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IN BRIEF

NEUROIMMUNOLOGY

Harnessing adaptive immunity for AD

Immunotherapy has potential as a disease-modifying approach to the treatment of Alzheimer's disease. In this study, Santuccione *et al.* found that among individuals with Alzheimer's disease, those who exhibit slower cognitive decline have higher blood levels of antibodies specific for the neuronal cytoskeletal protein ankyrin G (ANKG; also known as ANK3). ArcAβ mice (a transgenic mouse model of Alzheimer's disease) that were vaccinated with ANKG had fewer and smaller amyloid plaques than unvaccinated animals, as well as less spine loss. Thus, taking advantage of the adaptive immune response to ANKG could be a potential approach for Alzheimer's disease immunotherapy.

ORIGINAL RESEARCH PAPER Santuccione, A. C. *et al.* Active vaccination with ankyrin G reduces β-amyloid pathology in APP transgenic mice. *Mol. Psychiatry* 12 Jun 2012 (doi:10.1038/mp.2012.70)

NEUROLOGICAL DISORDERS

Focus on miR-134 for seizures

The numerous changes in synaptic physiology and structure that occur in epilepsy are not effectively targeted by the currently available anti-epileptic therapies. Here, Jimenez-Mateos *et al.* found that miR-134 — a brain-specific microRNA reported to be involved in regulating spine morphology — was upregulated in the brain of patients with epilepsy and in a mouse model of epilepsy. Pharmacological silencing of miR-134 in mice through the use of antagomirs attenuated seizure severity during status epilepticus and reduced cell death and classical hallmarks of epilepsy, such as astrogliosis.

ORIGINAL RESEARCH PAPER Jimenez-Mateos, E. M. *et al.* Silencing microRNA-134 produces neuroprotective and prolonged seizure-suppressive effects. *Nature Med.* 10 Jun 2012 (doi:10.1038/nm.2834)

SYNAPTIC PHYSIOLOGY

No return for spiking axons

Under certain circumstances, action potentials can be initiated in the distal axon, but how the back-propagation of this activity to the soma is prevented is unknown. In this study, pharmacologically induced gamma oscillations in mouse hippocampal slices produced ectopic action potentials in distal axons of CA3 pyramidal cells. Back-propagation of these spikes to the soma was reduced by GABA release from axo-axonic cells at the axon initial segment during fast oscillations, thus enabling functional compartmentalization of axonal and somatic activity.

ORIGINAL RESEARCH PAPER Dugladze, T. *et al.* Segregation of axonal and somatic activity during fast network oscillations. *Science* **336**, 1458–1461 (2012)

NEUROLOGICAL DISORDERS

SHANK2 misbehaves in autism

Numerous genetic studies have reported an association between *SHANK2* and autism spectrum disorders (ASDs). Won *et al.* generated mutant mice carrying a human ASD-associated microdeletion in *Shank2*. These mice exhibited a marked reduction in hippocampal NMDA receptor-mediated long-term potentiation and long-term depression and showed autistic-like behaviours (such as altered social interaction). Importantly, these behavioural deficits were attenuated by pharmacological modulation of metabotropic glutamate receptors that indirectly enhance NMDA receptor function, suggesting a possible future therapeutic approach for ASDs.

ORIGINAL RESEARCH PAPER Won, H. *et al.* Autistic-like social behaviour in *Shank2*-mutant mice improved by restoring NMDA receptor function. *Nature* **486**, 261–265 (2012)

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