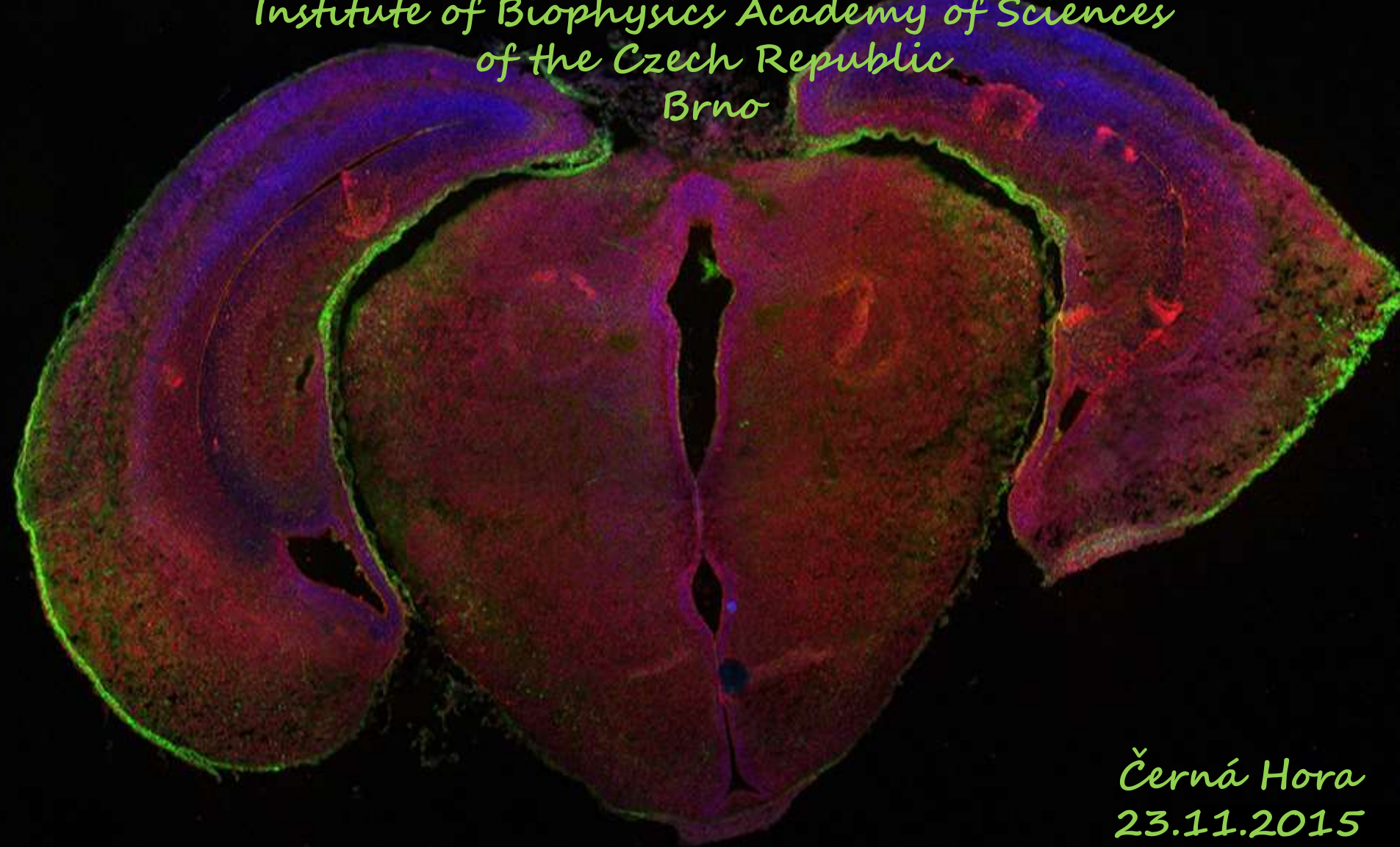


# Epigenetics of the brain

Jana Krejčí

Institute of Biophysics Academy of Sciences  
of the Czech Republic  
Brno



Černá Hora  
23.11.2015

**a**

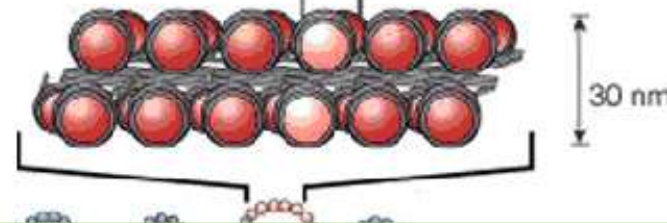
Short region of  
DNA double helix



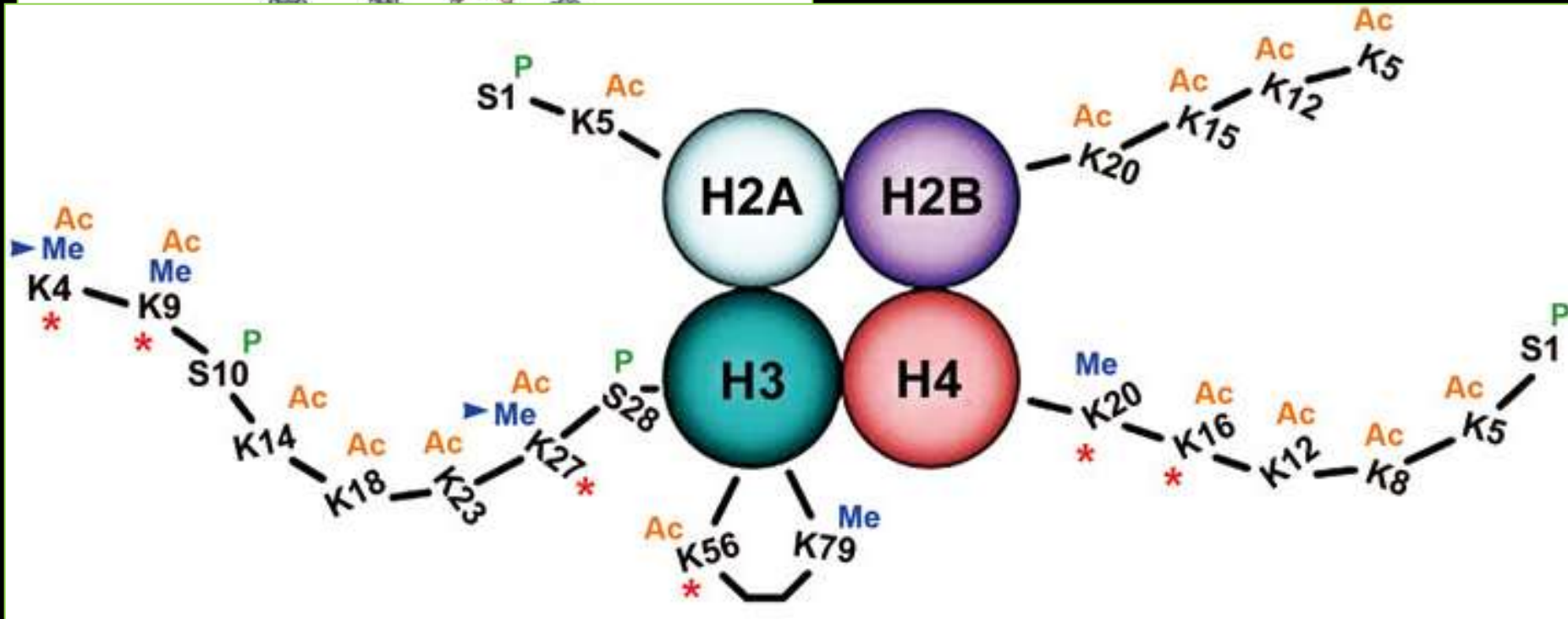
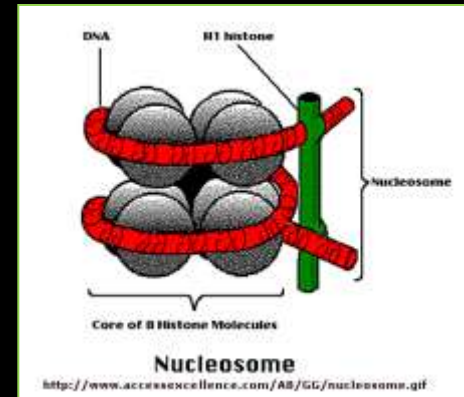
"Beads on a string"  
form of chromatin

