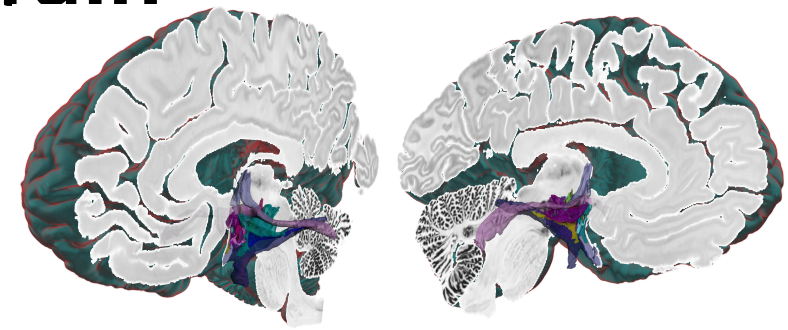
neuro
Montreal Neurological Institute-Hospital

HIBALL
HELMHOLTZ International BigBrain Analytics & Learning Laboratory

An Atlas of the Human Hypothalamus at Ultra-High Resolution using the BigBrain



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McGill
Douglas Institut universitaire en santé mentale / Mental Health University Institute
MCIN McGill Centre for Integrative Neuroscience
Universität Konstanz
Centre universitaire de santé McGill Institut de recherche
McGill University Health Centre Research Institute
Centre LUDMER
Fonds de la recherche en santé Québec
CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada
FERRING REPRODUCTIVE HEALTH With you every step of the way

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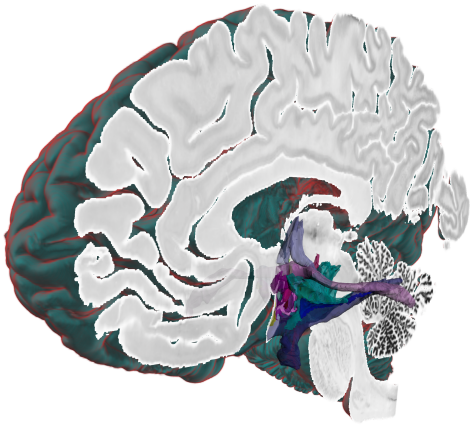
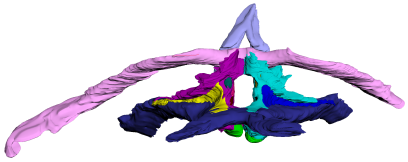
Hypothalamus



autonomic function & hormone axes

numerous nuclei

- sexually dimorphic
- distinct functions



Methods

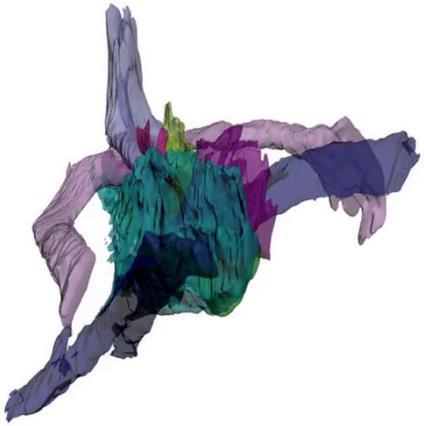
BigBrain 2015 release
(Amunts et al. Science, 2013)

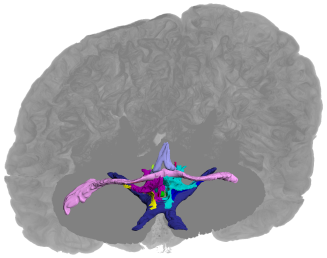
Atelier3D
(Borgeat et al., IEEE Comput Graph, 2007)

