



Uncoupling Protein 1 Role in Thermogenesis and Energy intake in Upper Airway Obstruction/Removal mice model.

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Introduction

- SDB can lead to accelerated weight gain post-tonsillectomy.
- Brown fat uncoupling protein 1 (UCP1) regulates body heat (thermogenesis) and weight.
- UCP1 is 50% lower in obese subjects - regardless of SDB.
- The sympathetic nervous system (SNS) activates brown fat UCP1 by the β_3 receptor - lipolysis and thermogenesis (body temperature).

Introduction

- In rodents, upper airway obstruction/ obstruction removal (AO/ OR) is a model for human SDB. Tarasiuk *et al.* Eur Respir J 2011; Tarasiuk *et al.* Sleep 2014; Tarasiuk & Segev, Front Endocrinol. 2018.
- Orexin plays a role in breathing and feeding in AO/ OR.
- SDB and orexin can activate the SNS.
- We hypothesize that UCP1 plays a role in feeding and thermogenesis in AO/ OR mice.

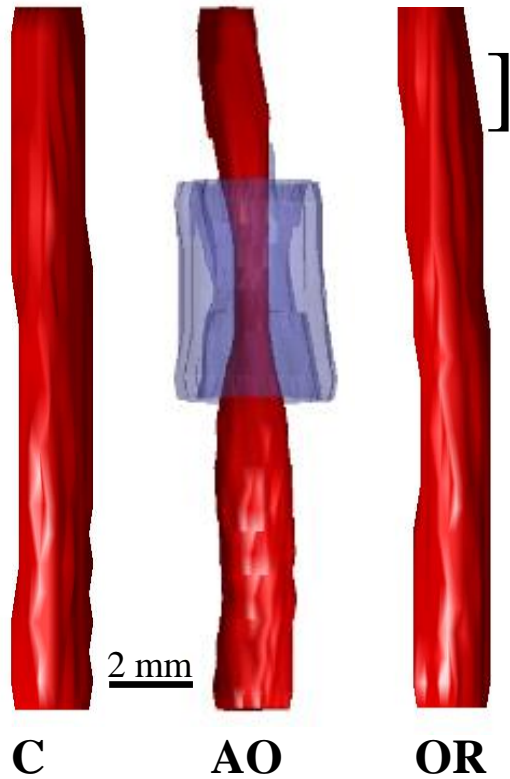
Study aim

To explore whether SNS activation influences thermogenesis and feeding behavior in AO/ OR mice model.

