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IN BRIEF

NEUROPHYSIOLOGY

Pericytes set the tone

Do pericytes have a role in regulating cerebral blood flow? Attwell and colleagues showed that in rat cerebellar slices, glutamate application triggered dilation of pericytes and capillaries. Whisker pad stimulation evoked pericyte dilation and then capillary dilation in the somatosensory cortex, particularly at locations apposed by pericytes. In rat cortex slices, ischaemia induced vasoconstriction at locations apposed by pericytes, followed by pericyte death. These findings point to a role for pericytes in blood flow regulation and suggest that pericyte death may prevent reperfusion after ischaemia.

ORIGINAL RESEARCH PAPER Hall, C. N. *et al.* Capillary pericytes regulate cerebral blood flow in health and disease. *Nature* http://dx.doi.org/10.1038/nature13165 (2014)

NEUROIMAGING

Functional networks are short-lived

Functional MRI (fMRI) studies have shown that activity in resting-state networks (RSNs) fluctuates over seconds. To assess functional connectivity with a temporal resolution higher than that of fMRI, Baker *et al.* used a novel, magnetoencephalography-based approach. This revealed several brain 'states' that were each characterized by a functional network resembling an fMRI-based RSN. Transitions between certain states were more likely to occur than transitions between other states. Importantly, each state remained stable for only 100–200 ms, indicating that functional networks are shorter-lived than suggested by fMRI data.

ORIGINAL RESEARCH PAPER Baker, A. P. *et al.* Fast transient networks in spontaneous human brain activity. *eLife* http://dx.doi.org/10.7554/eLife.01867 (2014)

TRANSPORTERS

Channelling seizure susceptibility

Mice lacking K^+-Cl^- cotransporter 2 (KCC2; also known as SLC12A5) have seizures. Investigating possible *KCC2* mutations in human families with seizure disorders, the authors identified a variant, KCC2-R952H, that was associated with febrile seizures. Mouse cortical neurons transfected with KCC2-R952H showed deficient Cl^- extrusion and reduced surface expression of the transporter. *In vitro* experiments showed that the variant impairs the role of KCC2 in dendritic spine formation. These findings provide a potential molecular basis for KCC2-R952H-induced susceptibility to seizures.

ORIGINAL RESEARCH PAPER Puskarjov, M. *et al.* A variant of KCC2 from patients with febrile seizures impairs neuronal Cl^- extrusion and dendritic spine formation. *EMBO Rep.* http://dx.doi.org/10.1002/embr.201438749 (2014)

SENSORY PROCESSING

Shifting states

Cortical neurons show irregular spiking activity during rest and sensory stimulation. This could mean that the cortex is in an asynchronous cortical state in which the membrane potential (V_m) is just below the spike threshold and irregular spiking results from converging uncorrelated inputs, or that irregular spikes are due to infrequent correlated inputs that induce large V_m fluctuations. The authors assessed these possibilities using intracellular recordings in the visual cortex of monkeys performing a visual fixation task. The recordings showed that during fixation (in the absence of visual stimulation), the cortex is in a synchronous state and that it shifts to an asynchronous, high-conductance state during visual stimulation.

ORIGINAL RESEARCH PAPER Tan, A. Y. Y. *et al.* Sensory stimulation shifts visual cortex from synchronous to asynchronous states. *Nature* http://dx.doi.org/10.1038/nature13159 (2014)