Annotations performed on voxels
at 20μm isotropic resolution

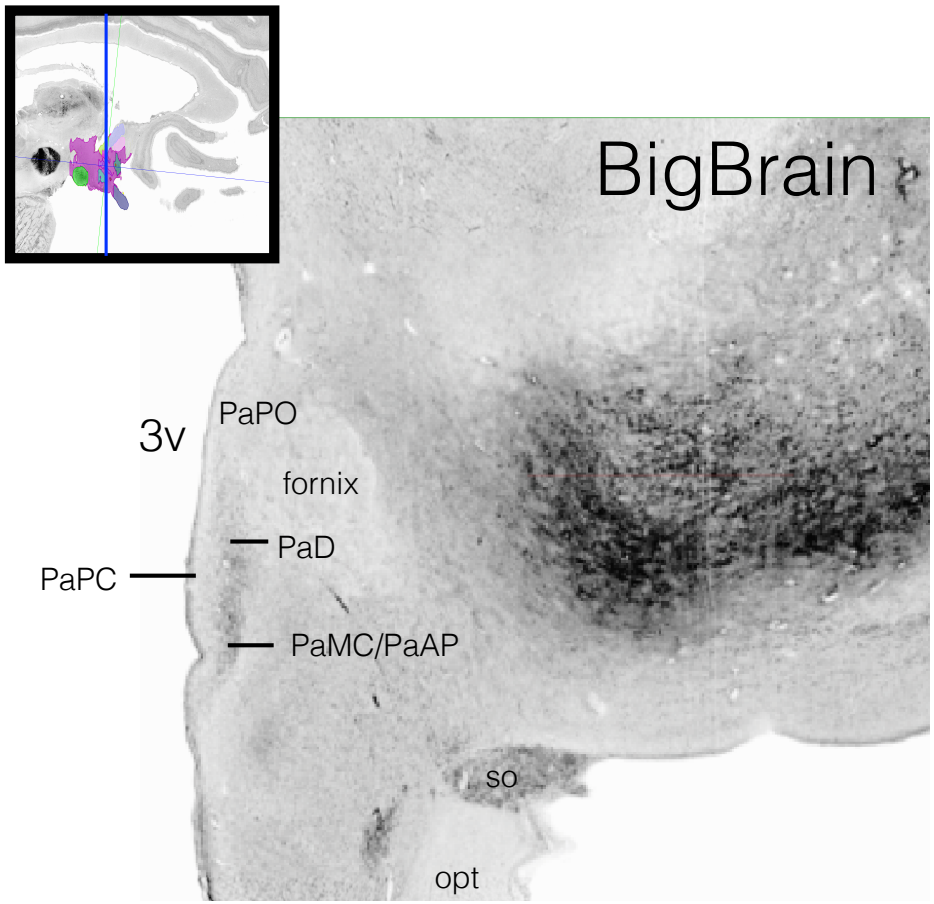
- Based on Mai et al. (2015) atlas
- Manual & automatic extraction

