

Dr Catriona J. Cunningham

Research Fellow

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Employment

Research Fellow, University of Aberdeen: November 2019 –present

Supervisor: Dr Wenlong Huang

Project focussing on novel tissue engineering strategies for spinal cord injury repair.

Honorary Research Associate, University of Manchester: November 2019 – present

EPSRC Doctoral Prize Fellowship, University of Manchester: November 2018 –October 2019

Sponsor: Dr Catherine Lawrence

Project title: A tissue engineering strategy to maximise the therapeutic potential of exosomes for stroke

Education

PhD Regenerative Medicine, University of Manchester: April 2015 – September 2018

Supervisor: Professor Stuart Allan

Thesis title: Investigating the role of mesenchymal stem cell secretome in promoting recovery after ischaemic stroke.

MBChB Medicine, University of Aberdeen: September 2008 – June 2014

Distinction in first year for outstanding exam results and Community Course Essay Prize in third year

BSc (Hons) Neuroscience with Psychology, University of Aberdeen: September 2012 – June 2013

First class

Grants

EPSRC Doctoral Prize Fellowship: August 2018

Sole applicant, £41,742 (£15,490 consumables, £1,882 travel, £24,370 stipend) independent fellowship to research tissue engineering approaches to maximise the potential of extracellular vesicle therapies

Doctoral Academy Conference Support Fund (£500): July 2018

Wellcome Trust ISSF Public Engagement Grant: December 2017

Lead applicant, £430 to develop interactive activities to explain stroke research

UMI³ Proof of Principle Programme Funding: March 2017

Sole applicant, £5000 to explore mesenchymal stem cells as a therapy for stroke

Overseas Research Scholarship: June 2013

£4000 travel and living costs for 8 week summer research scholarship to Professor James Fox's group in the Division of Comparative Medicine, Massachusetts Institute of Technology

Awards

Scottish Universities Life Science Alliance (SULSA) Early Career Researcher Prize

Shortlisted under Understand and Treating Disease theme

University of Manchester Outstanding Contribution to Patient and Public Involvement and Engagement: July 2019

Lead of the Broken Brain Games team which was shortlisted and awarded highly commended

Cayman Chemicals Thesis Printing Sponsorship: March 2019 (\$200)

Doctoral Academy Graduate Society Conference Best Poster Presentation Prize: June 2018

University of Manchester Post-graduate Summer Research Showcase Short Film Award: July 2016

Made short film about my research journey and awarded best short film prize

Neuroscience Prize for Best Student: June 2013

Awarded after excellent academic achievement and successful prize interview

Publications

Cunningham, CJ, Wong, R, Barrington, J, Tamburrano, S, Pinteaux, E, Allan, SM. Systemic administration of mesenchymal stem cell-derived conditioned medium promotes recovery after cerebral ischaemia. *Stem Cell Research & Therapy*, 11(1), 32.

Thomas*, JM, **Cunningham***, CJ, Lawrence, CB, Pinteaux, E, Allan, SM. (2020). The therapeutic potential of extracellular vesicles in preclinical stroke models: a systematic review and meta-analysis. *BMJ Open Science*: in press. *contributed equally.

Haley, MJ, White, C, Roberts, D, O'Toole, K, **Cunningham, CJ**, Rivers-Auty, J, O'Boyle, C, Lane, C, Heaney, O, Allan, SM, Lawrence, CB. Stroke induces prolonged changes in lipid metabolism and body composition. *Translational Stroke Research*, [Epub ahead of print]. doi:10.1007/s12975-019-00763-2

Bolan*, F, Louca*, I, Heal, C, **Cunningham, CJ**, The potential of biomaterial-based approaches as therapies for stroke: a systematic review and meta-analysis of preclinical studies. *Frontiers in Neurology*, 10, 924. *contributed equally

Redondo-Castro, E, **Cunningham, CJ**, Miller, J, Cain, SA, Allan, SM and Pinteaux, E. (2018). Generation of Human Mesenchymal Stem Cell 3D Spheroids Using Low-binding Plates. *Bio-protocol* 8(16): e2968.

Cunningham, CJ, Redondo-Castro, E. and Allan, S. M. (2018) The Therapeutic Potential of the Mesenchymal Stem Cell Secretome in Ischaemic Stroke. *JCBFM*, 38(8), 1276-92.

