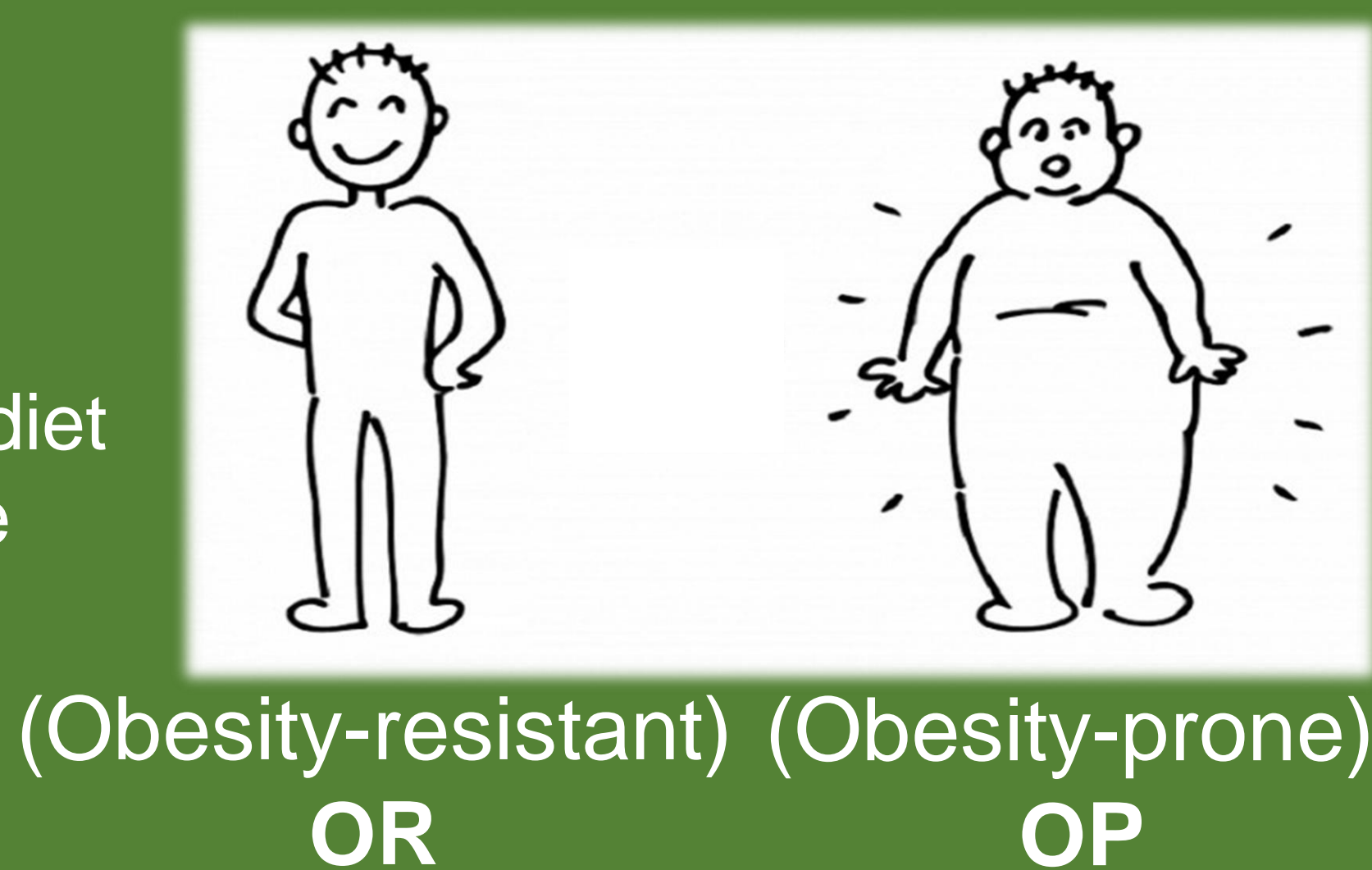


# Spatial reorganization of proopiomelanocortin (POMC)-expressing neurons in the arcuate nucleus of POMC-EGFP mice resistant or prone to obesity