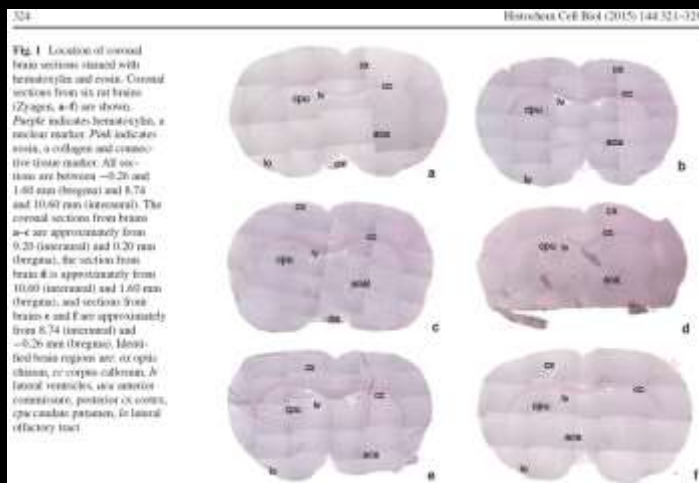
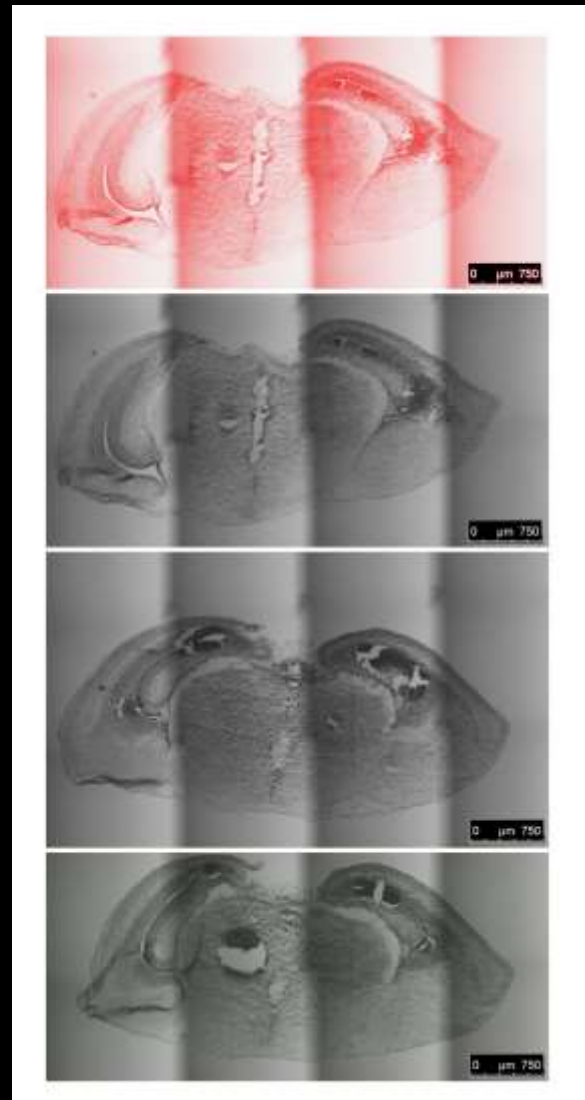
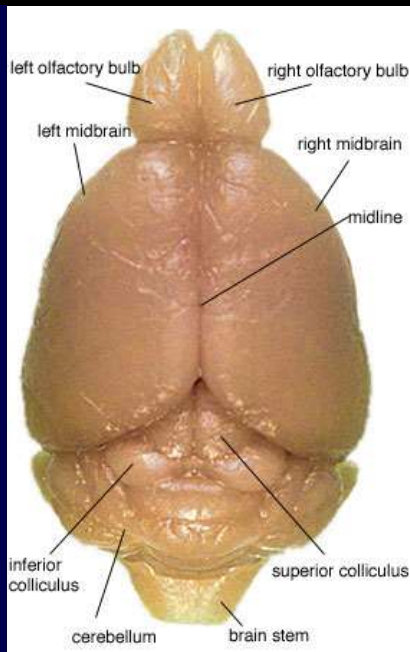
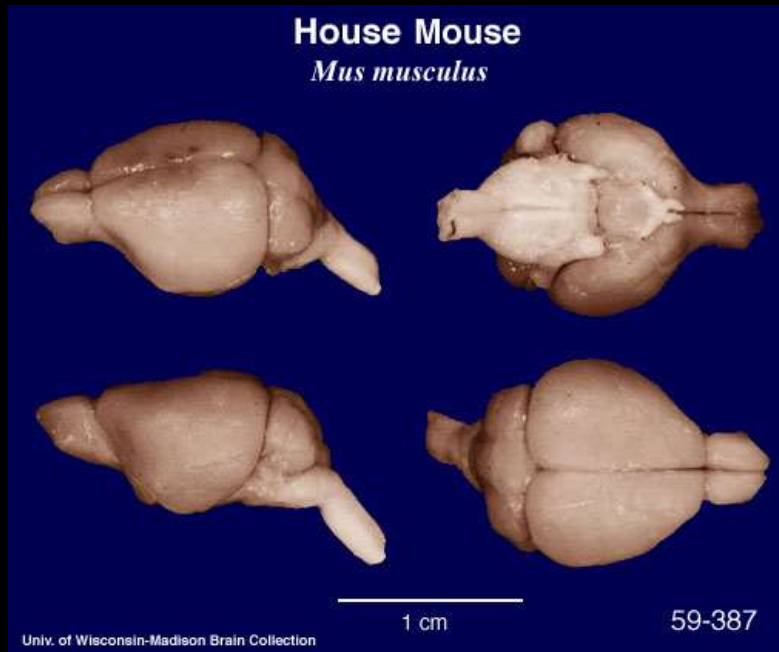


