Lecturer at the University of Tasmania
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Jack Rivers-Auty

Education

PhD in Pharmacology

Department of *Pharmacology* and Toxicology, University of Otago. April 2008 – October 2013.
Thesis title: An investigation into the cannabinoid receptor type 2 as a therapeutic target for childhood cerebral hypoxia.

Diploma for Graduates in Applied Statistics - Grade A+ average.

Department of Mathematics and Statistics, Massey University. January 2014 – November 2018.
Dissertation title: Alzheimer's disease progression and the use of non-steroidal anti-inflammatories.

First Class Post Graduate Diploma (Honours Equivalent) - Grade A average.

Department of Botany, University of Otago. February 2007 – December 2007.
Dissertation title: The interaction between oxidative stress signals during heat stress and viral infection in Phaseolus Vulgaris. Evaluating the roles of antioxidant activity, DNA damage and lipid peroxidation during stress.

BSc (Anatomy) - Grade A average.

Department of Structural Anatomy, University of Otago. 2004-2006.

Awards

Young Scientist Divisional Speaker Award. Given by the Division of Neuroscience and Experimental Psychology to showcase excellent research for annual School of Biological Sciences event, at the University of Manchester. 2018.

Winner of the best overall presentation at the ANZLAA New Zealand conference. 2014.

Winner, as voted by the audience, of the Australasian "Three Minute Thesis Competition". 2011. http://www.postgraduate.uwa.edu.au/news/3mt/video/rivers

Winner of the University of Otago "Three Minute Thesis Competition". 2011.

Winner of the Fred Fastier Oral Presentation Prize at the ASCEPT conference. 2009.

Finalist at the University of Otago "Three Minute Thesis Competition". 2009.

Runner up in the Fred Fastier Oral Presentation Prize at the ASCEPT conference. 2008.

Recipient of the University of Otago Doctoral Scholarship. 2008.

Recipient of Marsden Funding for Doctoral Studies. 2008.

Relevant Employment History

Lecturer

University of Tasmania, College of Medicine and Health, School of Medicine, Medical Sciences. November 2019 – Present.
Work packages:

- Establish the inflammatory properties of environmental microplastics

- Ascertain the physiological importance of the unique features of pro-IL-1α
- APOE4 as an inflammatory risk factor for Alzheimer's disease

Research Fellow

University of Manchester, Faculty of Biology, Medicine and Health. October 2017 – October 2019.

Project: Inflammation and the ageing process

Postdoctoral Researcher

University of Manchester, Faculty of Biology, Medicine and Health. October 2014 – October 2017.

Supervised by: Dr. Catherine Lawrence and Prof. David Brough.

Project: Zinc deficiency induced inflammasome activation as an exacerbating factor in Alzheimer's disease.

Postdoctoral Researcher

University of Otago, Pathology Department. November 2013 - October 2014.

Supervised by: Prof. Robin Frazer, Prof. Madhav Bhatia and Prof. Mark Hampton.

Project: The role of hydrogen sulfide and neutrophil NETosis in sepsis.

Assistant Research Fellow/Postdoctoral Researcher

University of Otago, Pathology Department. January 2012- April 2013.

Supervised by: Prof. Madhav Bhatia.

Project: Hydrogen sulfide as a novel regulator of inflammation.

Pharmacology laboratory demonstrator

University of Otago, Department of Pharmacology. February 2009 – December 2011.

Head Senior Residential Assistant

Cumberland College, University of Otago. February 2009 - November 2011.

Grants Awarded

Pure Oceans Grant.

Awarded March 2020. €47,300 (EUR). (Lead applicant)

Awarded for costs toward research into the pathophysiological effects of plastic exposure on Flesh-footed Shearwaters.

ARUK Network Pump Priming Grant.

Awarded December 2018. £3250 (GBP). (Lead applicant)

Awarded for costs toward a pilot experiment investigating paracetamol as an exacerbating factor in Alzheimer's disease.

BBSRC Future Leaders Fellowship Award.

Awarded December 2016. £298,137 (GBP). (Sole applicant)

Awarded for my salary, research consumables, small equipment and conference attendance. Grant award covers 3 years of research, the University of Manchester is also funding an additional year of research. Research topic: Understanding how dietary zinc and inflammation impact healthy ageing in the brain.

