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Area of research

Neurotransmitter receptor trafficking in plasticity and disease

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Summary

Understanding the processes that dictate the distribution, maintenance and dynamics of neurotransmitter receptors is of fundamental importance to the molecular basis of fast excitatory transmission, synaptic plasticity and brain function.

The Henley lab is interested in the mechanisms by which neurotransmitter receptors are targeted to, retained at and removed from synapses under normal, stimulated and disease conditions. Receptors share common biosynthetic and endocytic pathways but important specific differences allow selective regulation.

Increased understanding of the mechanisms of these processes will give important insights into synapse formation, stabilisation and plasticity and thus into the cellular mechanisms underlying learning and memory and some neurodegenerative diseases.

In particular we focus on the roles of posttranslational modifications, such as SUMOylation, and protein-protein interactions at AMPA and kainate receptors.

To address these questions we use a wide range of molecular, biochemical, cell biology and imaging techniques including the use of viral transduction and fluorophore protein tagging technology to visualise the dynamics of receptor movement in living neurones in real time.

Teaching

Advanced Options in Biochemistry

Keywords

- Glutamate receptor
- GABA
- NSF
- GluR2
- Syntenin
- GFP
- AMPA receptor
- PICK1
- SUMOylation
- SUMO

Memberships

Organisations

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Links

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Selected publications

- Petrovic, M, Silva, SVd, Clement, JP, Vyklicky, L, Mulle, C, Gonzalez, MI & Henley, JM, 2017, '[Metabotropic action of postsynaptic kainate receptors triggers hippocampal long-term potentiation](#)'. *Nature Neuroscience*, vol 20., pp. 529-539
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Recent publications

- Binda, C, Nakamura, Y, Henley, J & Wilkinson, K, 2019, '[Sorting nexin 27 rescues neuroligin 2 from lysosomal degradation to control inhibitory synapse number](#)'. *Biochemical Journal*, vol 476., pp. 293-306
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- Carmichael, RE & Henley, JM, 2018, '[Transcriptional and post-translational regulation of Arc in synaptic plasticity](#)'. *Seminars in Cell and Developmental Biology*, vol 77., pp. 3-9

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