30-nm chromatin  
fibre of packed  
nucleosomes

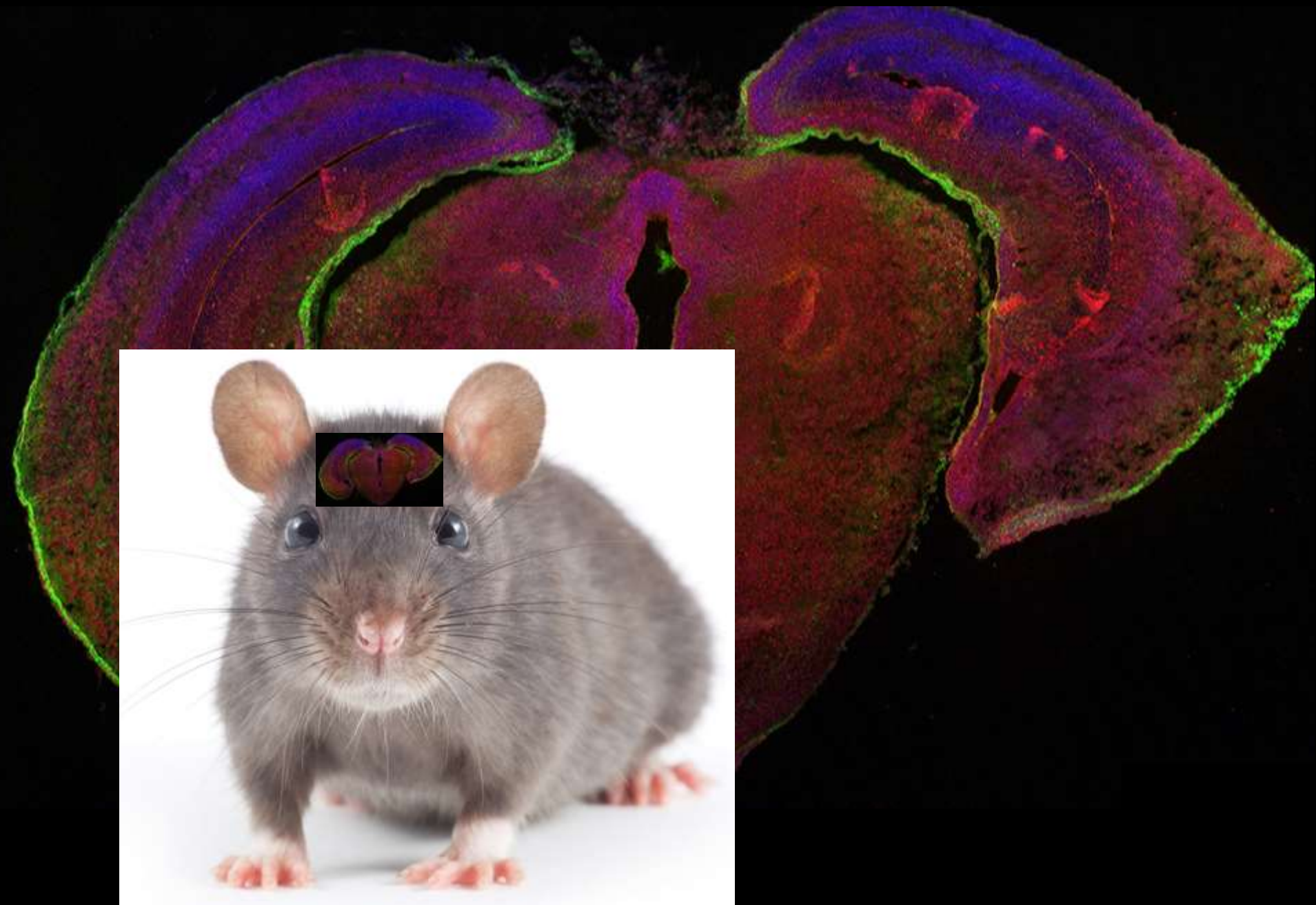


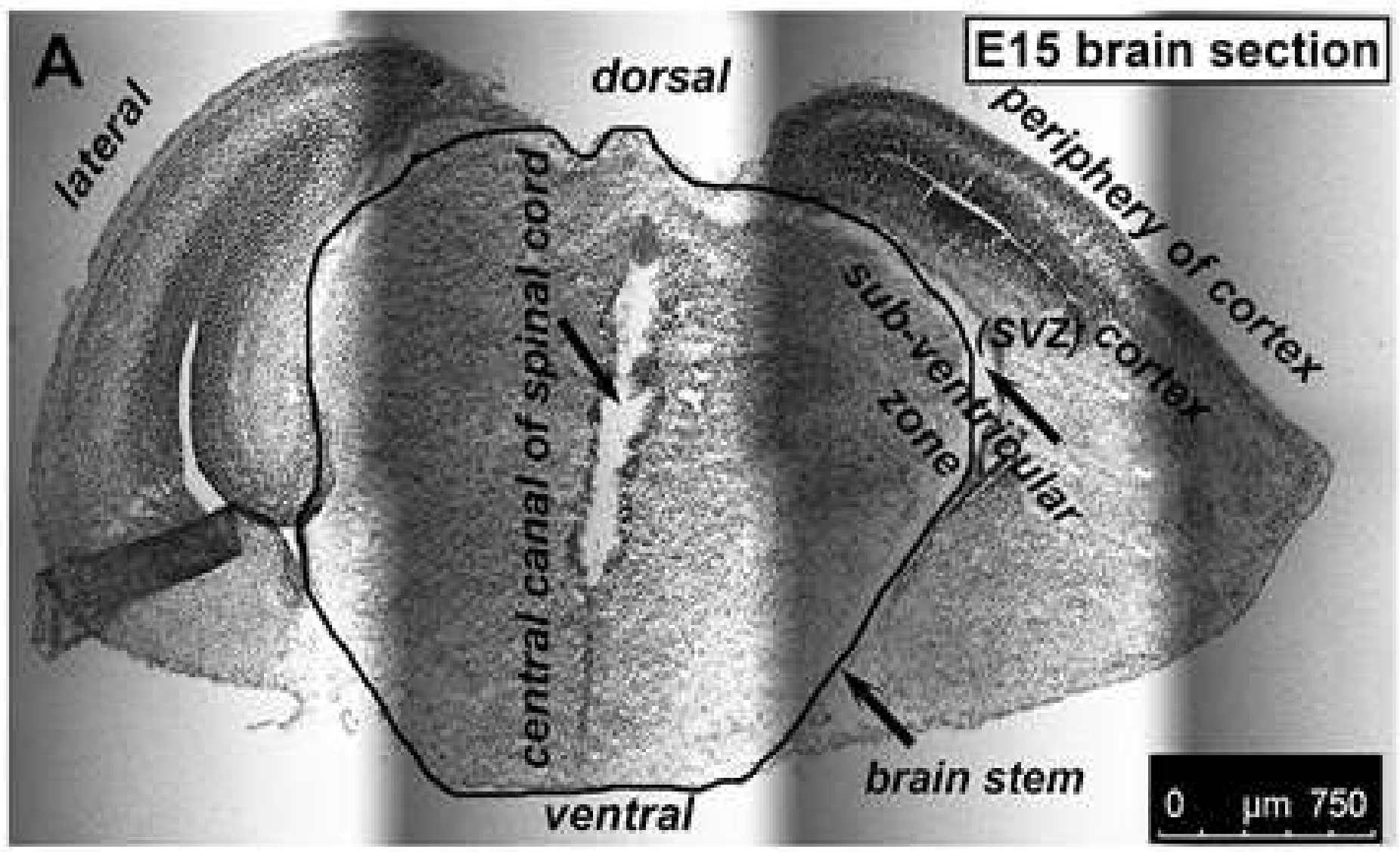
## Nucleosome

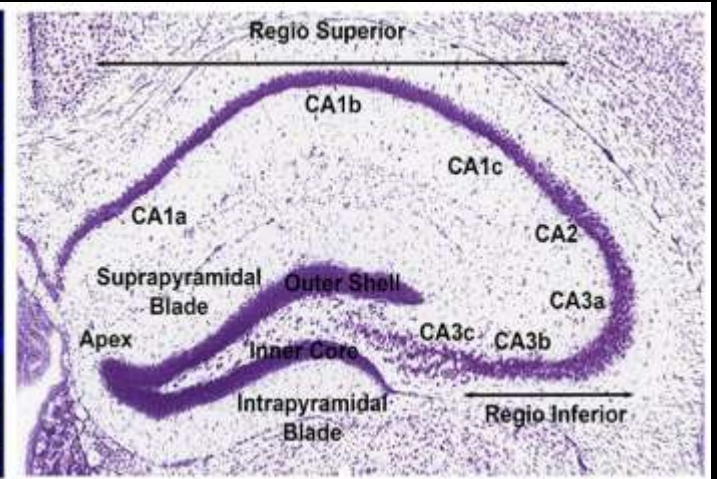
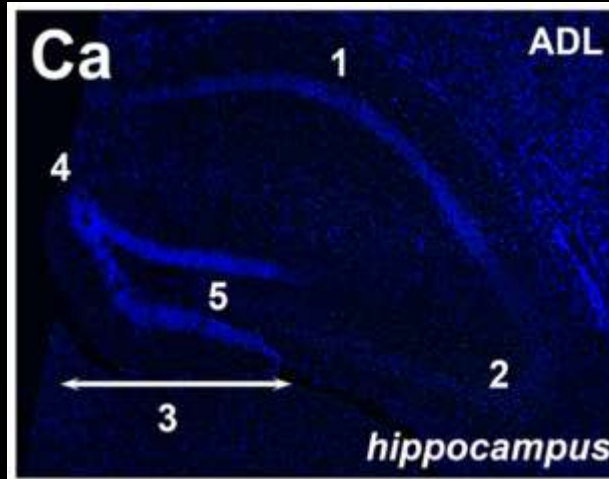
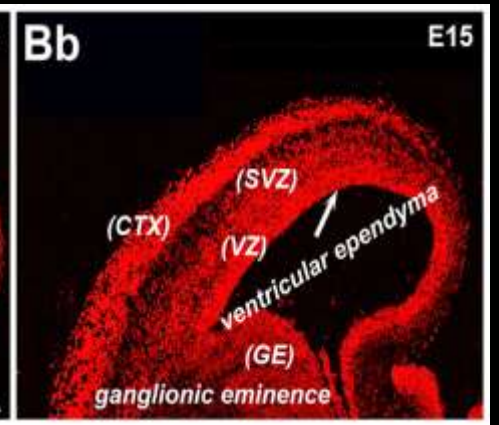