Alzheimer's Research UK (ARUK) Equipment Grant.

Awarded July 2016. £18310 (GBP). (Co- author)

Awarded for mouse behaviour equipment including cameras, tracking software, rotarod equipment and computers.

ARUK Network Grant for Small Equipment.
Awarded December 2015. £1231 (GBP). (Lead applicant)
Awarded for mouse behaviour equipment including custom Y-mazes and a Morris water maze.

ARUK Network Grant for Small Equipment.
Awarded April 2015. £4995 (GBP). (Co-lead applicant with Prof. David Brough)
Awarded for Class II microbiological safety cabinet with UV lamp, stand and installation costs accounted.

Welcome Trust Collaborative Visit Grant.
Awarded March 2015. £1950 (GBP). (Lead applicant)
Awarded for travel and consumables to visit Dr. Pablo Pelegrin's laboratory at the Biomedical Research Institute, Murcia Health Foundation (IMIB-FFIS), Murcia, Spain.

Pump-priming Award from the University of Manchester - Neurobiology Research Theme.
Awarded March 2015. £750 (GBP). (Sole applicant)
Awarded for consumables for in vitro research on lysosomal mechanisms of inflammasome activation.

Canterbury Medical Research Foundation General Project Grant.
Awarded November 2013. $50,000 (NZD). (Lead applicant)
Awarded for consumables for research into the role of the liver sieve in septic shock.

University of Otago Health Sciences Career Development Programme - Postdoctoral Fellowship.
Awarded May 2013. $154,000 (NZD). (Sole applicant)
Awarded for my salary, conference attendances and consumables for two years researching the role of hydrogen sulfide and neutrophil NETosis in sepsis.

Publications

Orcid ID: https://orcid.org/0000-0001-5321-2347

Hadjidemetriou M, **Rivers-Auty J**, Papafilippou L, et al., 2021. Nanoparticle-enabled enrichment of longitudinal blood proteomic fingerprints in Alzheimer's disease. ACS nano, Accepted to be published.

Rivers-Auty J, Tapia VS, White CS, et al., 2021. Zinc Status Alters Alzheimer's Disease Progression through NLRP3-Dependent Inflammation. Journal of Neuroscience, Accepted, to be published.

Rivers-Auty J, Mather AE, Peters R, Lawrence CB, Brough D, (2020) Anti-inflammatories in Alzheimer's disease—potential therapy or spurious correlate? Brain Communications 2020; 2,

Haley MJ, White CS, Roberts D, et al., 2019. Stroke Induces Prolonged Changes in Lipid Metabolism, the Liver and Body Composition in Mice. Translational Stroke Research, 1-14.

Tapia VS, Daniels MJD, Palazon-Riquelme P, Dewhurst M, Luheshi NM, **Rivers-Auty J**, Green J, Redondo-Castro E, Kaldis P, Lopez-Castejon G, Brough D (2019) The three cytokines IL-1beta, IL-18, and IL-1alpha share related but distinct secretory routes. J Biol Chem. doi:10.1074/jbc.RA119.008009

Crilly S, Njegic A, Laurie S, Fotiou E, Hudson G, Barrington J, Webb K, Young H, Badrock A, Hurlstone A, **Rivers-Auty J**, Parry-Jones A, Allan S, Kasher P (2018) Using zebrafish larval models to study brain injury, locomotor and neuroinflammatory outcomes following intracerebral haemorrhage. F1000Research 7 (1617). doi:10.12688/f1000research.16473.1

Hoyle C, **Rivers-Auty J**, Lemarchand E, Vranic S, Wang E, Buggio M, Rothwell N, Allan S, Kostarelos K, Brough D (2018) Small, Thin Graphene Oxide Is Anti-Inflammatory Activating Nuclear Factor Erythroid 2-Related Factor 2 (NRF2) Via Metabolic Reprogramming. ACS Nano. DOI: 10.1021/acsnano.8b03642

Rajkovic I, Wong R, Lemarchand E, **Rivers-Auty J**, Rajkovic O, Garlanda C, Allan SM, Pinteaux E (2018) Pentraxin 3 promotes long-term cerebral blood flow recovery, angiogenesis, and neuronal survival after stroke. J Mol Med:1-14

Rivers-Auty, J, Daniels, M. J. D., Colliver, I., Robertson, D. L. & Brough, D. Redefining the ancestral origins of the interleukin-1 superfamily. Nat. Commun. 1156, doi:10.1038/s41467-018-03362-1 (2018).