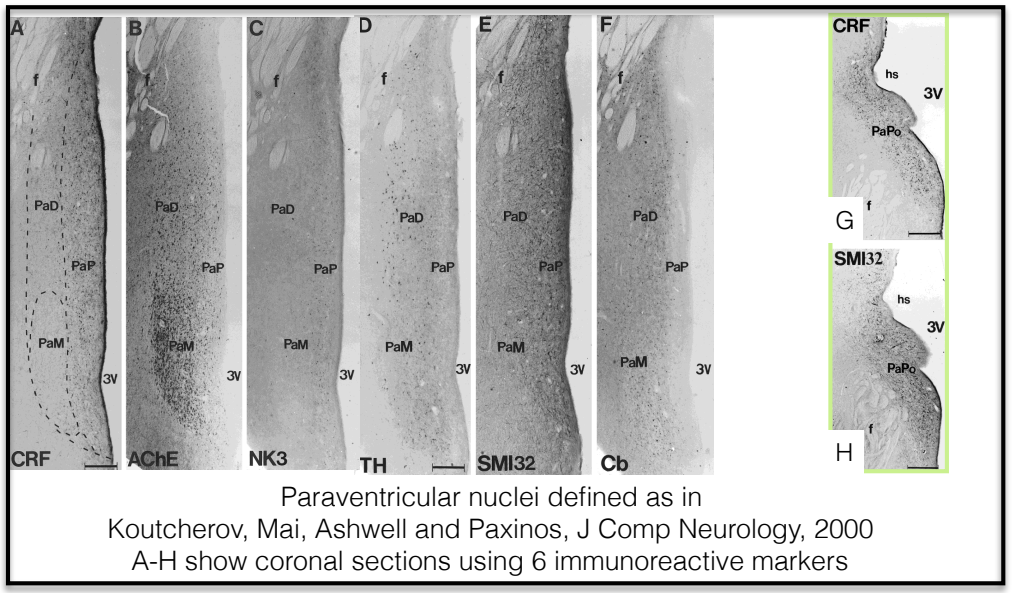
Smoothing





Paraventricular Nuclei

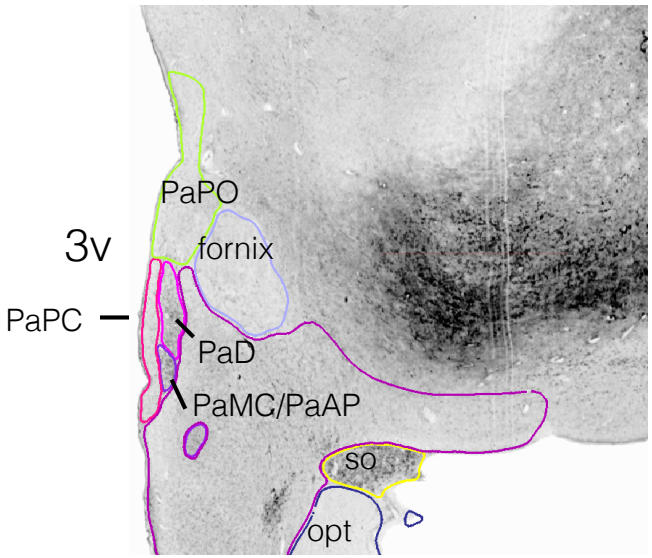


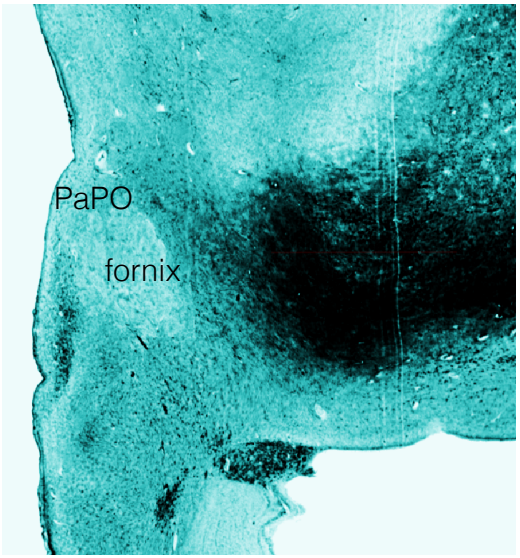


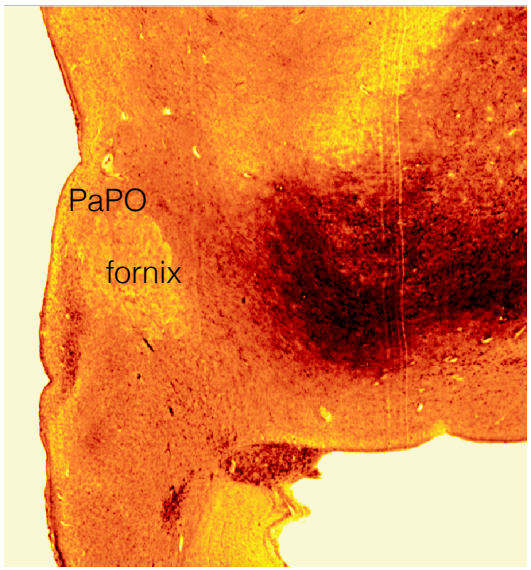
Paraventricular nuclei defined as in
Koutcherov, Mai, Ashwell and Paxinos, J Comp Neurology, 2000
A-H show coronal sections using 6 immunoreactive markers

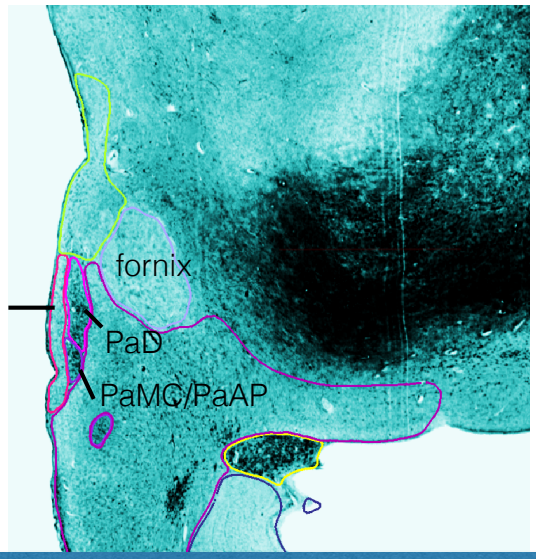
PaPC: paraventricular nucleus-parvocellular region
PaPO: paraventricular nucleus-posterior region
PaD: paraventricular nucleus dorsal region
PaMC: paraventricular nucleus magnocellular region