Redondo-Castro, E, **Cunningham, CJ**, Miller, J, Brown, H, Allan, SM and Pinteaux, E. (2018). Changes in the secretome of tri-dimensional spheroid-cultured human mesenchymal stem cells in vitro by interleukin-1 priming. *Stem Cell Research & Therapy*, 9(1), 11.

Redondo-Castro, E, **Cunningham, C**, Miller, J, Martuscelli, L, Aoulad-Ali, S, Rothwell, NJ, Kielty, CM, Allan, SM and Pinteaux, E. (2017). Interleukin-1 primes human mesenchymal stem cells towards an anti-inflammatory and pro-trophic phenotype in vitro. *Stem Cell Research & Therapy*, 8(1), 79.

Hainsworth, AH, Allan, SM, Boltze, J, **Cunningham, C**, Farris, C, Head, E, Ihara, M, Isaacs, JD, Kalaria, RN, Lesnik Oberstein, SAMJ, Moss, MB, Nitzsche, B, Rosenberg, GA, Rutten, JW, Salkovic-Petrisic, M and Troen, AM (2017). Translational models for vascular cognitive impairment: a review including larger species. *BMC Medicine*, 15(1), 16.

Burns, M, Muthupalani, S, Ge, Z, Wang, TC, Bakthavatchalu, V, **Cunningham, C**, Ennis, K, Georgieff, M and Fox, JG (2015). Helicobacter pylori Infection Induces Anemia, Depletes Serum Iron Storage, and Alters Local Iron-Related and Adult Brain Gene Expression in Male INS-GAS Mice. *PLoS One*, 10(11), e0142630.

Research Experience

Research Fellow: November 2019 –present

Home Office personal license PIL A, B and C (mouse and rat)

Techniques: ex vivo spinal cord injury model, dorsal root ganglion and cortical neuron cultures, primary mixed glial culture, self-assembling peptide hydrogels, mesenchymal stem cell culture (2D and 3D)

EPSRC Doctoral Prize Fellowship: November 2018 –present

In vitro techniques: 3D cell culture, hydrogels, extracellular vesicle isolation, live cell imaging, imaging flow cytometry, Western blotting, protein fractionation

In vivo techniques: collagenase model of intracerebral haemorrhage in rat, rotarod, cylinder test, neurological score

Courses: Statistics for In Vivo and In Vitro Biologists: An Introduction to R, Developing Research Leaders

PhD Project: April 2015 – September 2018

In vivo techniques: surgery, burrowing behaviour, nest building, social interaction, open field, neurological scores, rotarod, elevated zero maze, novelty-suppressed feeding, novel object recognition, MRI, immunohistochemistry (paraffin and free-floating)

In vitro techniques: mesenchymal stem cell culture (2D and spheroids), co-cultures, ELISAs, immunohistochemistry, endothelial tube formation assay, scratch assay, live cell imaging

Overseas Research Scholarship to Massachusetts Institute of Technology: June – August 2013

Contributed to a project on iron deficiency in *H. pylori* infected INS-GAS mice and the effects on cognition. Presented to the department in MIT and at the Gastroenterology Research Symposium, University of Aberdeen.

Techniques: open field, elevated zero maze, DNA extraction from faecal samples, PCR, ELISAs

University of Aberdeen HOTSTART Programme: August – September 2012

Conducted a 6 week research project on the role of TWEAK in Parkinson's disease in the lab of Dr Peter Teismann finishing with a poster presentation evening.

Techniques: cryosectioning, Nissl staining, immunohistochemistry, stereological cell counting

University of Aberdeen HOTSTART Programme: July – August 2010

Completed an 8 week project on euglobulin clot lysis time with Professor Nuala Booth culminating in an oral and poster presentation.

Techniques: euglobulin clot lysis assay, ELISAs, SDS PAGE and Western blotting

Teaching Experience

University of Aberdeen: November 2019 – present

Supervision: co-supervising several honours students and a masters student conducting lab-based projects on stem cell-based therapies for spinal cord injury repair. Main supervisor of two students conducting systematic reviews for their honours year thesis.