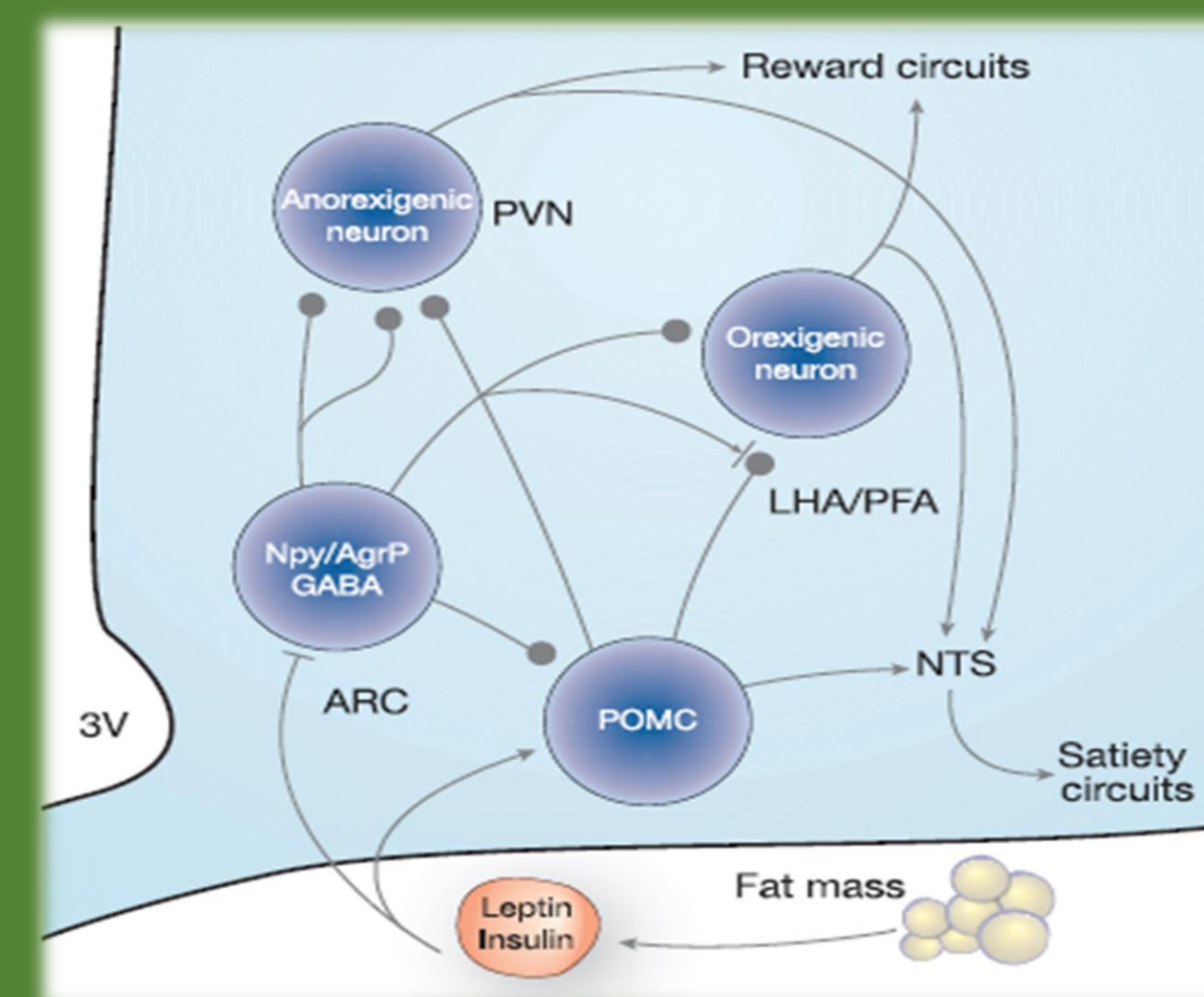
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## CONTEXT

Not all people exposed to a Western pattern diet become obese



Hypothalamic neural pathways involved energy homeostasis including neurons originating from the ARC that express NPY/AgRP which stimulate food intake, or POMC which are anorexigenic neuropeptides



(Morton et al 2006)

→ Do OP and OR mice have different densities and spatial distributions of POMC neurons in the ARC ?

