

Katharine R. Smith Ph.D.

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Current position: Assistant Professor, University of Colorado Denver, Anschutz Medical Campus

Education and Training

- 2015-2016 **Elizabeth Blackwell Institute Early Career Fellow**
University of Bristol, UK. Molecular mechanisms underlying disrupted
Excitatory/Inhibitory (E/I) balance and relevance to neuropsychiatric disease.
- 2012- 2015 **Marie Curie Postdoctoral Fellow**
2012-2014: Penzes Lab, Northwestern University, Chicago, USA. Advisor: Prof.
Peter Penzes.
2014-2015: Hanley Lab, University of Bristol, UK. Advisor: Dr. Jonathan Hanley.
- 2010-2012 **Postdoctoral Researcher**, Kittler Lab, UCL.
- 2005-2010 **Ph.D. Molecular Neurobiology**
University College London (UCL), London, UK.
Supervisor: Dr. Josef Kittler
Thesis title: Molecular determinants of GABA_A receptor trafficking.
Awarded: 10th October 2010.
- 2001-2005 **MSci Biochemistry** 2i Honours Degree, Imperial College, London, UK.
Final year 6 month lab placement with Dr. Yuri Ushkaryov, Imperial College,
London, 'A study of the structure of the LNB receptor Latrophillin'.

Publications

1. **Katharine R. Smith**, Katherine J. Kopeikina, Jessica Fawcett-Patel, Katherine Leaderbrand, Ruoqi Gao, Britta Schürmann, Kristoffer Myczek, Jelena Radulovic, Geoffrey T. Swanson and Peter Penzes (2014). Psychiatric risk factor *ANK3*/Ankyrin-G nanodomains regulate the structure and function of glutamatergic synapses, *Neuron*, PMID:25374361.
2. **Katharine R. Smith**, Elizabeth C. Davenport, Jing Wei, Xiangning Li, Manavendra Pathania, Victoria Vaccaro, Zhen Yan and Josef T. Kittler (2014). GIT1 and βPIX are essential for GABA_A receptor synaptic stability and inhibitory neurotransmission, *Cell Reports*, PMID:25284783.
3. Lara J. Duffney, Jing Wei, Jia Cheng, Wenhua Liu, **Katharine R. Smith**, Josef T. Kittler, Zhen Yan (2013). Shank deficiency induces NMDA receptor hypofunction via an actin-dependent mechanism, *Journal of Neuroscience*, PMID:24089484.
4. Deepak P. Srivastava, Kevin M. Woolfrey, Kelly A. Jones, Charles T. Anderson, **Katharine R. Smith**, Theron A. Russell, Hyerin Lee, David L. Wokosin, Marina V. Yasvoina, P. Hande Ozdinler, Gordon M. G. Shepherd, Peter Penzes (2012). Disease-associated coding variant reveals role for a Ras/Epac2-dependent pathway in controlling basal dendrite maintenance. *PLoS Biology*, PMID: 22745599.

