the developmental stages that could mask potential cognitive alterations in the adulthood. So, we performed a detailed evaluation of neurodevelopmental milestones that consisted in an examination of the reflexes, sensory capabilities, muscular strength, coordination, and the appearance of postnatal developmental milestones. There, we found no significant differences in the performance for gender and genotype, with an exception for the homing test for IP_3R2KO females. In short, the results obtained indicate that mice with constitutive deletion of IP_3R2, retain a normal somatic and neurological reflex development, being a good tool for behavior assessment in adult stages.

References
[1]Takata, N., T. Mishima, C. Hisatsune, T. Nagai, E. Ebisui, K. Mikoshiba, and H. Hirase, Astrocyte calcium signaling transforms cholinergic modulation to cortical plasticity in vivo. J Neurosci, 2011. 31(49): p. 18155-65. [2]Navarrete, M., G. Perea, D. Fernandez de Sevilla, M. Gomez-Gonzalo, A. Nunez, E.D. Martin, and A. Araque, Astrocytes mediate in vivo cholinergic-induced synaptic plasticity. PLoS Biol, 2012. 10(2): p. e1001259.

T09-050B

Protein translation in astrocytic processes

A. Müller[1], P. Landgraf[1], A. Stellmacher[1], J. L. Vázquez López[1], D. C. Dieterich[1,2,3]

[1]Otto-von-Guericke University Magdeburg, Institute for Pharmacology and Toxicology, Magdeburg, Germany
[2]Leibniz-Institute for Neurobiology, Magdeburg, Germany
[3]CBBS, Magdeburg, Germany

Long lasting changes of synaptic strength are partly based on a dynamic adaptation of the synaptic proteome in neurons. As astrocytes contribute to the modulation of synaptic strength as part of the tripartite synapse, similar mechanisms might exist in astrocytes.
Local protein synthesis enables a fast and site-specific regulation of the proteome composition but also affords additional translation sites with a minimal translation machinery on-site and an activity-dependent, tight regulation of mRNA translation.
First experiments in neuron-glia cocultures indeed show, beside the localisation at the ER, a decentralized organisation of components of the translational machinery such as ribosomes and translation factors in astrocytic processes. In order to deepen our understanding for dynamics in protein translation of astrocytes, we use an approach that combines different metabolic labeling and detection strategies to identify and analyze newly synthesized proteins and their sites of translation. We are able to detect ongoing translation events in astrocytic processes applying SUnSET and we find biotin-tagged, ergo newly synthesized proteins, in synaptoneurosomal preparations of both cell culture derived and mouse brain derived tissues applying cell type-specific labeling techniques with astrocyte specific expression of $MetRS^{L274G}$ and ANL as a methionine surrogate. As one candidate that might be translated in a local fashion in astrocytic processes we present GFAP whose mRNA is found in tips of astrocytic processes and single translation events are detectable in processes by a proximity ligation assay in cultured astrocytes. These first approaches support the idea that astrocytic protein translation in part might be organized in a local manner in astrocytic processes and thereby might contribute to stabilize a tripartite synapse on a long term. In the future, we aim to elucidate the functional role of local protein synthesis in astrocytes as well as the identity of locally translated proteins.

T09-051B

Role of ATP and astrocytes in the lamprey respiratory network

L. Iovino, E. Cinelli, D. Mutolo, F. Bongianni

University of Florence, Department of Experimental and Clinical Medicine Section Physiology, Florence, Italy

The paratrigeminal respiratory group (pTRG) is a brainstem region responsible for the respiratory rhythm generation in the lamprey, a lower vertebrate that has proved to be highly useful to demonstrate that the basic features of rhythmogenic networks have been conserved throughout vertebrate evolution. Since no information is available on the role of ATP and astrocytes within the lamprey respiratory network, experiments were performed on isolated brainstems of lampreys. The vagal motor output was used to monitor respiratory activity. Bath application and microinjections (30-50 nl) of several drugs were employed. Bilateral microinjections of 1 mM ATP-γ-S, a nonhydrolyzable ATP analog, performed into the pTRG caused marked increases in respiratory frequency. Bath application of the P2 receptor antagonist PPADS (100 μM) did not

