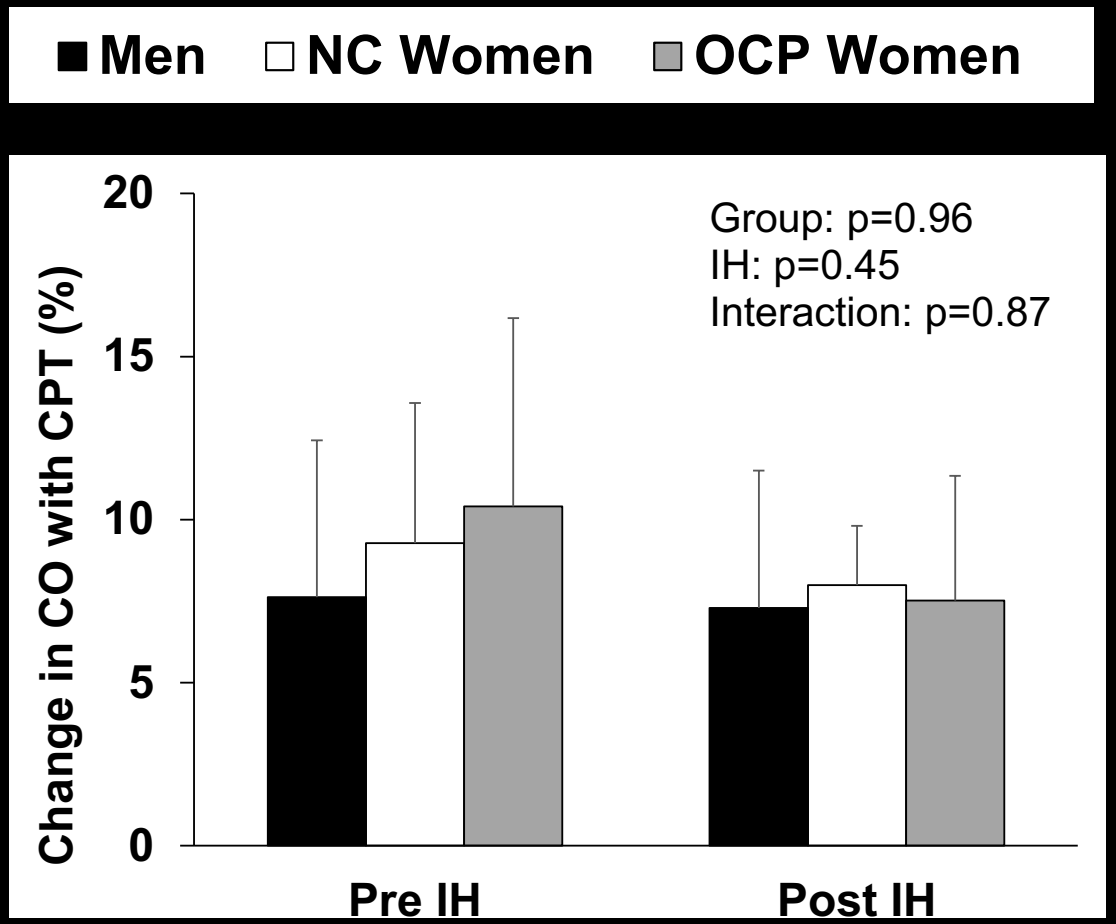
*p<0.05 vs Pre IH

Results

There is *no effect* of acute intermittent hypoxia on the cardiac output response to sympathetic activation.

CO = cardiac output
CPT = cold pressor test
IH = intermittent hypoxia

NC = naturally cycling
OCP = oral contraceptive

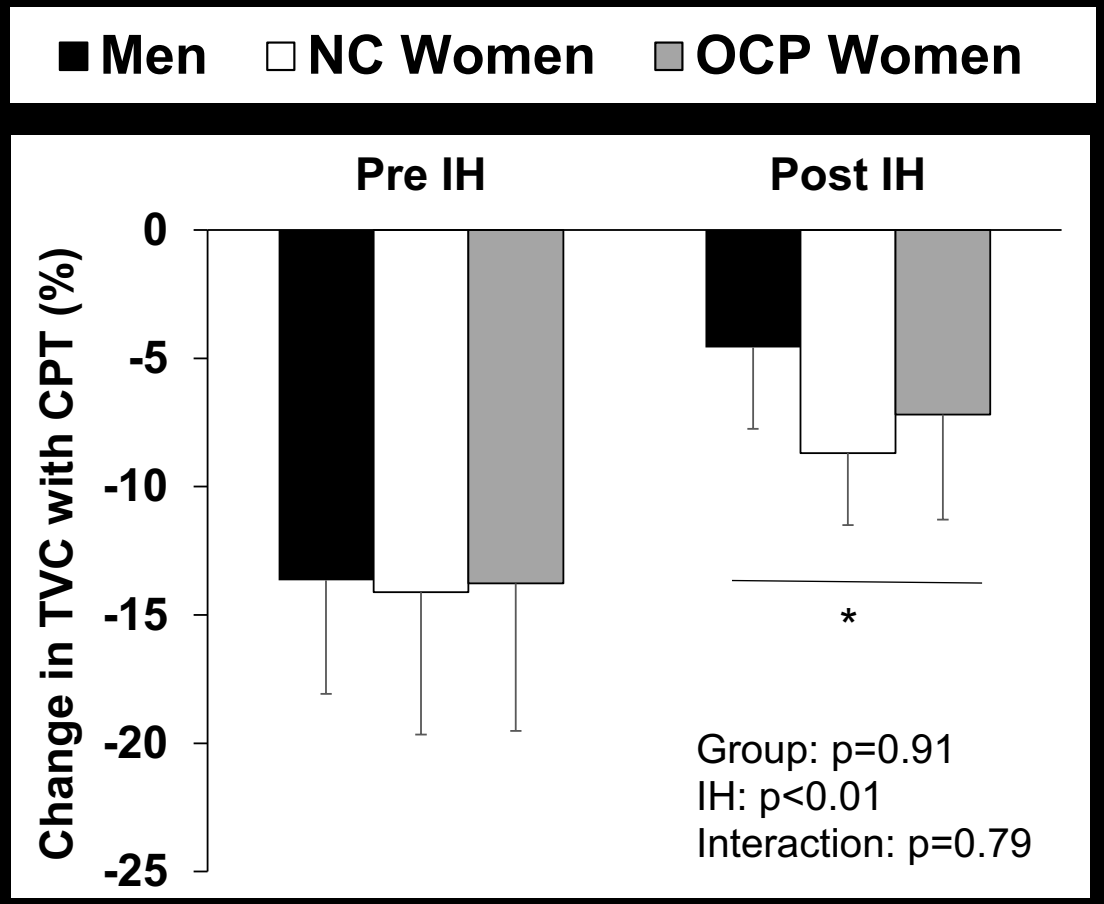


Results

After acute intermittent hypoxia, there is less vasoconstriction in response to acute sympathetic activation - independent of sex or hormone(s).

TVC = total vascular conductance
CPT = cold pressor test
IH = intermittent hypoxia

NC = naturally cycling
OCP = oral contraceptive



***p<0.05 vs Pre IH**

Conclusion

The mean blood pressure and total vascular conductance response to sympathetic activation are attenuated following intermittent hypoxia in both men and women. However, the rise in cardiac output is preserved across groups.

Acute adaptive responses to sympathetic activation following intermittent hypoxia in healthy adults are independent of sex or hormone(s).