5. **Katharine R. Smith**, James Muir, Yijian Rao, Marietta Browarski, Marielle Gruenig, David F. Sheehan, Volker Haucke, Josef T Kittler (2012), Stabilisation of GABA_A receptors at endocytic zones is mediated by an AP2 binding motif within the GABA_A receptor β 3 subunit, *Journal of Neuroscience*, PMID: 22396422.
6. James Muir, I Lorena Arancibia-Carcamo*, Andrew F MacAskill*, **Katharine R. Smith***, Lewis Griffin, Josef T Kittler (2010), NMDA receptors regulate GABA_A receptor lateral mobility and clustering at inhibitory synapses through serine 327 on the γ 2 subunit, *Proc Natl Acad Sci U S A*, PMID: 20823221, *equal contribution to the work.
7. **Katharine R. Smith** and Josef T Kittler (2010), The cell biology of synaptic inhibition in health and disease, *Current Opinion in Neurobiology*, PMID: 20650630.
8. **Katharine R. Smith**, Peter L Oliver, Michael J Lumb, I Lorena Arancibia-Carcamo, Raquel Revilla-Sanchez, Nicholas J Brandon, Stephen J Moss, Josef T Kittler (2010), Identification and characterisation of a Maf1/Macoco protein complex that interacts with GABA_A receptors in neurons, *Molecular and Cellular Neuroscience*, (Cover) PMID: 20152113.
9. Lynette Beattie, Mattias Svensson, Alison Bune, Najmeeyah Brown, Asher Maroof, Soombul Zubairi, **Katharine R. Smith**, Paul M. Kaye (2010), Leishmania donovani-induced expression of signal regulatory protein α on Kupffer cells enhances hepatic invariant NKT-cell activation, *European Journal of Immunology*, PMID: 19877019.
10. **Katharine R. Smith***, Kristina McAinsh*, G Chen, I Lorena Arancibia-Carcamo, Volker Haucke, Zhen Yan, Stephen J Moss, Josef T Kittler (2008), Regulation of inhibitory synaptic transmission by a conserved atypical interaction of GABA_A receptor β - and γ -subunits with the clathrin AP2 adaptor, *Neuropharmacology*, PMID: 18662706.*equal contribution to the work.
11. Josef T Kittler, Guojun Chen, Viktoria Kukhtina, Ardeschir Vahedi-Faridi, Zhenglin Gu, Verena Tretter, **Katharine R. Smith**, Kristina McAinsh, I Lorena Arancibia-Carcamo, Wolfram Saenger, Volker Haucke, Zhen Yan, Stephen J Moss (2008), Regulation of synaptic inhibition by phospho-dependent binding of the AP2 complex to a YECL motif in the GABA_A receptor γ 2 subunit, *Proc Natl Acad Sci U S A*, PMID: 18305175.

Conference attendance

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| 2015 | Talk at European Synapse Meeting 2015, Bristol, UK.
A role for autism-associated cadherin-10 at excitatory and inhibitory synapses. |
| 2014 | Poster Presentation at Neuroscience 2014, Washington DC, USA.
Psychiatric risk factor ANK3/Ankyrin-G nanodomains regulate the structure and function of glutamatergic synapses |
| 2014 | Talk at Neuropharmacology Satellite Conference: GABAergic Signaling in Health and Disease, VA. A role for autism-associated cadherin-10 at excitatory and inhibitory synapses. |
| 2014 | Poster Presentation at 6 th Special Conference of the International Society for Neurochemistry, University of Tokyo, Japan. Psychiatric risk factor ANK3/Ankyrin-G nanodomains regulate the structure and function of glutamatergic synapses |
| 2014 | Poster Presentation at Chicago chapter SFN meeting, Northwestern University, Chicago. Regulation of synapse structure and dendrite morphology by an autism associated cadherin. |
| 2014 | Poster Presentation at Brain Research Foundation Neuroscience Day, Northwestern University, Chicago. Regulation of synapse structure and dendrite morphology by an autism associated cadherin. |
| 2013 | Poster Presentation at Neuroscience 2013, San Diego, USA. |

- Regulation of synapse structure and dendrite morphology by an autism associated cadherin.
- 2012 Neuroscience 2012, New Orleans, USA.
- 2011 **Poster Presentation**, UCL Neuroscience Symposium, UCL, London.
A GIT1/ β PIX/Rac1 signalling pathway has an important role in the regulation of GABA_A receptor trafficking and inhibitory synapse modulation.
- 2010 **Poster Presentation**, FENS Forum, Amsterdam, Netherlands.
Cell surface down regulation of GABA_A receptors during oxygen glucose deprivation is mediated by a basic patch AP2 binding motif within the GABA receptor β 3 subunit.
- 2009 **Poster Presentations** at Neuroscience 2009, Society for Neuroscience and Synaptic Inhibition in Health and Disease, Abcam, Chicago, USA.
The signalling adaptor GIT1 has an important role in the regulation of GABA_A receptor trafficking dynamics and inhibitory synapse modulation.
- 2008 **Poster Presentation**, FENS Forum, Geneva, Switzerland.
Regulation of inhibitory synaptic transmission by the GABA_A receptor β 3 and γ 2 subunits binding to the clathrin adaptor protein, AP2.
- 2007 **Poster Presentation**, BNA, Harrogate, UK.
Identification of a Maf1/Macoco myosin-like protein complex important for regulating the number of surface GABA_A receptors.