alter respiratory activity, but prevented the increases in respiratory frequency in response to microinjections of ATP-γ-S into the pTRG. The contribution of astrocytes to the modulation of the respiratory activity was investigated by using the gliotoxin aminoadipic acid. Bath application of 1 mM aminoadipic acid caused increases in the frequency and amplitude of vagal bursts followed by progressive decreases in both these respiratory variables. Furthermore, the responses to ATP-γ-S microinjected into the pTRG were abolished, indicating that pTRG astrocytes play a key respiratory role. However, consistently with the glial function of providing glutamine to neurons for glutamate synthesis, bath application of 5 mM glutamine caused a rapid recovery of baseline respiratory variables. In addition, the pH of the perfusing solution was reduced from 7.4 to 7.0 to ascertain whether ATP and astrocytes contribute to acidification-induced increases in respiratory activity. Marked low pH-induced increases in the respiratory motor output were still present after bath application of PPADS, but were completely abolished after aminoadipic acid application. The results show that astrocytes are involved in rhythm generation as well as in ATP- and acidification-induced increases of respiratory activity. The role of astrocytes in rhythmic networks appears to be phylogenetically conserved.

T09-052B

Neuron-astrocyte signaling is preserved in the ageing brain

M. Martin Fernandez[1], M. Gómez-Gonzalo[2], R. Martínez-Murillo[2], S. Mederos[2], A. Hernández-Vivanco[2], G. Perea[2], A. Araque[1]

[1]University of Minnesota, Neuroscience, Minneapolis, United States
[2]Instituto Cajal, Madrid, Spain

Astrocytes play crucial roles in brain homeostasis and are emerging as regulatory elements of neuronal and synaptic physiology by responding to neurotransmitters with Ca2+ elevations and releasing gliotransmitters that activate neuronal receptors. Ageing involves neuronal and astrocytic alterations, being considered risk factor for neurodegenerative diseases. Most evidence of the astrocyte-neuron signaling is derived from studies with young animals; however, the features of astrocyte-neuron signaling in adult and aging brain remain largely unknown. We have investigated the existence and properties of astrocyte neuron signaling in physiologically and pathologically ageing mouse hippocampal and cortical slices at different lifetime points (0.5 to 20 month-old animals). We found that astrocytes preserved their ability to express spontaneous and neurotransmitter-dependent intracellular Ca2+ signals from juvenile to ageing brains. Likewise, resting levels of gliotransmission, assessed by neuronal NMDAR activation by glutamate released from astrocytes, were largely preserved with similar properties in all tested age-groups, but DHPG-induced gliotransmission was reduced in aged mice. In contrast, gliotransmission was enhanced in the APP/PS1 mouse model of Alzheimer's disease, indicating a dysregulation of astrocyte-neuron signaling in pathological conditions. Disruption of the astrocytic IP3R2 mediated-signaling, which is required for neurotransmitter-induced astrocyte Ca2+ signals and gliotransmission, boosted the progression of amyloid plaque deposits and synaptic plasticity impairments in APP/PS1 mice at early stages of the disease.
Therefore, astrocyte-neuron interaction is a fundamental signaling, largely conserved in the adult and ageing brain of healthy animals, but it is altered in Alzheimer's disease, suggesting that dysfunctions of astrocyte Ca2+ physiology may contribute to this neurodegenerative disease.

Acknowledgement
Work supported by: Human Frontier Science Program (Research Grant RGP0036/2014) and NIH (R01NS097312-01) to AA, MINECO (SAF2015-65586) to RM; (BFU2013-47265-R, BFU2016-75107-P and CSD2010-00045) and Cajal Blue Brain to GP.

T09-053B

Glycine receptor in astrocytes - effect upon astrocytic communication

T. Morais, D. Coelho, S. H. Vaz, A. M. Sebastião, C. A. Valente

Instituto de Medicina Molecular, Ana Sebastião Lab, Lisboa, Portugal

Glycine and GABA are inhibitory neurotransmitters. Classically GABA is described as acting in the brain, while glycine exerts functions in the spinal cord and brainstem. However, the presence of glycinergic transmission markers in the brain, like glycine receptor (GlyR) and transporters have been recently reported. However, GlyR expression in brain astrocytes was never described.