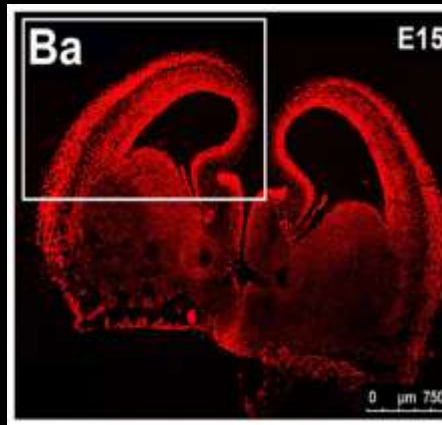
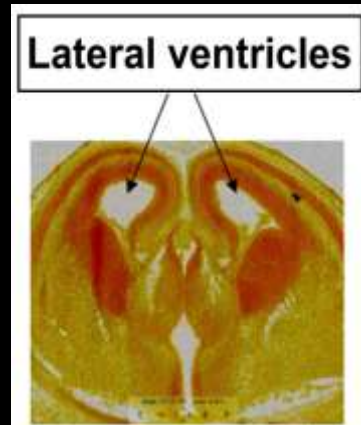
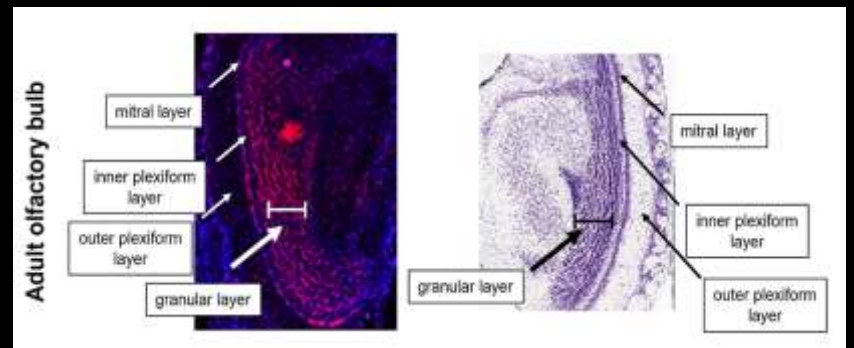
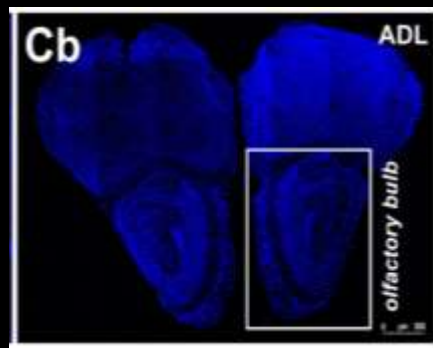
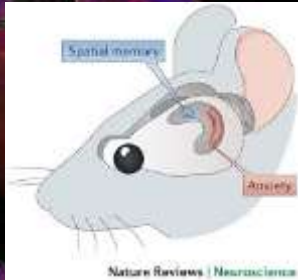
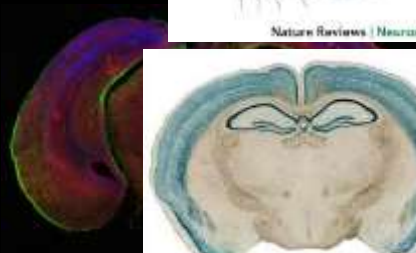
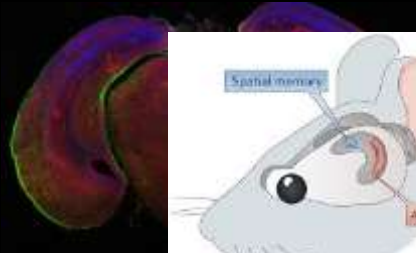