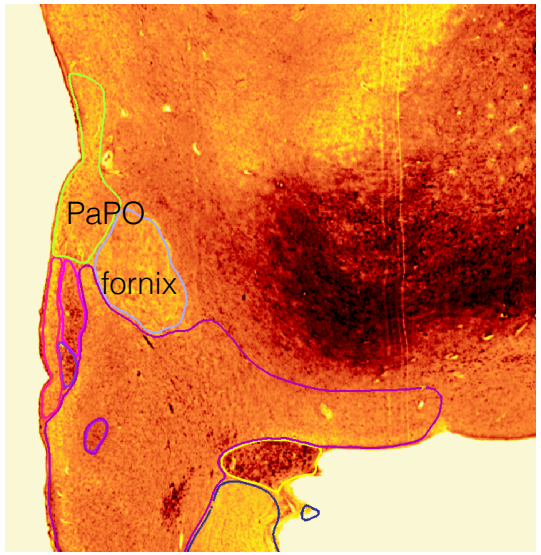
Paraventricular Nuclei





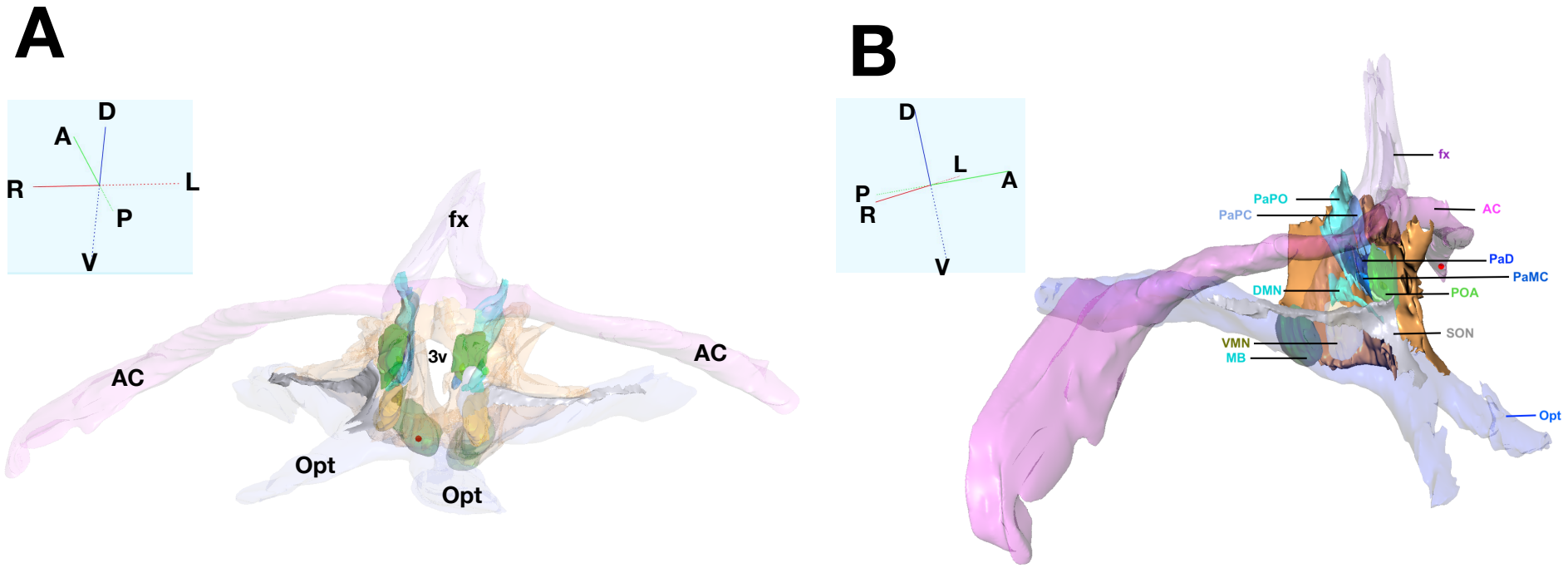






A3D colour map helped guide segmentations for different sub nuclei

Three dimensional reconstruction of the hypothalamus and key surrounding white matter structures on BigBrain



Three dimensional reconstruction of the hypothalamus and key surrounding white matter structures on BigBrain. Smoothed surfaces were visualized in BrainBrowser (Sherif et al., 2015).

3v: third ventricle; AC: Anterior commissure; DMN: dorsomedial nucleus; fx: fornix; MB: mamillary body; PaPC: paraventricular nucleus-parvocellular region; PaPO: paraventricular nucleus-posterior region; PaD: paraventricular nucleus dorsal region; PaMC: paraventricular nucleus magnocellular region; POA: preoptic nucleus; SON: supraoptic nucleus; opt: optic tract; VMN: ventromedial nucleus.

Orientation is shown in the blue legends, dorsal (D), ventral (V), right (R), left (L), anterior (A), posterior (P).