Study protocol

Animals - 6 weeks male mice - 19 gr

3D MRI scan



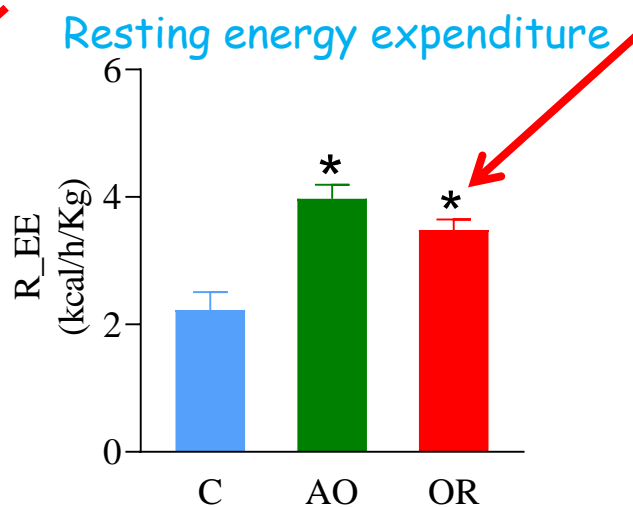
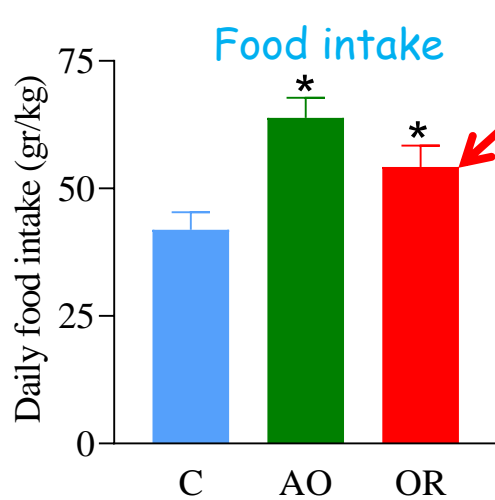
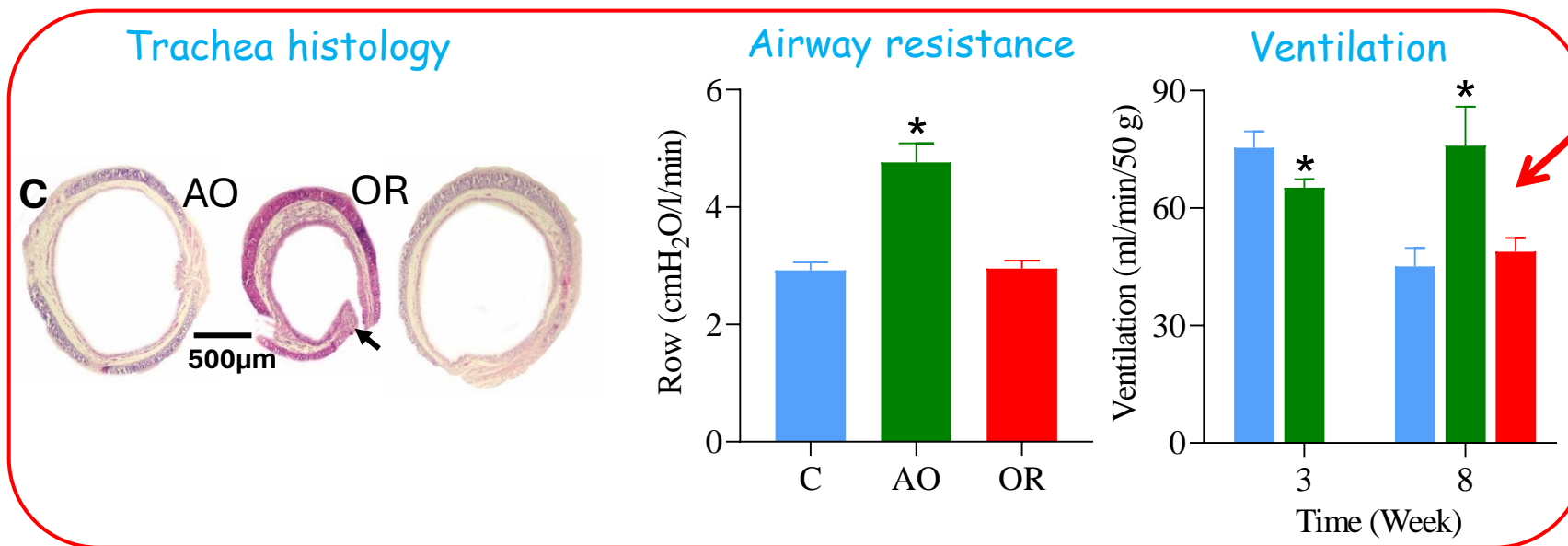
AO - 19 gr mice
(1-2 yrs. in human terms)