Measure of spatial distribution of POMC neurons in the ARC of these two groups of mice, using 3D reconstruction and statistical mapping of POMC-neuron densities.

## Experimental procedure

**Experiment 1 :**  
6 C57BL/6J POMC-EGFP mice for control group (Aged 9 weeks)

Control group (until aged 11 weeks)



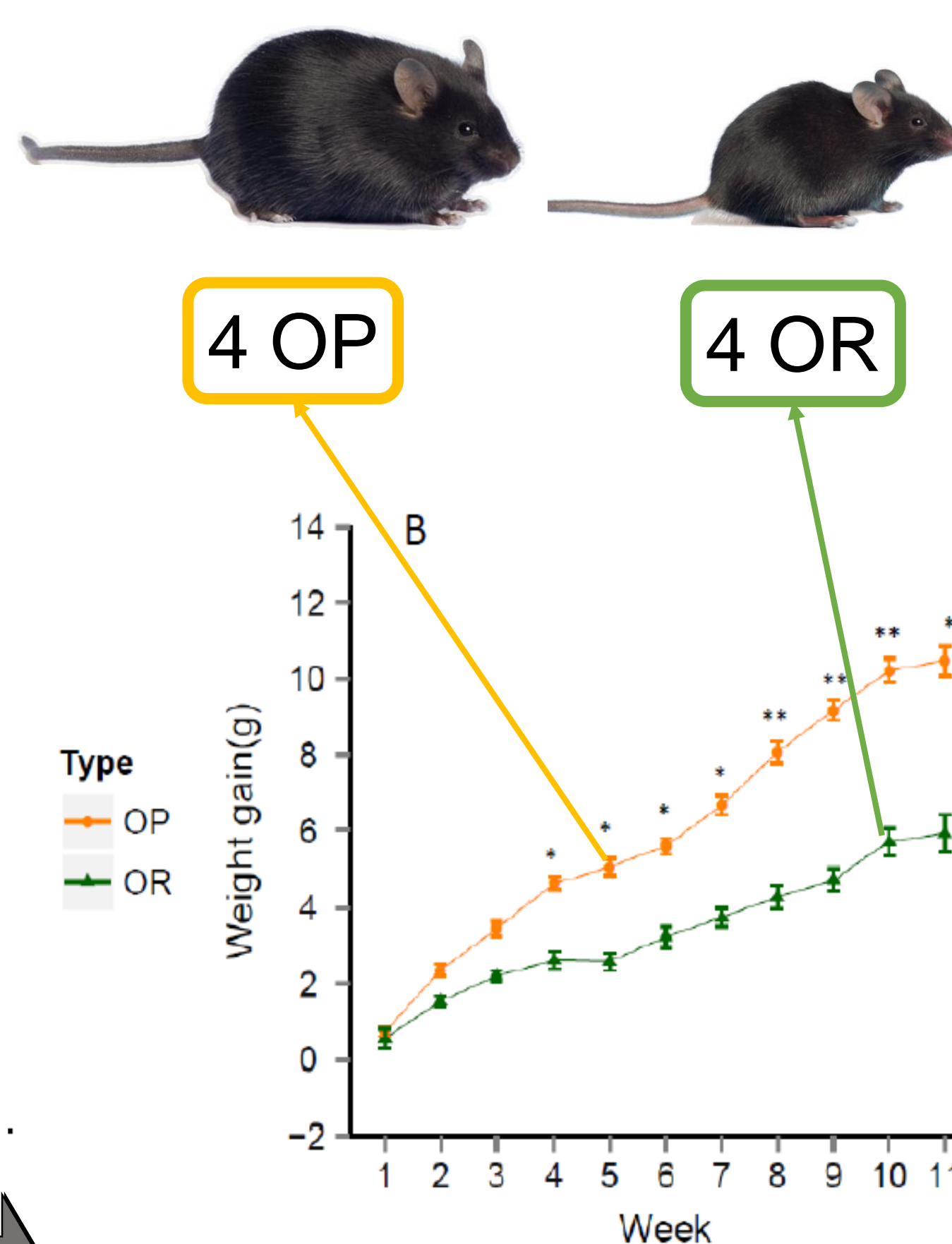
Brain slicing

**Experiment 2 :**  
16 mice for OP/OR selection (Aged 2 weeks)

High Fat High Protein diet until aged 13 weeks

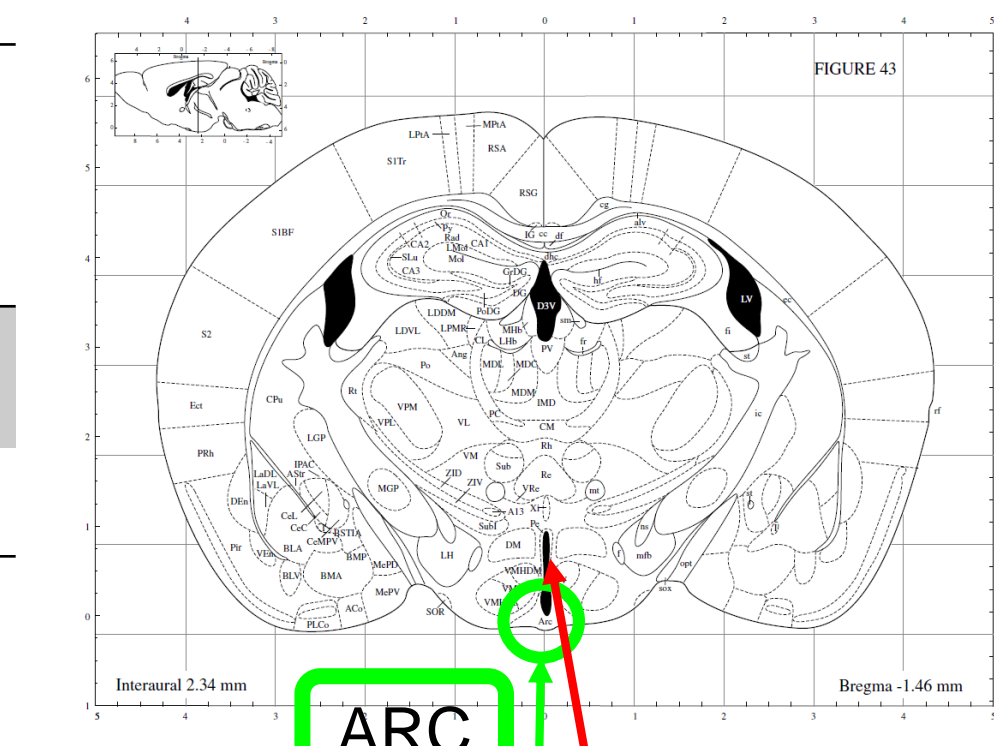
Habitation  
W0 W1 W5 W9 W11  
DEXA DEXA DEXA