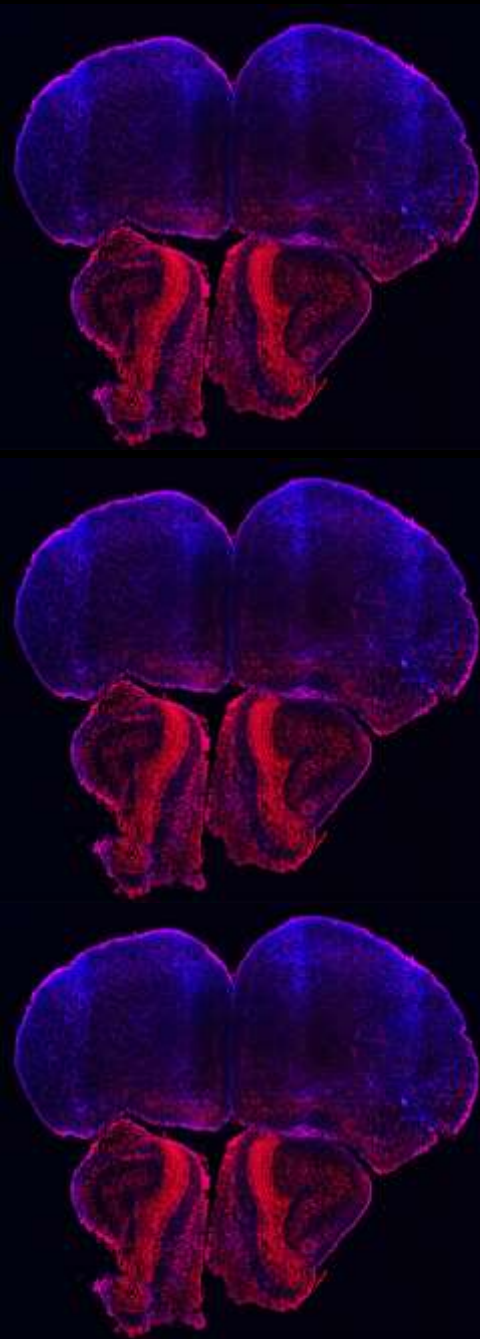




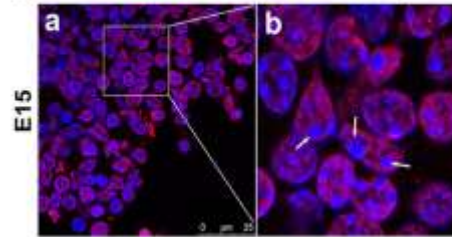




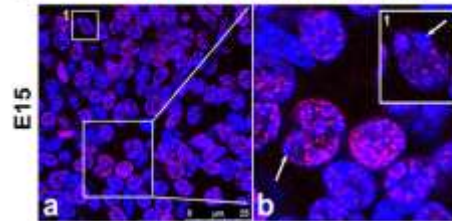
# Immunostaining of epigenetics marks in embryonic and adult brains