OR - day 9

Follow-up -
8-12 weeks

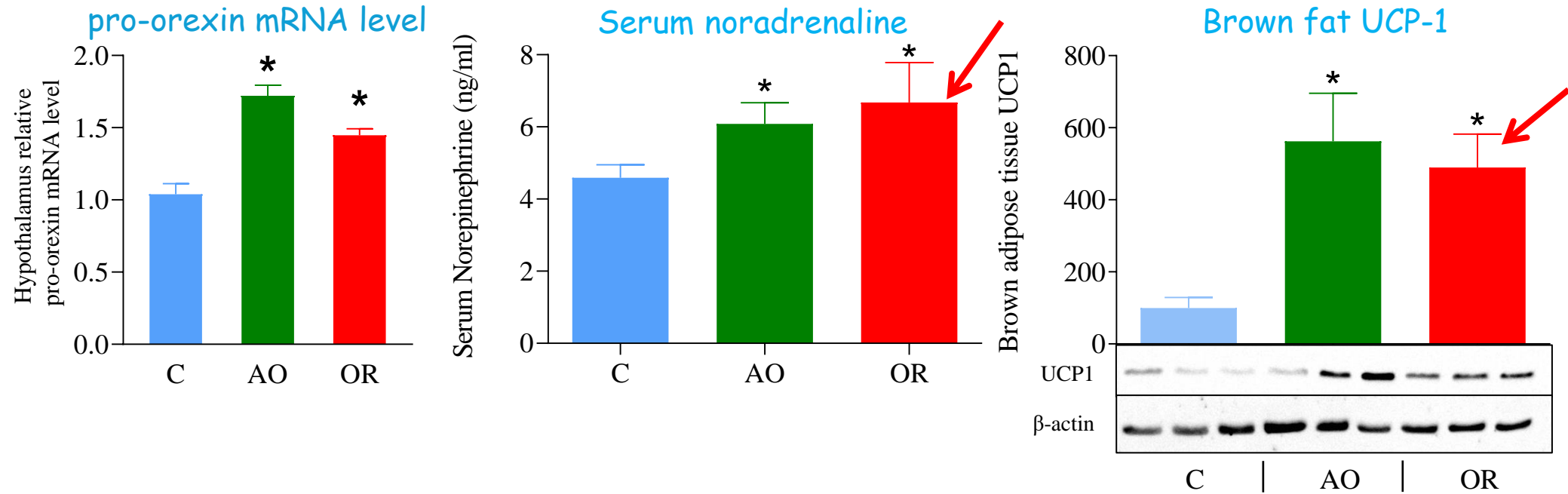
Data collection - day 56-84
(20 yrs. follow-up in human terms)

Respiratory activity and energy intake



R_ee - body heat generation, work of breathing, food digestion

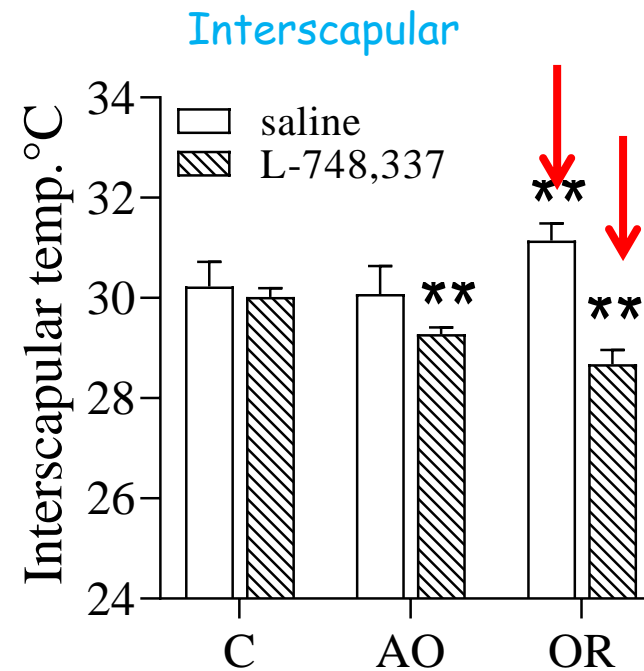
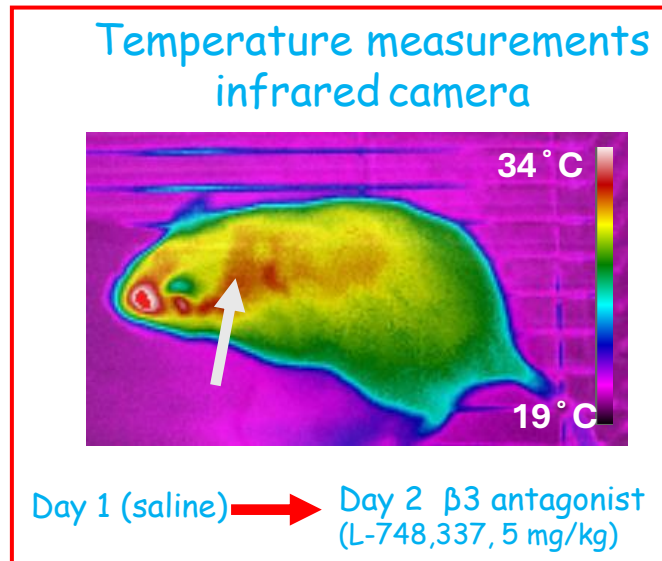
Orexin and sympathetic activation of UCP-1



Noradrenaline - sympathetic nervous activity.