DEXA= Dual energy X-Ray absorptiometry



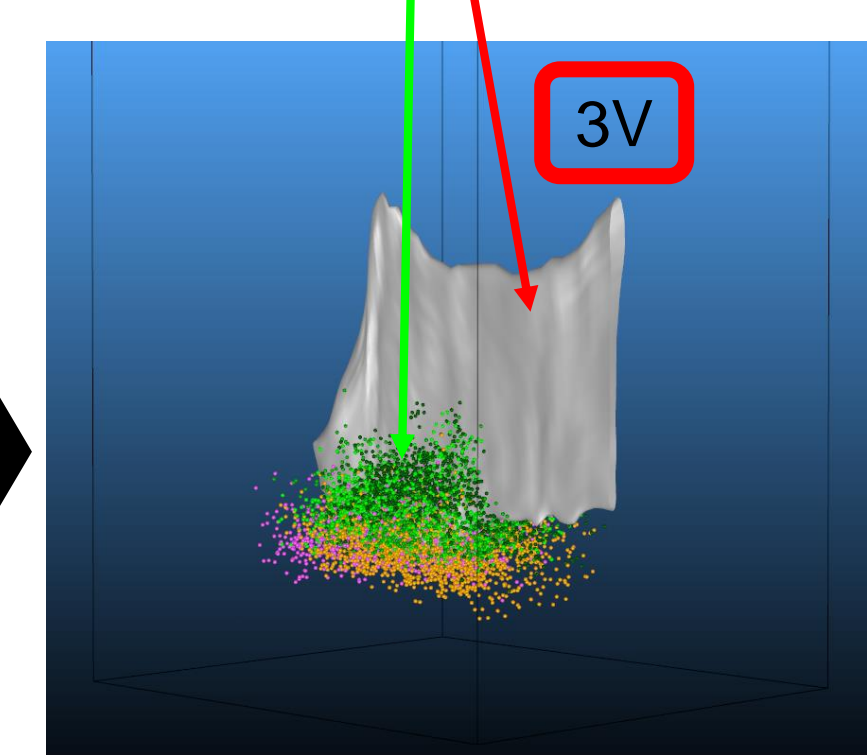
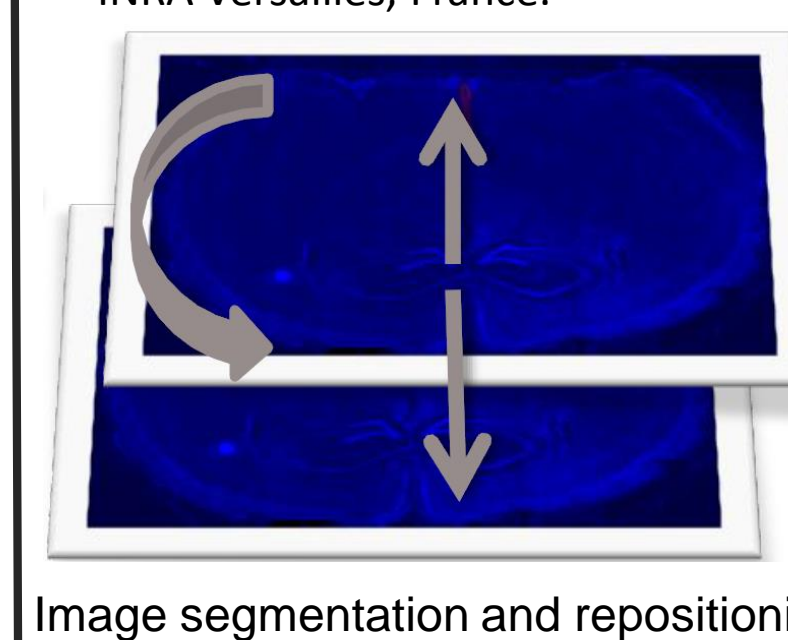
Selection of OP/OR mice

Bregma -0.14mm to -2.90mm\*  
 coloration DAPI  
 Slicing Cryostat



Brain slicing

Software: Free-D, developed by Modeling and Digital Imaging team of the Institut Jean-Pierre Bourgin, INRA Versailles, France.