Tutor on MBChB student selected component year 1 (ME2511)

Manchester Access Programme: 2016 – 2019

Tutor

Provided A-level students with guidance and feedback on biology assignments

Lab Supervision: 2015 – 2019

Co-supervised a PhD student, ERASMUS masters student and an undergraduate project student. Trained a number of other students in tissue culture techniques and behavioural testing.

Graduate Teaching Assistant: September 2015 – October 2018

Demonstrated on undergraduate medicine practicals including blood pressure and spirometry

External Duties

Editorial Board member CNS Neuroscience & Therapeutics: 2020 - present

Peer Review: January 2019 - present

Peer reviewed for journals including BMJ Open Science, JoVE Frontiers in Neurology, and CNS Neuroscience & Therapeutics

Conference Chairing

Local/national: Doctoral Academy Graduate Society Conference 2019, 4th UK Preclinical Stroke Symposium 2019

International: 10th International Symposium on Neuroprotection and Neurorepair, TERMIS European Chapter Meeting 2019

Conference Organisation

Organising committee for 4th UK Preclinical Stroke Symposium 2019, University of Manchester

Invited Speaker

Mercia Stem Cell Alliance Meeting 2019, University of Chester. Talk title: Harnessing the role of the MSC secretome as a therapy for stroke

University of Manchester Pathways Event 2019. Invited panellist for session entitled “Starting to climb the academic ladder”

Alzheimer’s Research UK North West Network Early Careers Conference 2019, University of Manchester. Talk title: Surviving the PhD examination process.

Public Engagement

Extensive experience of running table top activities at events including the University of Manchester Community Festival and Brain Box 2016 (Manchester Town Hall)

STEMNET Ambassador: April 2015 – present

Events include Café Scientifique on ethics of embryonic stem cells and Fun Palaces at Oldham Library

Blogging and Video Making: August 2017 – present

Run my own blog (www.sciencecat.co.uk) and produce short science communication videos for both my channel and the CDT Regenerative Medicine YouTube channel

Other Interests

Cub scout leader: April 2016 – Present

Responsibilities include running and planning games, activities and camps
Wood badge (training award) and nights away permit achieved June 2018

Selected Conferences

Bolan, F, Louca, I, Heal, C and **Cunningham, CJ** (2019). [oral presentation] The potential of biomaterial-based approaches as therapies for ischaemic stroke: a systematic review and meta-analysis of preclinical studies. 4th UK Preclinical Stroke Symposium, Manchester, UK.

Cunningham, CJ, Wong, R, Pinteaux, E and Allan, SM (2019). [oral presentation]. Harnessing the mesenchymal stem cell secretome as a therapy for ischaemic stroke. TERMIS European Chapter Meeting 2019. Rhodes, Greece.

Bolan, F, Louca, I, Heal, C and **Cunningham, CJ** (2019). [poster presentation] The potential of biomaterial-based approaches as therapies for ischaemic stroke: a systematic review of preclinical studies. TERMIS European Chapter Meeting 2019. Rhodes, Greece.

Cunningham, CJ, Wong, R, Redondo-Castro, E, Pinteaux, E and Allan, SM (2018). [Oral Presentation]. Investigating the role of the mesenchymal stem cell secretome in promoting repair after ischaemic stroke. 10th International Symposium on Neuroprotection and Neurorepair. Dresden, Germany.

Cunningham, C. J., Wong, R., Redondo-Castro, Pinteaux, E. and Allan, S. M. (2018). [Oral and Poster Presentation]. Investigating the role of the mesenchymal stem cell secretome in promoting repair after ischaemic stroke. EPSRC and MRC Centres for Doctoral Training in Tissue Engineering and Regenerative Medicine Joint Conference, Keele, UK.

Cunningham, CJ, Redondo-Castro, E, Wong, R, Martuscelli, L, Pinteaux, E and Allan, SM (2017). [Oral Presentation]. Enhancing the anti-inflammatory properties of mesenchymal stem cells as a therapy for stroke. 3rd UK Preclinical Stroke Symposium, Nottingham, UK.

Redondo-Castro, E, **Cunningham, CJ**, Martuscelli, L, Pinteaux, E and Allan, SM (2017). [Poster Presentation]. Enhancing the anti-inflammatory properties of mesenchymal stem cells as a therapy for stroke. BRAIN, Berlin, Germany.