



Centre de Neurosciences Psychiatriques

CNP SEMINAR

ANNOUNCEMENT

Thursday October 24th, 2024, 11:00 to 12:00

Functional astrocyte diversity in the adult hippocampus

By: Ruth Beckervordersandforth

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Summary:

In the adult brain, the dentate gyrus (DG) of the hippocampus harbors a special form of plasticity in which new neurons are generated life-long and integrate into existing circuitries. Adult neurogenesis-mediated plasticity allows the brain to dynamically remodel cellular compartments and molecular contents in response to an individual's interaction with the outside world. Astrocytes are major cellular constituents of the neurogenic niche and support of neural stem cell (NSC) function as well as maturation and survival of newborn neurons. With the aim to identify cellular and molecular mechanisms governing plasticity of the adult mammalian brain, my group is focusing on the so-far unexploited role of astrocytes. Besides extensive investigations of the astrocyte-like NSC, the astrocyte compartment has been mostly neglected, and considered to be static and homogeneous. In contrast to this, we have recently shown that molecularly, morphologically, and functionally diverse astrocyte subtypes are associated to distinct DG layers. Furthermore, the astrocytic compartment is constantly changing due to life-long generation of new astrocytes. These astrocytes are mainly generated by locally dividing astrocytes, which are able to adapt their proliferation capacity to environmental and behavioral stimuli. Our results establish astrocytes as plastic elements in DG circuits and indicate a vital contribution of astrocyte diversity and dynamics to hippocampal plasticity.

Invited by: nicolas.toni@chuv.ch

Short Bio:

Since 01/2017 Independent Group Leader Institut für Biochemie Friedrich-Alexander-Universität Erlangen-Nürnberg
05/2012-12/2016 Temporary PI (DFG-funded) = you can also term it my second PostDoc with own funding Laboratory of Prof. Chichung Lie Institut für Biochemie Friedrich-Alexander-Universität Erlangen-Nürnberg
02/2008-04/2012 Postdoctoral Scientist Institute of Stem Cell Research Helmholtz Centre, Munich Prof. Magdalena Götz.

Publications:

My group: Karpf J, Unichenko P, Chalmers N, Beyer F, Wittmann MT, Schneider J, Fidan E, Reis A, Beckervordersandforth J, Brandner S, Liebner S, Falk S, Sagner A, Henneberger C, Beckervordersandforth R (2022) Dentate gyrus astrocytes exhibit layer-specific molecular, morphological and physiological features. Nature Neuroscience, doi:10.1038/s41593-022-01192-5
Schneider J, Weigel J, Wittmann MT, Svehla P, Ehrt S, Zheng F, Elmzahi T, Karpf J, Panagua-Herranz L, Basak O, Ekici A, Reis A, Alzheimer C, Ortega F, Liebscher S, Beckervordersandforth R (2022) Astrogenesis in the murine dentate gyrus is a life-long and dynamic process. The EMBO Journal, doi.org/10.15252/embj.2021110409
Post Doc with Chichung: Beckervordersandforth R#, Ebert B*, Shin J, Fiebig C, Moss J, Moore DL, Ghosh L, Trincherio MF, Stockburger C, Friedland K, Steib K, Schäffner I, von Wittgenstein J, Keiner S, Redecker C, Hölter SM, Wurst W, Jagasia R, Schinder AF, Jessberger S, Ming GL, Song H, Toni N, Lie DC# (2017) Role of mitochondrial metabolism in the control of early lineage progression and aging phenotypes in 10.1016/j.neuron.2017.03.008
Post Doc with Magdalena: adult hippocampal neurogenesis. Neuron, doi: Beckervordersandforth R#, Deshpande A, Schäffner I, Huttner HB, Lepier A, Lie DC, and Götz, M. (2014) In vivo targeting of adult neural stem cells in the dentate gyrus by a split-Cre approach Stem Cell Reports, doi: 10.1016/j.stemcr.2014.01.004 (JIF 7.7)
Beckervordersandforth R*, Tripathi P*, Ninkovic J*, Bayam E, Lepier A, Stempfhuber B, Kirchhoff F, Hirrlinger J, Haslinger A, Lie DC, Beckers J, Yoder B, Irmeler M, and Götz M. (2010) In vivo fate mapping and expression analysis reveals molecular hallmarks of prospectively isolated adult neural stem cells. Cell Stem Cell, doi: 10.1016/j.stem.2010.11.017
PhD work: Beckervordersandforth RM, Rickert C, Altenhein B, and Technau GM. (2008) Subtypes of glial cells in the Drosophila embryonic ventral nerve cord as related to lineage and gene expression. Mech Dev, doi: 10.1016/j.mod.2007.12.004

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