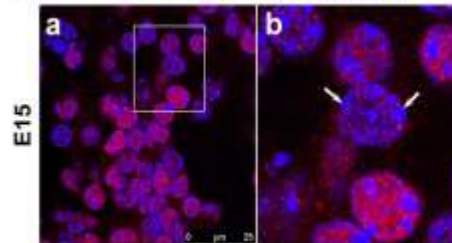
**A** H3K9me1 / DAPI staining



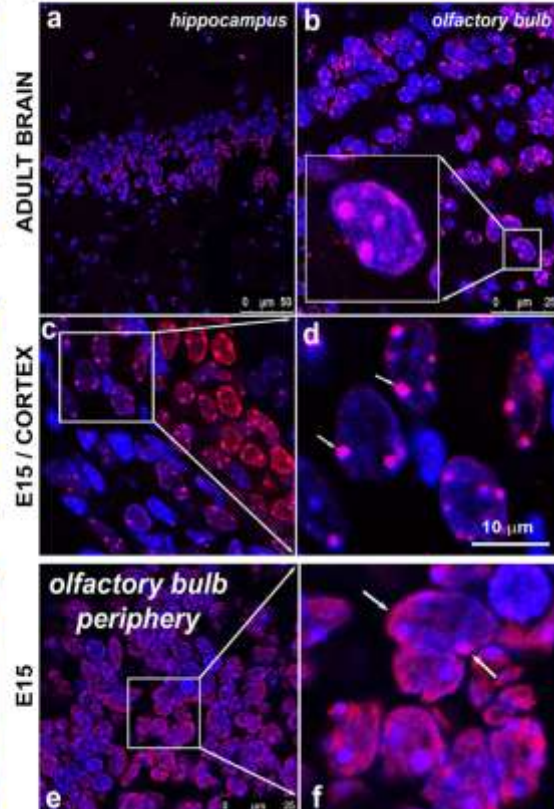
**B** H3K9me2 / DAPI staining



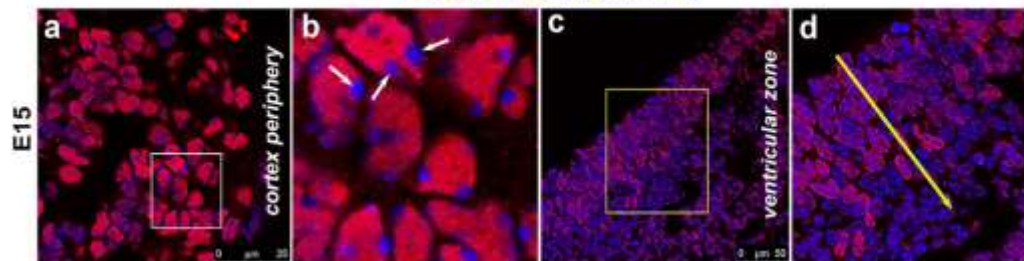
**D** HP1β / DAPI staining



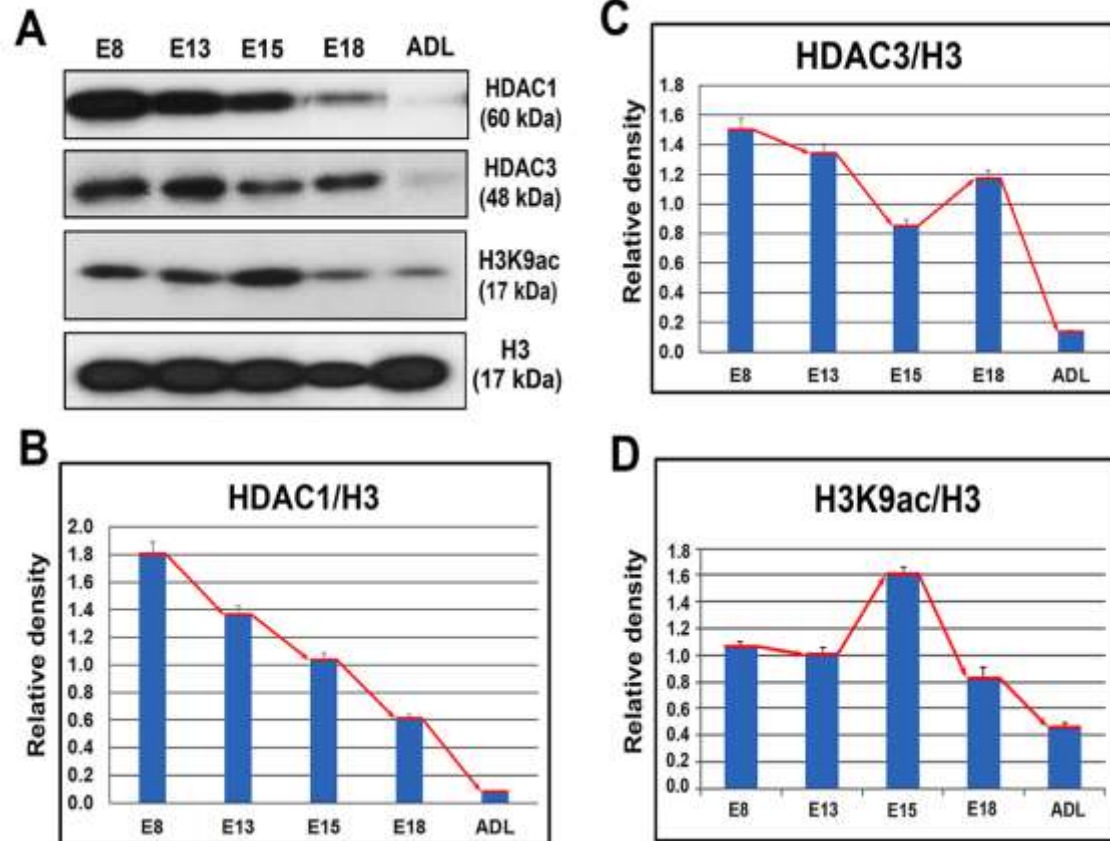
**C** H3K9me3 / DAPI staining



H3K9ac / DAPI staining

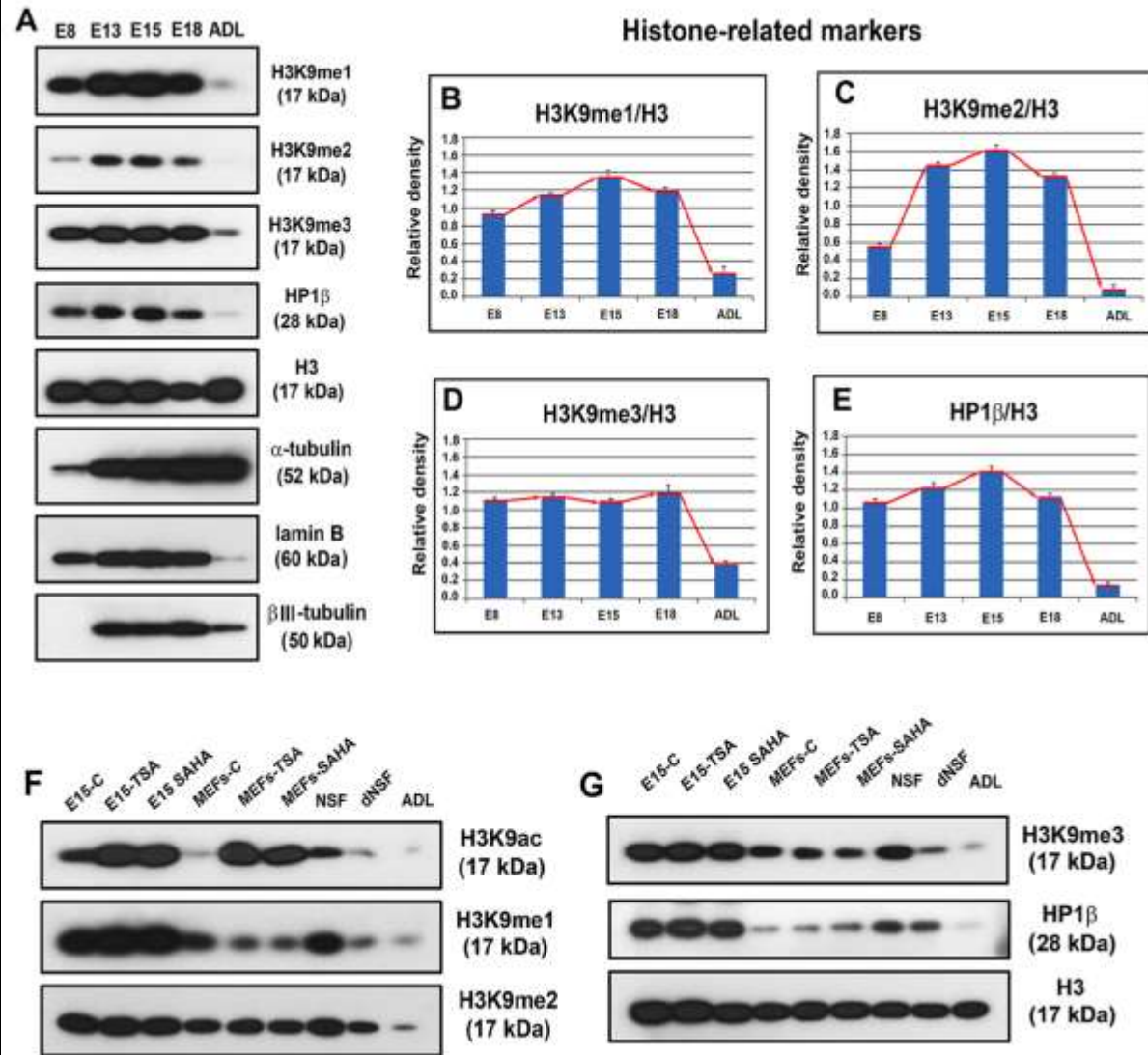


# Proteomic analysis of brains during development

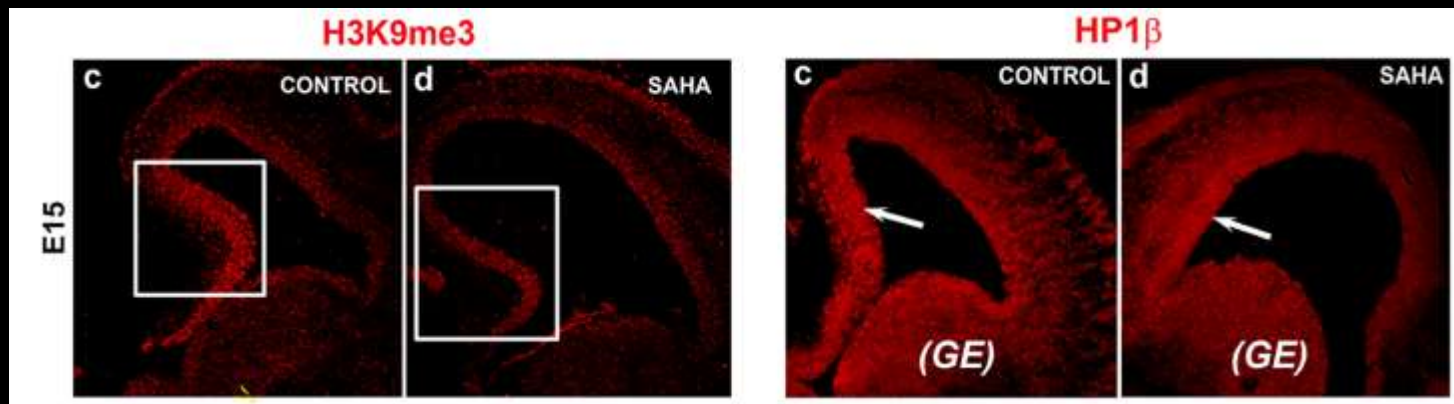
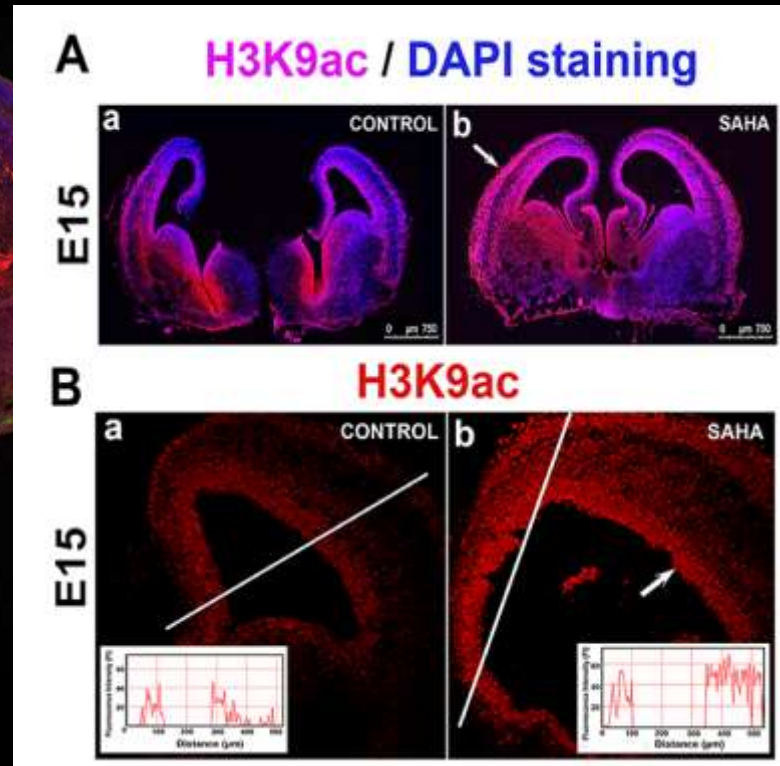