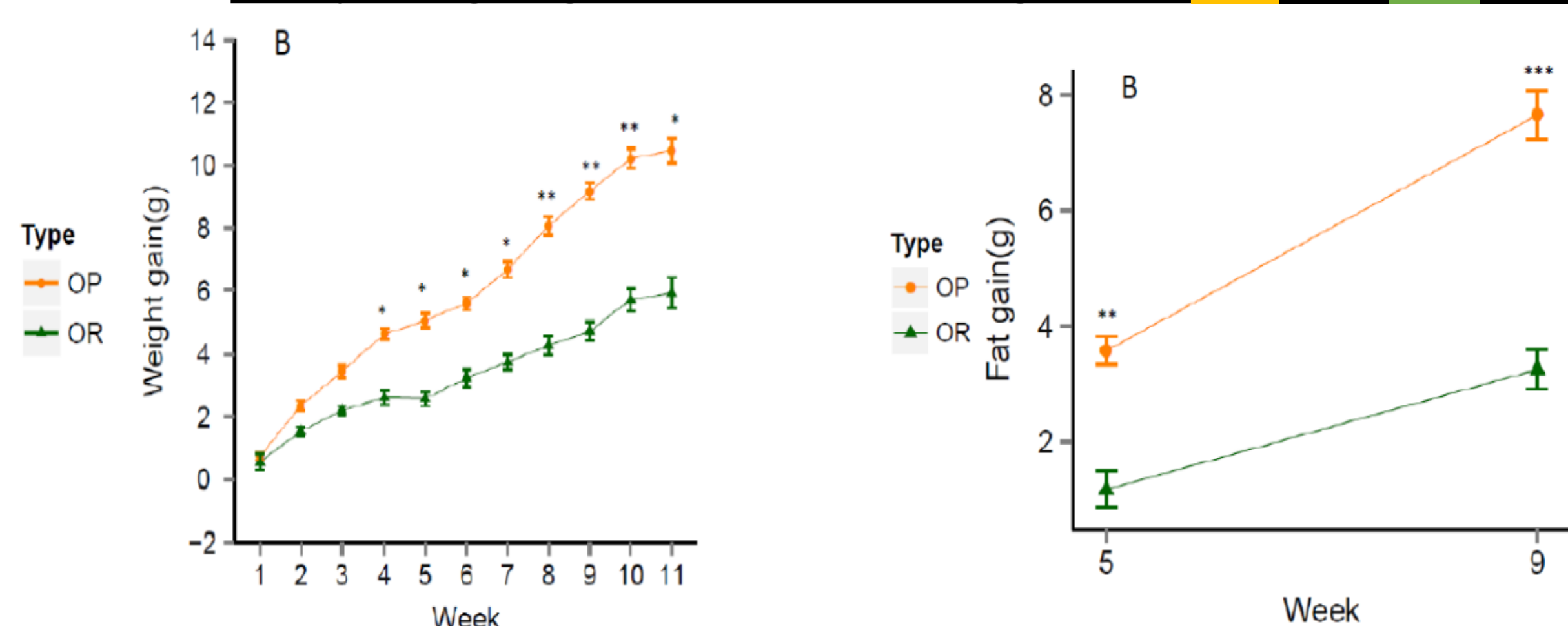


3D reconstruction of the third ventricle and POMC neurons

## Results

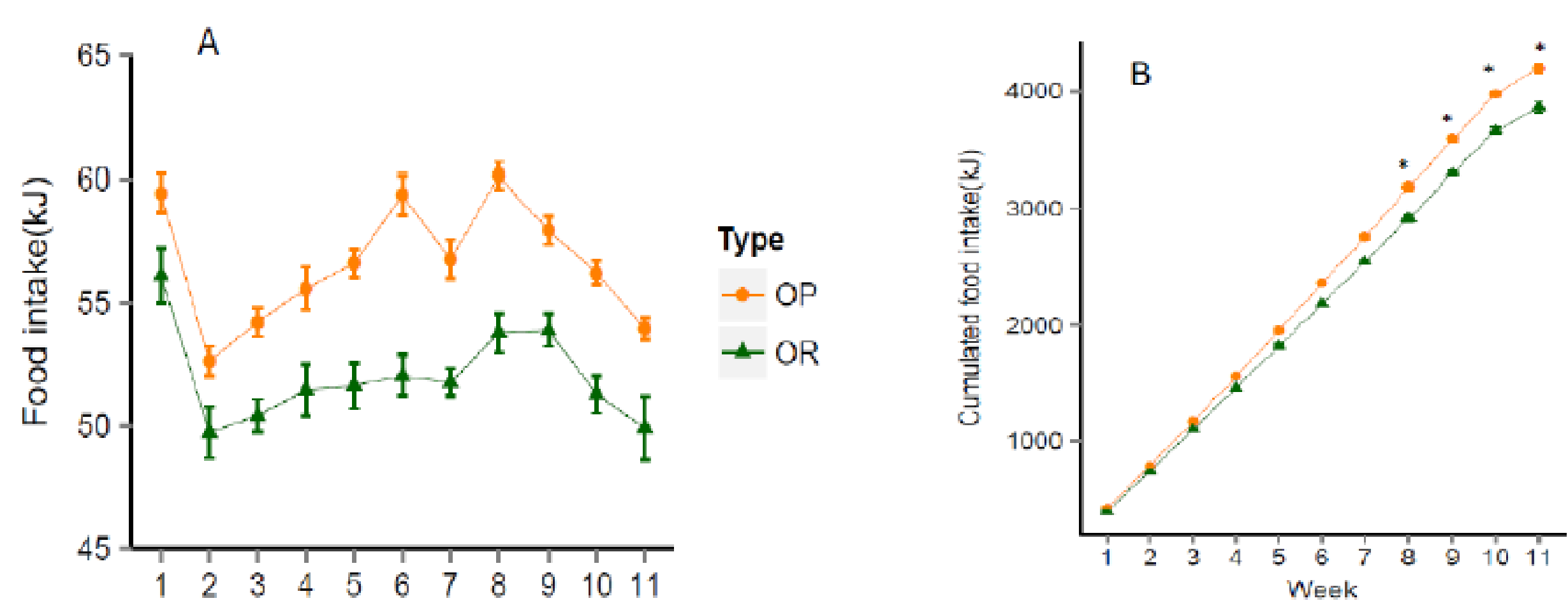
Selection of OP/OR mice

Body weight gain and fat mass gain of OP and OR mice