Baldwin AG, **Rivers-Auty J**, Daniels MJD, White CS, Schwalbe CH, Schilling T, Hammadi H, Jaiyong P, Spencer NG, England H, Luheshi NM, Kadirvel M, Lawrence CB, Rothwell NJ, Harte MK, Bryce RA, Allan SM, Eder C, Freeman S, Brough D (2017) Boron-Based Inhibitors of the NLRP3 Inflammasome. Cell Chemical Biology. 24(11), 1321-1335
doi:https://doi.org/10.1016/j.chembiol.2017.08.011

Diamond CE, Leong KWK, Vacca M, **Rivers-Auty J**, Brough D, Mortellaro A (2017) Salmonella typhimurium-induced IL-1 release from primary human monocytes requires NLRP3 and can occur in the absence of pyroptosis. Scientific Reports 7:6861. doi:10.1038/s41598-017-07081-3

White CS, Lawrence CB, Brough D, **Rivers-Auty J** (2016) Inflammasomes as therapeutic targets for Alzheimer's disease. Brain Pathology: doi:10.1111/bpa.12478

Daniels* MJ, **Rivers-Auty* J**, Schilling T, Spencer NG, Watremez W, Fasolino V, Booth SJ, White CS, Baldwin AG, Freeman S, Wong R, Latta C, Yu S, Jackson J, Fischer N, Koziel V, Pillot T, Bagnall J, Allan SM, Paszek P, Galea J, Harte MK, Eder C, Lawrence CB, Brough D (2016) Fenamate NSAIDs inhibit the NLRP3 inflammasome and protect against Alzheimer's disease in rodent models. Nature Communications 7:12504. *** were equal contributors**. doi:10.1038/ncomms12504

Xu J, Begley P, Church SJ, Patassini S, McHarg S, Kureishy N, Hollywood KA, Waldvogel H, Liu H, Zhang S, Lin W, Herholz K, Turner C, Synek BJ, Curtis MA, **Rivers-Auty J**, Lawrence CB, Kellett KAB, Hooper NM, Vardy ERLC, Wu D, Unwin RD, Faull RLM, Dowsey AW, Cooper GJS, (2016). Elevation of brain glucose and polyol-pathway intermediates with accompanying brain-copper deficiency in patients with Alzheimer's disease: metabolic basis for dementia. Scientific Reports. 6:27524. doi:10.1038/srep27524

Martins I, **Rivers-Auty J**, Allan SM, Lawrence CB, (2017). Alzheimer's like mitochondria and synaptic pathology in high-fat fed mice coincides with cognitive and memory deficits. Journal of Alzheimer's Disease. 55 (3), 915-932

Rivers-Auty J, Brough D, (2015). Potassium efflux fires the canon: Potassium efflux as a common trigger for canonical and noncanonical NLRP3 pathways. European Journal of Immunology. 45: 2758-61.

Rivers-Auty J, (2015). An evolutionary perspective on the immunomodulatory role of hydrogen sulphide. Medical Hypotheses. 85: 612-7.

Rivers-Auty J, (2014). The blind leading the blind: animal facility staff and researchers working together to reduce bias in animal research. Royal Society of New Zealand ANZCCART.

Rivers-Auty J, Smith PF, Ashton JC, (2014). The cannabinoid CB2 receptor agonist GW405833 does not ameliorate brain damage induced by hypoxia-ischemia in rats. Neuroscience Letters. 569, 104-9.

Rivers-Auty J, Ashton JC, (2013). Neuroinflammation in Ischemic Brain Injury as an Adaptive Process. Medical Hypotheses. 82(2): 151-8.