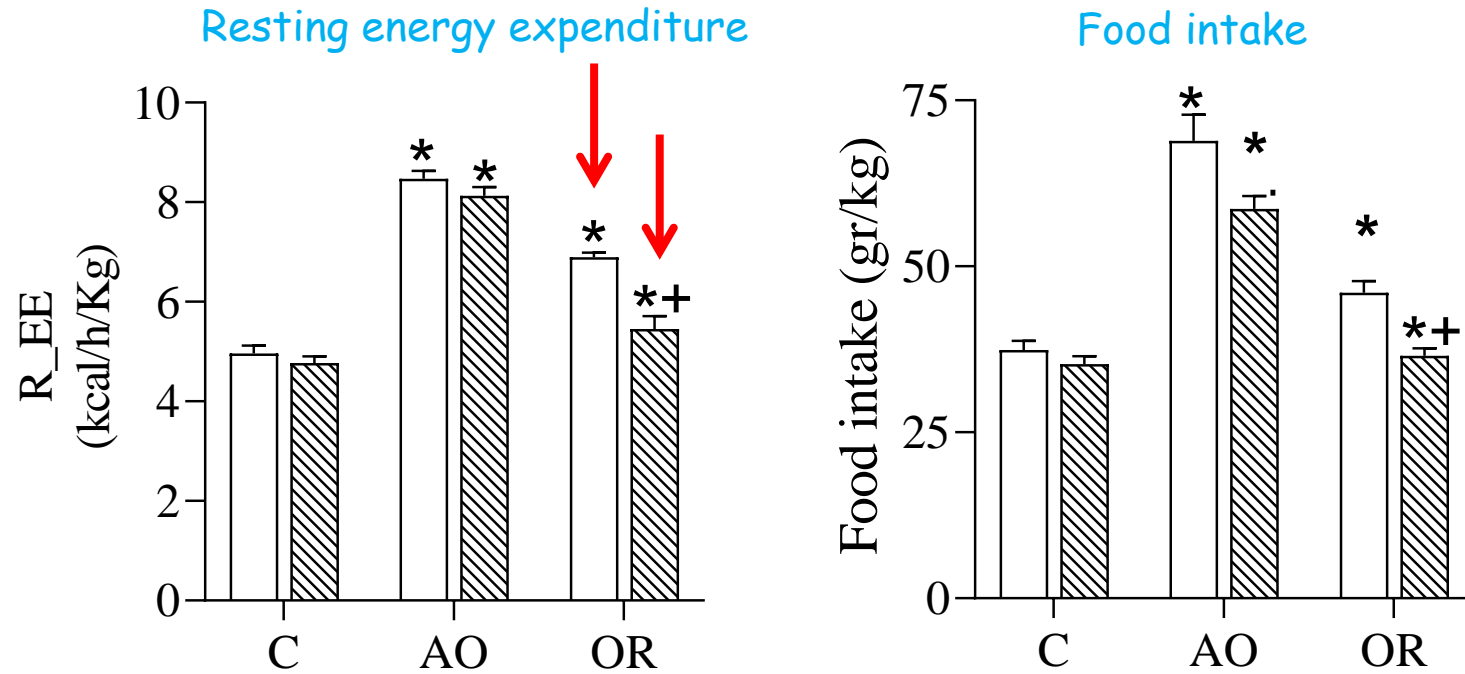
Brown fat UCP1 - thermogenesis, converting fat to body heat.

The Effect of SNS on Thermogenesis



β ₃ expressed in adipose tissue - lipolysis and thermogenesis (body temperature).

The Effect of $\beta 3$ Antagonist on Resting Energy Expenditure and Feeding



Conclusion

- AO/ OR leads to irreversible increased food intake.
- Changes in UCP1 affect feeding and energy expenditure.
- SNS plays a role in energy intake following OR, which may lead to obesity in the long run.

Thank you for your attention

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Dr. Arazi Eden



Dr. Assadi Mohammad