→ OP mice gain more weight and fat than OR mice

Average daily (A) or cumulated (B) food intake of OP and OR mice

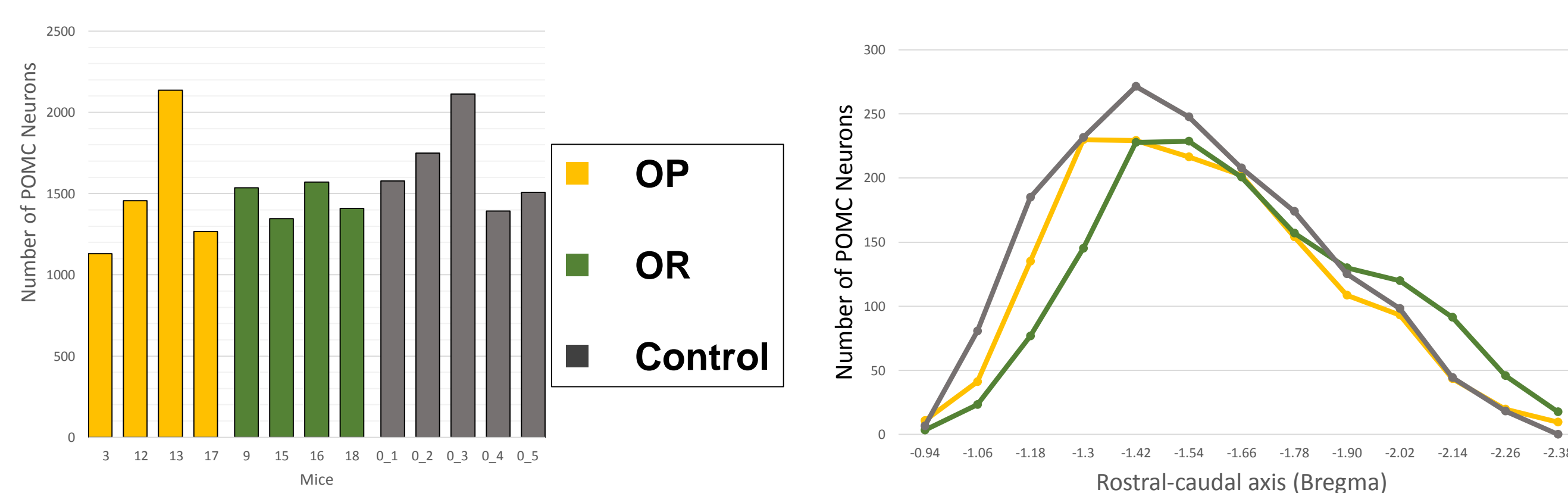


→ OP mice consume greater amounts of HFHP than OR mice  
 → this leads to greater total energy intake for OP mice