Invited talks

- March 2015 **Northwestern University, Chicago, IL.** Sponsor: Alfred George.
- February 2015 **Centre for Integrative Physiology, University of Edinburgh.** Sponsor: Mike Shipston.
- February 2015 **Department of Pharmacology, University of Oxford.** Sponsor: Nigel Emptage.
- November 2014 **Neuropharmacology Conference: GABAergic Signaling in Health and Disease, VA.** A role for autism-associated cadherin-10 at excitatory and inhibitory synapses.
- February 2014 **Third International Epilepsy Research Center Symposium, Newport Beach, CA.** Regulation of synapse structure and dendrite morphology by an autism-associated cadherin.
- September 2013 **Northwestern University Interdisciplinary Neuroscience Program annual retreat, St Charles, IL.** Regulation of synapse structure and function by neuropsychiatric disorder risk factors.
- January 2013 **Institute Pasteur Paris, France.** Disease-associated regulators of synaptic architecture. Sponsor: David DiGregorio.
- January 2011 **University of British Columbia, Vancouver, Canada.** Molecular mechanisms of GABA_A receptor internalization. Sponsor: Ann Marie Craig.
- May 2008 **University College London, UK.** Physiology Department PhD Student Seminars.

Extramural Funding

- 2015-2016 **Elizabeth Blackwell Institute Early Career Fellowship**, University of Bristol, UK. Molecular mechanisms underlying disrupted Excitatory/Inhibitory (E/I) balance and relevance to neuropsychiatric disease.
- 2012-2015 **Marie Curie International Outgoing Fellowship**,
Morphing Synapses: the coordination of dendritic spine morphogenesis during synaptic plasticity and pathology.
PI: Katharine Smith, Sponsor: Dr Jonathan Hanley.
12/12 – 12/15, €283,500 funding postdoctoral work with Peter Penzes, Northwestern University (2 years) and Jonathan Hanley, University of Bristol (1 year).

2003 **Wellcome Trust vacation studentship**, for undertaking an undergraduate research placement at the London School of Hygiene and Tropical Medicine with Prof. Paul Kaye.

Awards

2014 **Poster Award**, for presentation at 6th Special Conference of the International Society for Neurochemistry, University of Tokyo, Japan

2014 **ISN Special Conference Travel Award**, for attendance and presentation at 6th Special Conference of the International Society for Neurochemistry, University of Tokyo, Japan

2013 **SfN Postdoctoral Fellow Travel Award**, for attendance and presentation at SfN Neuroscience 2013.

2010 **BNA Travel Bursary**, for attendance and presentation at the FENS Forum 2010.

2009 **UCL Graduate School Student Conference Fund Major award**, for attendance and presentation at SfN Neuroscience 2009.

2008 **BNA Travel Bursary**, for attendance and presentation at the FENS Forum 2008.

2008 **UCL Graduate School Research Project Fund Minor Award**, for attendance at FENS-IBRO European Synapse Summer School, Bordeaux.

Courses

2013 **Imaging Structure and Function of the Nervous System**, Cold Spring Harbor Laboratories, USA.

2008 **FENS-IBRO European Synapse Summer School**, Bordeaux PENS Training Centre, Bordeaux Neuroscience Institute, France.

2008 **Advanced Microscopy Course**, University College London, UK.

Reviewing

Reviewer for Journal of Neural Transmission, Cell Reports and Journal of Neuropharmacology.

Teaching and Service

2015 Bitesize research talk at Bristol Bright Night (Public talk), @t Bristol, UK.

2014 Member of post-doctoral panel advising graduate students on post-doctoral applications, Northwestern University, IL.

2013 Member of career panel for Lake Forest High School Career Roundtable in Biosciences, Lake Forest, IL.

2013 Teaching Assistant on Imaging Structure and Function of the Nervous System Course, Cold Spring Harbor Laboratories, USA.

2013 Mentor of SIR students from Illinois Mathematics and Science Academy.

2008-present PhD and Undergraduate student mentor, University College London, Northwestern University and University of Bristol.