# Proteomic analysis of brains during development and after hyperacetylation

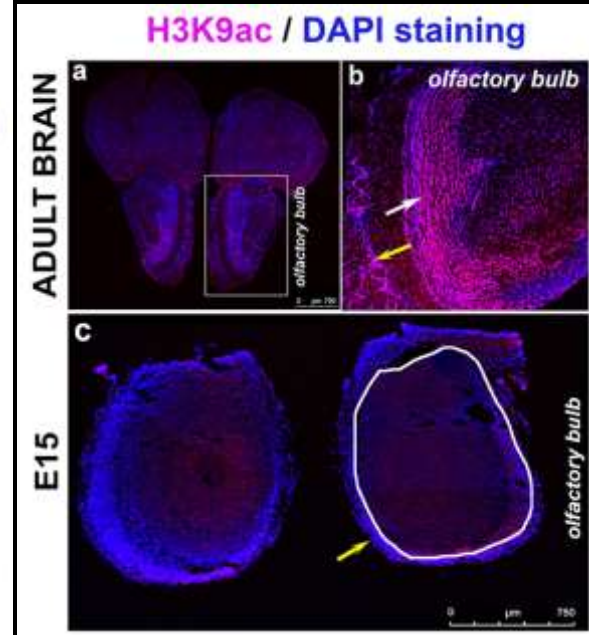
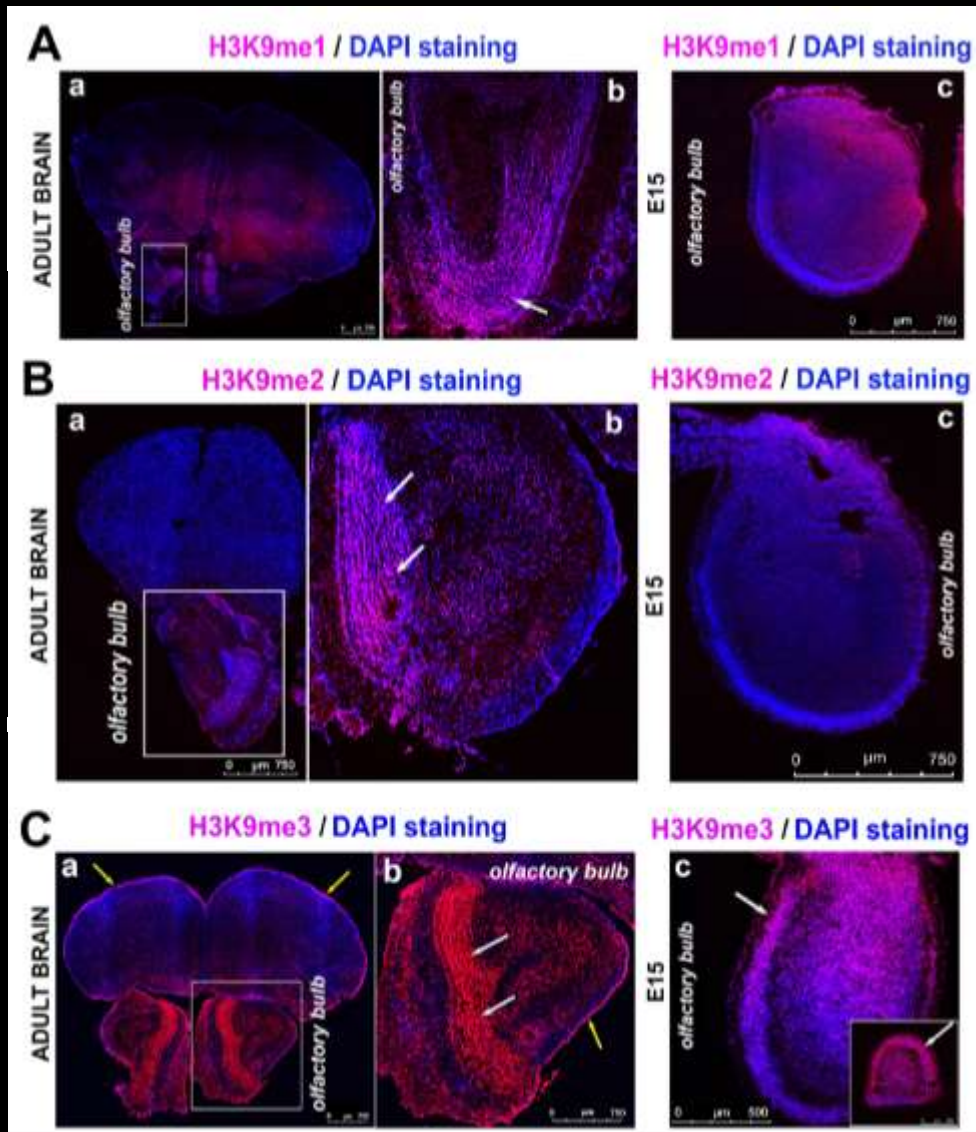


*Epigenetics marks in ventricular endpendyma of mouse embryonic brains after hyperacetylation*



