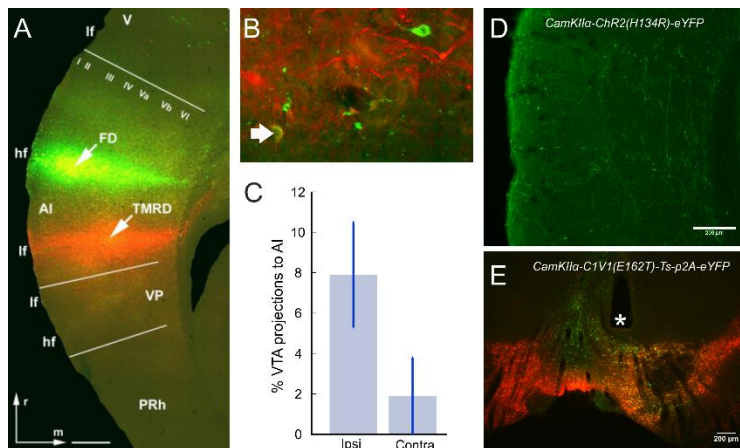


Master-Project in Integrative Neuroscience

How does *REWARD* come to the auditory brain?

Modern neuroanatomy of dopaminergic pathways from the midbrain to rodent auditory cortex

During learning, the dopaminergic reward system activates broad networks in the brain including areas of sensory processing like the auditory cortex (ACx). In recent years, two main anatomical structures have been identified as potential sources of monoaminergic (e.g. dopaminergic, adrenergic) input into the neocortex, namely the ventral tegmental area (VTA) and the locus coeruleus (LC). In the proposed project, we want to describe and quantify projections from the VTA and LC towards the ACx within the Mongolian gerbil – our animal model for learning and memory research.



Recommended literature:

- Dopaminergic and serotonergic neurotransmission systems are differentially involved in auditory cortex learning: a long-term microdialysis study of metabolites – Stark & Scheich 1997
- Anatomical connections suitable for the direct processing of neuronal information of different modalities via the rodent primary auditory cortex – Budinger & Scheich 2009
- Dopaminergic impact on local and global cortical circuit processing during learning – Happel 2016
- Co-release of noradrenaline and dopamine in the cerebral cortex elicited by single train and repeated train stimulation of the locus coeruleus – Devoto et al. 2005

Current research of efferent and afferent cortical projections between the ACx and VTA

A) Tracer injections in the high- and low-frequency fields (hf and If, respectively) of the ACx. B) Co-fluorescence of hf marker with TH-immunostaining verifying dopaminergic cells in the VTA (white arrow) projecting to the ACx. C) Percentage of VTA projections on all projections towards the ACx. D) VTA projections from VTA to ACx labeled with a virus. E) Co-fluorescence of viral transfection and TH-antibody staining.



If you are interested in learning methods of modern neuroanatomy including:

- Neuronal tract tracing of ACx, VTA and LC connections using anterograde and retrograde viruses
- Brain perfusion and extraction
- Preparation of brain slices and immunostaining
- Anatomical examination and analysis of dopaminergic projections using fluorescence microscopy and camera-lucida analysis (NeuroLucida)

...then you are the right person for joining our collaborative research team!



This project is a collaboration between the AG Functional anatomy and plasticity of auditory cortex (PD Dr Budinger) and the AG CortXplorer (PD Dr Happel)

Contact:

If you are interested in joining this project, please contact us for further detailed information:

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