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Professor of Molecular Neuroscience

**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
- Henley, J & Wilkinson, K, 2016, '[Synaptic AMPA receptor composition in development, plasticity and disease](#)'. *Nature Reviews Neuroscience*, vol 17., pp. 337?350
- Tang, LT, Craig, TJ & Henley, JM, 2015, '[SUMOylation of synapsin Ia maintains synaptic vesicle availability and is reduced in an autism mutation](#)'. *Nature Communications*, vol 6.
- Girach, F, Craig, TJ, Henley, JM & Henley, JM, 2013, '[RIM1 \$\alpha\$  SUMOylation is required for fast synaptic vesicle exocytosis](#)'. *Cell Reports*.
- Henley, JM, Craig, TJ & Wilkinson, KA, 2014, '[Neuronal SUMOylation: mechanisms, physiology, and roles in neuronal dysfunction](#)'. *Physiological Reviews*, vol 94., pp. 1249-85

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## Recent publications

- Prado, FJ, Luo, J, Rubin, P, Henley, J & Wilkinson, K, 2019, '[Developmental profiles of SUMOylation pathway proteins in rat cerebrum and cerebellum](#)'. *PLoS ONE*, vol 14.
- Fletcher-Jones, A, Hildick, K, Evans, A, Nakamura, Y, Wilkinson, K & Henley, J, 2019, '[The C-terminal Helix 9 motif in rat cannabinoid receptor type 1 regulates axonal trafficking and surface expression](#)'. *eLife*, vol 8.
- Lee, L, Seager, R, Nakamura, Y, Wilkinson, K & Henley, J, 2019, '[Parkin-mediated ubiquitination contributes to the constitutive turnover of mitochondrial fission factor \(Mff\)](#)'. *PLoS ONE*, vol 14.
- Needs, H, Henley, B, Cavallo, D, Gurung, S, Modebadze, T & Henley, J, 2019, '[Changes in excitatory and inhibitory receptor expression and network activity during induction and establishment of epilepsy in the rat Reduced Intensity Status Epilepticus \(RISE\) model](#)'. *Neuropharmacology*, vol 158.
- Evans, A, Gurung, S, Henley, J, Nakamura, Y & Wilkinson, K, 2019, '[Exciting Times: New Advances Towards Understanding the Regulation and Roles of Kainate Receptors](#)'. *Neurochemical Research*, vol 44., pp. 572-584

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