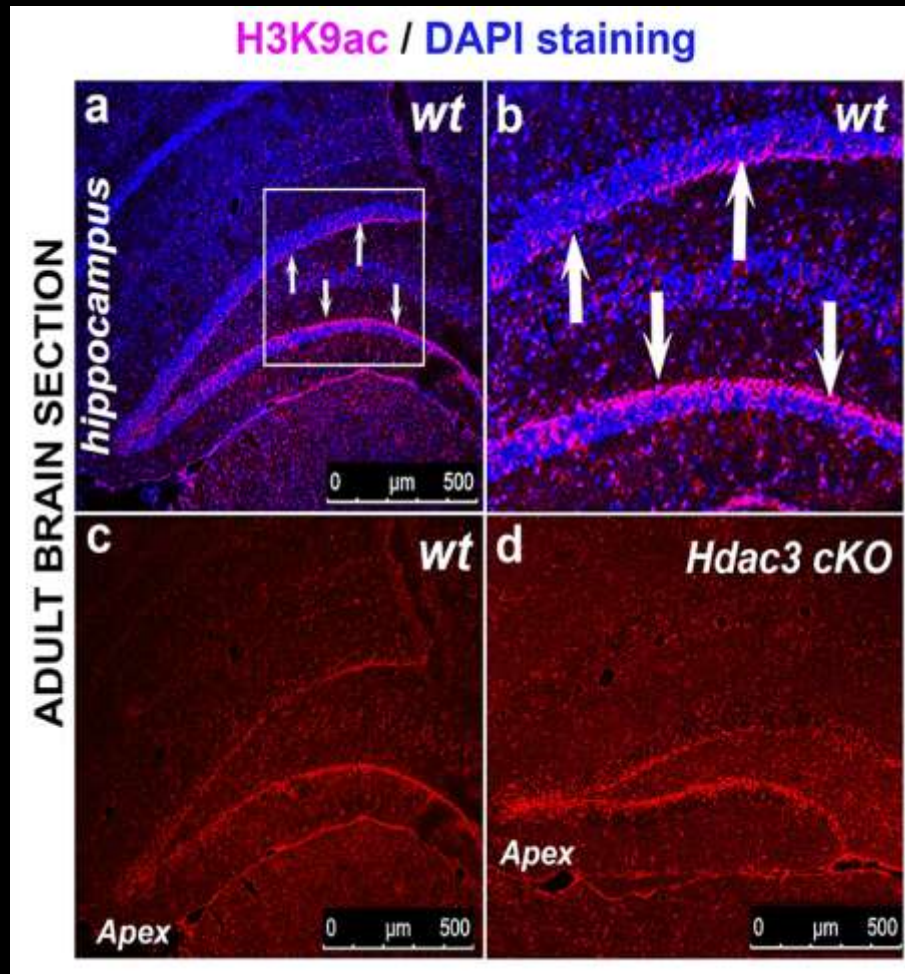


# Pattern of PMTs of H3 histone in olfactory bulbs in embryonic and adult mouse brains

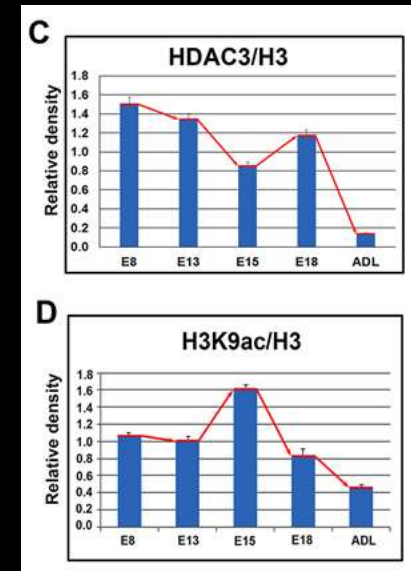


# Hippocampus in wild type and Hdac3 cKO adult mouse brains

adult



embryonic

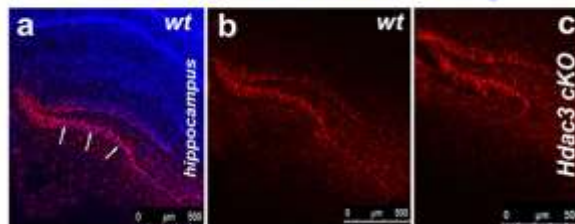


*cKO HDAC3 mice*  
Dr. Yindi Jiang  
Prof. Jenny Hsieh LAB

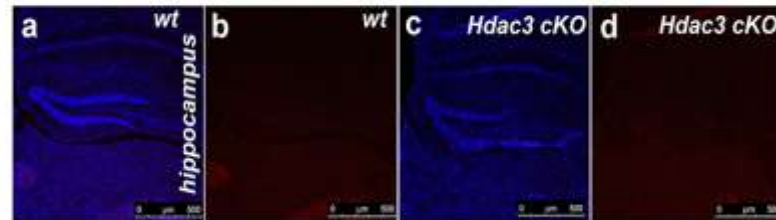


Hippocampus in wild type and Hdac3 cKO  
adult mouse brains

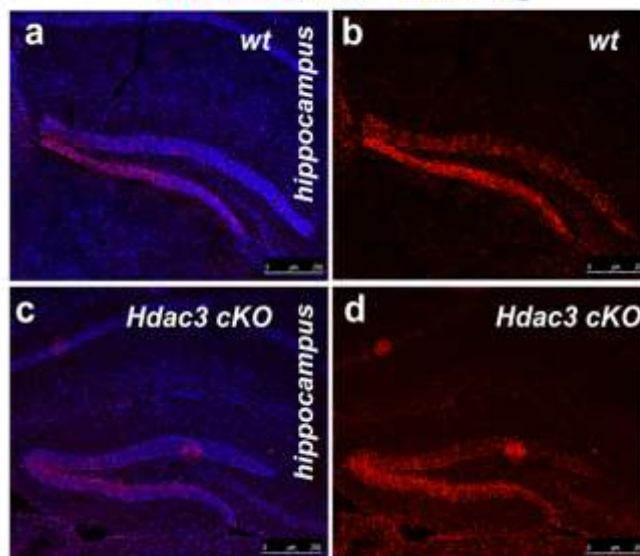
**A** H3K9me1 / DAPI staining



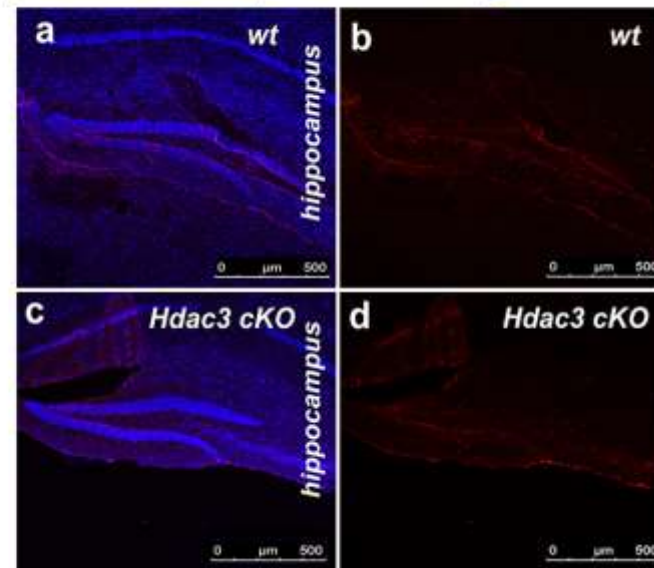
**B** H3K9me2 / DAPI staining



**C** H3K9me3 / DAPI staining



**D** HP1 $\beta$  / DAPI staining







# Conclusions

- HDACi change H3K9ac in ventricular ependyma
- H3K9 me1, me3 but not H3K9me2 and HP1b is abundant in hippocampal blade
- Granular layer of olfactory bulb is highly abundant for H3K9me3
- HDAC3 is responsible for regulation of H3K9ac in embryonic brains but not in adult brains
- Hyperacetylation induced by HDACi did not changes histone methylation profiles

## In schizophrenia rats

- HDAC1 decrease and pan-acetyl lysine was observed in olfactory bulbs
  - H3K9ac and pan-acetyl lysine were decrease in hippocampus of schizophrenia rat
- This was partially compensate by clinical used and tested psychotic drugs

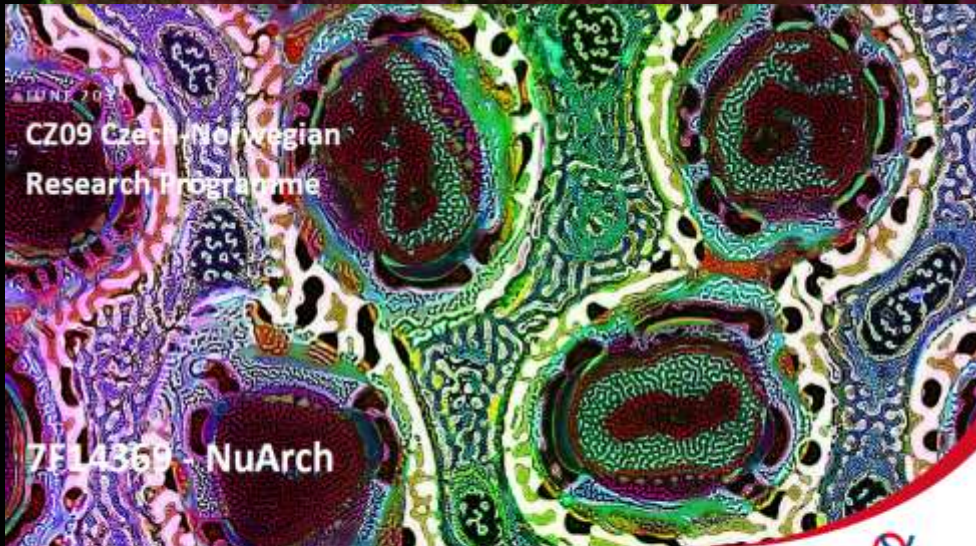
# THANK you for attention!



Eva Bártová  
Soňa Legartová  
DMCC-BFÚ



Josef Večeřa  
Jana Rudá  
Eva Dražanová



EVA BÁRTOVÁ, Institute of  
Biophysics, AS CR



cKO HDAC3 mice  
Dr. Yindi Jiang  
Prof. Jenny Hsieh LAB