POMC Neuron density in the ARC

Total number of POMC neurons

Number of POMC neurons per slice

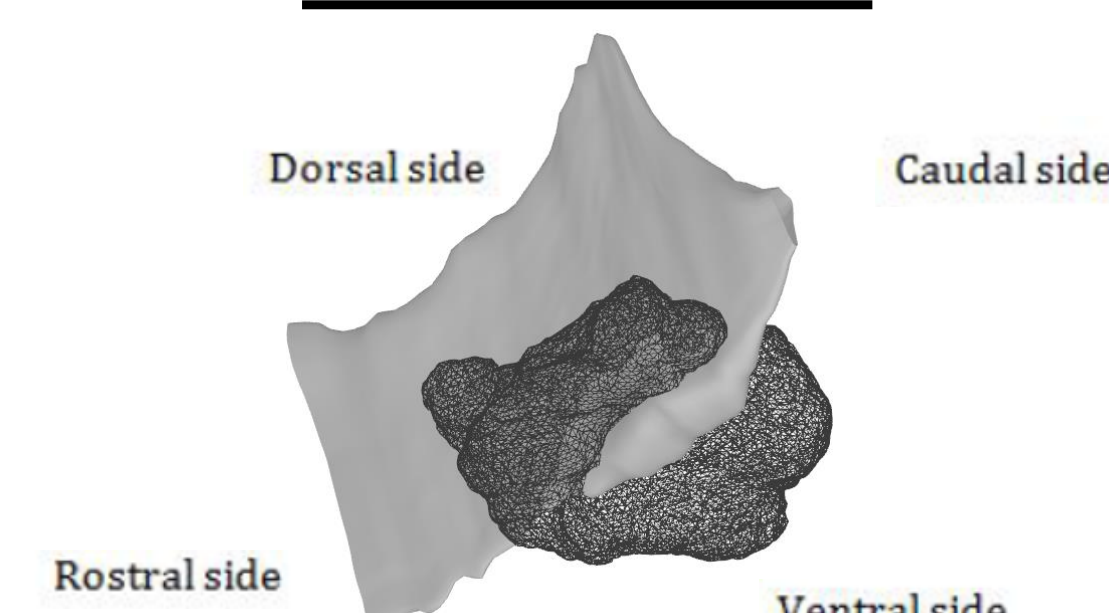
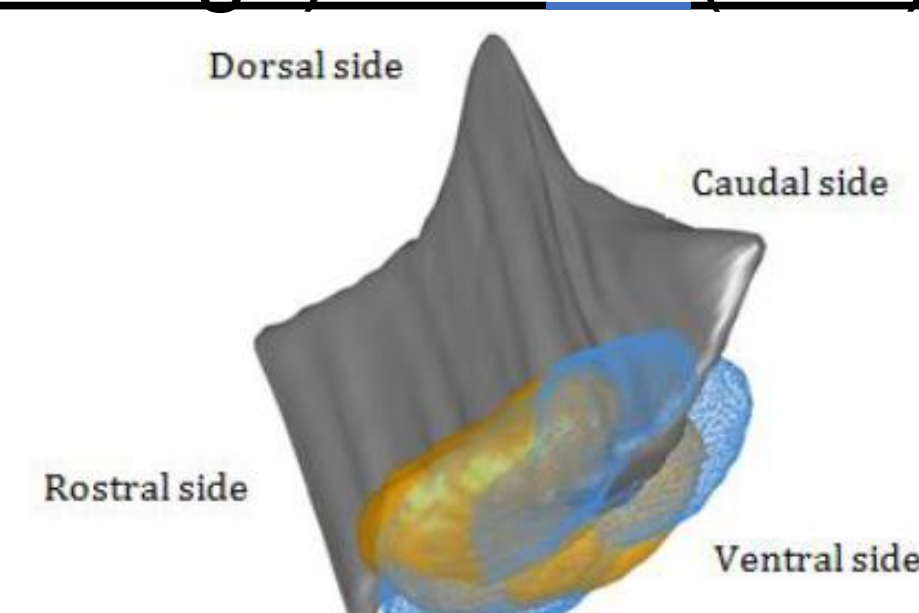


→ The total number of POMC neurons are not significantly different. However, there are differences in distributions along the rostral-caudal axis

Spatial distribution of POMC neurons

OP (orange) and OR (blue) mice

Control mice



→ 3D analyses bring to light structural differences between the three groups.

## CONCLUSION

Whereas global density of POMC neurons in the ARC do not seem to be influenced by an HFHP regime, results indicate differences between OP, OR and Control mice in spatial distribution and local density of these neurons. Control mice seem to have similar structures to OP mice, but further statistic comparisons must be made.

→ The next step is to investigate molecular mechanisms behind these spatial differences...