Rivers-Auty J, Ashton JC, (2013). Vehicles for Lipophilic Drugs: Implications for Experimental Design, Neuroprotection, and Drug Discovery. Current Neurovascular Research. 10(4);356-60

Badiei A, **Rivers-Auty J**, Ang A, Bhatia M. 2013. Inhibition of hydrogen sulfide production by gene silencing attenuates inflammatory activity of LPS-activated RAW264.7 cells. Applied Microbiology and Biotechnology. 97(17): 7845-52.

Ang AD, **Rivers-Auty J**, Akhil Hegde A, Ishii I, Bhatia M, (2013). The effect of CSE gene deletion in caerulein-induced acute pancreatitis in the mouse. American Journal of Physiology - Gastrointestinal and Liver Physiology. 305: 712-21.

Rivers-Auty J and Bhatia M, (2013). Hydrogen sulfide, systemic inflammatory response syndrome (SIRS) and compensatory anti-inflammatory response syndrome (CARS) following sepsis. OA Inflammation. 1(1):2-10.

Rivers JR and Ashton JC, (2013). Age matching animal models to humans - theoretical considerations. Current Drug Discovery Technologies. 10(3):177-81

Jupp L, **Rivers JR**, Bhatia M, (2013). Hydrogen sulfide and substance P in acute pancreatitis. In: Popescu AR, Singal PK, editors. Adaptation Biology and Medicine. New Delhi: Narosa Publishing House. 139-50.

Rivers JR, Badiei A, and Bhatia M, (2012). Hydrogen sulfide as a therapeutic target for inflammation. Expert Opinion on Therapeutic Targets. 16:439-449.

Rivers JR, Maggo SD, and Ashton JC, (2012). Neuroprotective effect of hydroxypropyl-beta-cyclodextrin in hypoxia-ischemia. NeuroReport. 23:134-138.

Rivers JR, and Ashton JC, (2012). Neonatal asphyxia and stroke: morbidity, models, consequences, and treatments in hypoxia: Causes, types and management. D. Vordermark, editor. Nova Publishers. 108-130.

Rivers JR, Sutherland BA, and Ashton JC, (2011). Characterization of a rat hypoxia-ischemia model where duration of hypoxia is determined by seizure activity. Journal of Neuroscience Methods. 197:92-96.

Rivers JR, and Ashton JC, (2010). The development of cannabinoid CBII receptor agonists for the treatment of central neuropathies. Central Nervous System Agents for Medicinal Chemistry. 10:47-64.

Teaching experience

Statistics for in vivo and in vitro biologists: An intro to R (2018-2019)

This course is a post-graduate level course consisting of 6 lectures and labs. I was the sole course developer, co-ordinator and lecturer. Run once each semester.

Guest lecturer in final year Neuroscience Unit (2015-2019)

I am a guest lecturer for the neuroscience unit where I discuss leading research. I have done lectures on the innate immune system, neurons, neuroinflammation, brain pathology, experimental design, statistics, bioinformatics and, protein and gene evolution.

Post-graduate supervision (2015-2019)

I have co-supervised four Master's students and three undergraduate students to graduation. I am currently a primary supervisor for one Ph.D. student and a co-supervisor to one Master's student.

Laboratory demonstrator (2011-2013)

I was a laboratory demonstrator for 200 and 300 level courses for the Pharmacology Department, University of Otago.

Science administration

Positions held

Review editor for Frontiers of Immunology since June 2016. Involves engaging in the Frontiers reviewer and editor community.

Alzheimer's Research UK (ARUK) network early career representatives since October 2016. Involved reviewing grant applications, organising networking and training events for early career researchers, and disseminating information to researchers and the public about ARUK events.

Communications Administrator for the British Society of Immunology Inflammation Affinity group since May 2017.

Statistical adviser to the Brain Inflame Group since October 2015. Providing advice and performing analyses for the use of inferential statistics in experimental research, big dataset analyses including RNAseq analysis, and epidemiological analyses. Additionally developing web application for the explanation of epidemiological and RNAseq datasets.

https://jackauty.com/web-apps-for-the-exploration-of-rnaseq-and-epidemiological-datasets/

Peer review

Reviewed grant proposals for the **BBSRC Fellowship Scheme**.

