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Program Cover
Composite image of immunofluorescence-labeled cultured neurons from lethargic (CaV β4-null mutant) mice reconstituted with specific splice variants of the calcium channel β4 subunit (shown on the background of a gene expression heat map). β4b (blue) and β4e (orange) both functionally interact with calcium channels in the membrane but possess strikingly different abilities to target into the nucleus and to regulate expression of neuronal genes including that of CaV2.1, the primary channel partner of b4 subunits in cerebellar synapses.

Courtesy, with permission: Solmaz Etemad, Gerald J. Obermair, Daniel Bindreither, Ariane Benedetti, Ruslan Stanika, Valentina Di Biase, Verena Burtscher, Alexandra Koschak, Reinhard Kofler, Stephan Geley, Alexandra Wille, Alexandra Lusser, Veit Flockerzi, and Bernhard E. Flucher, 2014, *The Journal of Neuroscience 34(4): 1446-1461.*

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Photo by Songquan Deng

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This hippocampal neuron, 14 d in vitro, lacks NMDA receptor subunit GluN2B. It was immunostained for the AMPA receptor subunit GluA1 (green), the vesicular glutamate transporter VGLUT1 (red), and the microtubule-associated protein MAP2 (blue). An edge-detect filter was used to enhance color and cluster contour. In the absence of the GluN2B subunit, synaptic clustering of AMPA receptors is increased as a result of impaired anchoring of the synaptic proteasome.

Courtesy, with permission: Joana S. Ferreira, Jeannette Schmidt, Pedro Rio, Rodolfo Águas, Amanda Rooyakkers, Ka Wan Li, August B. Smit, Ann Marie Craig, and Ana Luisa Carvalho, 2015, *The Journal of Neuroscience* 35(22): 8462-8479.

Photo by Rudolf Balasko

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Confocal immunofluorescence image shows the overlapping expression of Lmx1b (red) and 5-HT (green) in the rostral part of the hindbrain of wild-type mice at embryonic day 11.0. Yellow color indicates double staining of Lmx1b and 5-HT.

Courtesy, with permission: Zhong-Qiu Zhao, Michael Scott, Santina Chiechio, Jin-Shan Wang, Kenneth J. Renner, Robert W. Gereau IV, Randy L. Johnson, Evan S. Deneris, and Zhou-Feng Chen, 2006, *The Journal of Neuroscience* 26(49): 12781-12788.

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Thalamic axonal arbors from corticothalamic neurons of the primary somatosensory (S1) cortex. Colorized fluorescent image from an in vitro slice containing EYFP-expressing corticothalamic fibers originating from a small injection of virus transducing channelrhodopsin2-EYFP into deep S1 cortex.

Courtesy, with permission: Seung-Chan Lee, Saundra L. Patrick, Kristen A. Richardson, and Barry W. Connors, 2014, *The Journal of Neuroscience* 34(39): 13170-13182.

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Fluorescent image of the dentate gyrus of triple mutant mice: ArpC3f/f; SlickV-CreER;Loxstop-lox Rosa26 Tomato Fluorescent protein. Image shows the mosaic distribution within the same tissue of wild-type neurons (green) and knock-out neurons (blue) after tamoxifen treatment. Nuclei are labeled with DAPI (red). Disruption of the Arp2/3 complex by loss of the ArpC3 subunit leads to progressive loss of dendritic spines over time in vivo, which is associated with schizophrenia-like endophenotypes. Cover design by Il Hwan Kim.

Courtesy, with permission: Il Hwan Kim, Bence Racz, Hong Wang, Lauren Burianek, Richard Weinberg, Ryohei Yasuda, William C. Wetsel, and Scott H. Soderling, 2013, *The Journal of Neuroscience* 33(14): 6081-6092.

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NMDA spike/plateau potentials can be elicited locally in distal dendrites of thalamocortical neurons (two-photon reconstruction, color encodes depth) in dorsal lateral geniculate nucleus. Through these dendritic potentials, cortical feedback can regulate the flow of visual information by shifting the functional firing mode of thalamocortical neurons from burst to tonic and by facilitating retinal signal transmission in tonic mode.

Courtesy, with permission: Sigita Augustinaite, Bernd Kuhn, Paul Johannes Helm, and Paul Heggelund, 2014, *The Journal of Neuroscience* 34(33): 10892-10905.

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Striatal neurons from embryonic day 17.5 Frizzled3 knock-out mice, stained for dopamineand cAMP-regulated phosphoprotein of 32 kDa (DARPP-32; green). The striatum is normally heavily innervated by meso-diencephalic axons at this developmental stage, but the neurons shown here still await innervation by these projections.

Courtesy, with permission: Ali G. Fenstermaker, Asheeta A. Prasad, Ahmad Bechara, Youri Adolfs, Fadel Tissir, Andre Goffinet, Yimin Zou, and R. Jeroen Pasterkamp, 2010, *The Journal of Neuroscience* 30(47): 16053-16064.

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This image of a coronal section of the dorsal telencephalon from an embryonic day 18.5 mouse shows excitatory neurons of different layers (yellow and red). Haploinsufficiency for Rbm8a, a component of the exon junction complex, causes severe microcephaly and defective neurogenesis.

Courtesy, with permission: Hanqian Mao, Louis-Jan Pilaz, John J. McMahon, Christelle Golzio, Danwei Wu, Lei Shi, Nicholas Katsanis, and Debra L. Silver, 2015, *The Journal of Neuroscience* 35(18): 7003-7018.

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Cultured rat hippocampal neurons (7 d in vitro) 1.5 h after excitotoxic stimulation with glutamate. The cells are stained for vesicular GABA transporter (green) and βtubulin (red). Although hippocampal cultures are enriched in glutamatergic neurons, they also contain a small percentage of GABAergic neurons, which project axons throughout the culture.

Courtesy, with permission: João R. Gomes, Andrea C. Lobo, Carlos V. Melo, Ana R. Inácio, Jiro Takano, Nobuhisa Iwata, Takaomi C. Saido, Luís P. de Almeida, Tadeusz Wieloch, and Carlos B. Duarte, 2011, *The Journal of Neuroscience* 31(12): 4622-4635.

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This sagittal section shows the regeneration of mouse corticospinal tract axons (red) 7 months after Pten deletion was initiated in motor cortex. Pten deletion was initiated 1 year after spinal cord injury in this mouse. Green labels glial fibrillary acidic protein.

Courtesy, with permission: Kaimeng Du, Susu Zheng, Qian Zhang, Songshan, Xin Gao, Juan Wang, Liwen Jiang, and Kai Liu, 2015, *The Journal of Neuroscience* 35(26): 9754-9763.

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Photo by ViewApart

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