Reviewed grant proposals for the **Alzheimer's Society Fellowship Scheme**.

Peer reviewed articles for the Journal of Neuroinflammation, PLOS One, Journal of Neurochemistry, Journal of Inflammation, Immunopharmacology and Immunotoxicology, Frontiers in Neurology and Frontiers in Immunology.

Conference organisation

Co-organised the ARUK Early Careers Researcher Conference, July 2018. This included 11 speakers and 80 delegates. Program included plenary speakers Prof. Malcolm MacLeod and Dr. Selina Wray, professional development panel discussion and presentations on the importance of scientific rigor and navigating the early career research path.

Co-organised the ARUK Early Careers Researcher Conference, July 2017. This included 10 speakers and 80 delegates. Program included plenary speakers Dame Prof. Nancy Rothwell and Dr. Alison Mather, careers panel discussion, poster sessions and oral presentations.

Invited Speakers

Invited panellist to ISAART Alzheimer's Association International Conference, February 2021. Career advice panel for early career researchers with a focus on decision making in the field of dementia research.

Invited speaker to EnviSMART, May 2020. This event was to a wide range of environmental toxicology focus scientist. *Title: Microplastics as inflammatory pollutants.*

Invited speaker to the University of Manchester Stories event, January 2019. This event was to over 400 PhD studies. The organisers invited excellent speakers to tell their stories to inspire the next generation of thinkers. Speakers included Dame Prof. Nancy Rothwell and Chancellor Lemn Sissay. Title: *Usain Bolt shaves his legs.*

Invited speaker to the University of Manchester School of Biological Sciences annual event, January 2019. This event was to over 500 University of Manchester researchers. One speaker for each division was invited to speak on their leading research. Title: *From cell culture to populations:*
Evidence that a group of pain-relievers slow Alzheimer's disease progression.

Invited speaker to the Institute of metabolism and systems research, University of Birmingham seminar series, by Prof. Gareth Lavery, October 2018. Title: *From cell culture to populations: evidence that a group of pain-relievers slow Alzheimer's disease progression.*

Invited speaker to the Department of Epidemiology and Biostatistics, University of California San Francisco seminar series, by Prof. Maria Glymour, June 2018. Title: *NLRP3 and its role in Alzheimer's disease: From cells to people.*

Invited speaker to the Murcia Biomedical Research Institute (IMIB) seminar series, August 2015. Title: *Drugs, diet and inflammation: what is in the pipeline for Alzheimer's disease.*

Invited speaker and workshop organiser. Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART), July 2014. Topic: *Experimental rigour and animal ethics.*

Invited speaker to the departmental symposia for the University of Otago's Department of Women's and Children's Health, November 2011. Title: *Going beyond a PhD.*

Guest Speaker, Media Appearances and Outreach

Presenter for the British Science Association outreach event- Science at the Movies. Topic: Do we use 10% of a brain and can we drug ourselves smart? February 2018.

Presenter for the Manchester branch of Pint of Science, an international science outreach event. Topic: Why do we get old? Ageing, Alzheimer's and Animal Models. January 2018.

Presenter for the Manchester branch of Pint of Science, an international science outreach event. Topic: The coast of England, radioactive brains, bleach and other Alzheimer's disease related things. May 2015.

Speaker and experiment demonstrator for the Pivots of Change outreach programme. Class and assembly presentations at St. Luke RC Primary School and St. Ambrose Barlow RC High School. Topic: The history and future of science. February 2015.

University of Otago Christchurch Seminar Series. Topic: Cannabinoids and brain damage. June 2012.

Interviewed by Rebecca Rutherford for Critic Magazine on cannabinoid research. May 2012. http://www.critic.co.nz/features/article/1924/jack-rivers

Interviewed on Radio One on my research. Topic: Cannabinoids as a therapeutic target. September 2011. http://r1.co.nz/podcasts.php.

Creator of science blog websites www.jackauty.com established January 2012 and www.mereconjecture.com established January 2016.

Collaborations

Dr. Alison Mather. Quadram Institute Bioscience, Norwich Research Park, Norwich, UK. Epidemiological research into the effects of incidental NSAID use and cognitive decline in Alzheimer's and aged individuals.

Prof. Tamara Galloway. Chair in Ecotoxicology, College of Life and Environmental Sciences, University of Exeter, UK. Understanding the effects of microplastics on innate immune function.

Prof. Maria Glymour. Department of Epidemiology and Biostatistics, University of California, San Francisco, California, USA. Epidemiological research into the effects of incidental NSAID use and cognitive decline in Alzheimer's and aged individuals.

Dr. Ruth Peters. Neuroscience Research Australia, University of New South Wales, Barker Street, Sydney, New South Wales 2031, Australia. Epidemiological research into the effects of incidental NSAID use and cognitive decline in Alzheimer's and aged individuals.

Prof. Louise Serpel. Dementia Research Group, Sussex Neuroscience, School of Life Sciences, University of Sussex, Brighton, UK. Understanding the effects of APOE4 complexes on microglia inflammasome activation.

Dr. Bridie Allan. Department of Marine Science, University Otago, Dunedin, New Zealand. Understanding the effects of microplastics on innate immune function.

Conferences

Rivers-Auty J, Mather AE, Peters R, Lawrence CB, Brough D. 2018. [Poster Presentation] Use of common pain relieving drugs correlates with altered progression of Alzheimer's disease and mild cognitive impairment. Alzheimer's & Dementia: The Journal of the Alzheimer's Association 14 (7):P1337-P1338

Rivers-Auty J, White C, Beattie J, Brough D, and Lawrence C. 2017. [Poster Presentation] Zinc deficiency accelerates Alzheimer's phenotype in the APP/PS1 mouse model. Alzheimer's Research UK Conference. Aberdeen, UK.

Rivers-Auty J, Daniels MJ, White C, Beattie J, Lawrence C, Brough D. 2016. [Oral Presentation] Secretion of the pro-inflammatory cytokines interleukin-1β and its contribution to inflammation and Alzheimer's disease. Unconventional protein and membrane traffic conference. Lecce, Italy.

Rivers-Auty J, White C, Beattie J, Brough D, and Lawrence C. 2016. [Oral Presentation] The role of zinc deficiency in NLRP3 regulated neuroinflammation in a mouse model of Alzheimer's disease. Alzheimer's Research UK Conference. Manchester, UK.

Rivers-Auty J, White C, Beattie J, Brough D, and Lawrence C. 2015. [Oral Presentation] Why Alzheimer's disease research is important to me. Alzheimer's Society Conference. Manchester, UK.

Rivers-Auty J. 2014. [Oral Presentation] The blind leading the blind. Animal facility staff and researchers working together to reduce bias in animal research. ANZLAA and ANZCAART. New Zealand.

Rivers JR and Ashton JC. 2011. [Poster Presentation] Cannabinoid receptor type II as a target for neuroprotection following hypoxia ischemia. Or is it an active vehicle in the driving seat? AWCBR. New Zealand.

Rivers JR and Ashton JC. 2010. [Poster Presentation] Effect of the cannabinoid CBII receptor partial agonist GW 405833 on neurological damage caused by hypoxia ischemia in rats. WCBR. Denver, USA.

Rivers JR and Ashton JC. 2009. [Oral Presentation] A new look at an old model: Analysing predicting factors of infarct size in a rat perinatal asphyxia model. AWCBR. New Zealand.

Rivers JR and Ashton JC. 2009. [Oral Presentation] Hypoxia ischemia and the selective protection of the penumbral striatum of the CBII partial agonist GW405833. ASCEPT. New Zealand.

Rivers JR, Sutherland BA, Brownjohn PW, Glass M, Aston JC. 2008. [Oral Presentation] Preliminary investigations into the specificity of antibody probes raised against the cannabinoid CBII receptor. ASCEPT. New Zealand.

References

Dr. Catherine Lawrence
Primary supervisor during my postdoctoral fellowship, Division of Neuroscience & Experimental Psychology, Faculty of Biology, Medicine and Health, University of Manchester, UK.
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Email: catherine.lawrence@manchester.ac.uk

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Assoc. Prof. John Ashton
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