Ciaran MURPHY-ROYAL

*Curriculum Vitae*

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| Université de Montréal,  Assistant Professor, Dept. of Neuroscience  CRCHUM  Office - R08.440  900 Rue Saint Denis,  Montreal, QC  Canada | Email:  Phone:  Residency  Status:  Languages: | [ciaran.murphy-royal@umontreal.ca](mailto:ciaran.murphy-royal@umontreal.ca)  +1 514 890 8000 ext 12731 (office)  +1 587 891 3033 (cell)  Irish (EU citizen)  Canadian permanent resident  English  French |

**Career History**

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| **June 2020 - present** | **Assistant Professor, Department of Neuroscience, Université de Montréal**  Lab at the CRCHUM, Montréal |
| **Oct. 2014 – May 2020** | **Postdoctoral Fellow at the University of Calgary**  Working in Dr. Jaideep Bains’ and Dr. Grant Gordon’s lab  *The role of astrocytes in the central response to stress* |
| **April 2017** | **Collaboration at University of California Los Angeles (UCLA)** in Dr. Baljit Khakh’s lab to carry out astrocyte-specific RNA sequencing |
| **Aug. 2010 – June 2014** | **PhD at Neurocentre Magendie, INSERM, Université de Bordeaux, France**  PhD candidate between Dr. Stéphane Oliet’s and Dr. Laurent Groc’s labs.  “*Surface trafficking of the astrocytic glutamate transporter GLT-1 shapes synaptic transmission.”* |
| **April 2013** | **Collaboration at University of Ljubljana, Slovenia** in Dr. Robert Zorec’s lab to learn pure astrocyte culture technique and imaging of single vesicle endo/exocytosis. |
| **2010** | **Undergraduate at Trinity College Institute of Neuroscience, Dublin, Ireland**  Final year of Honors Bachelor degree in Prof. Marina Lynch lab.  *“Neuroinflammatory effects of HMGB-1 in the hippocampus”* |
| **2009** | **Summer Intern at Trinity College Institute of Neuroscience, Dublin, Ireland**  Summer internship in Prof. Marina Lynch lab. |

**Education**

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| **Oct. 2014 – June 2020** | **Postdoctoral Fellow** Neurobiology of Stress  *“Bioenergetic control of synaptic plasticity by astrocytes during acute stress.”* | **Dr. Jaideep Bains &**  **Dr. Grant Gordon**  University of Calgary, Canada |
| **Aug. 2010 – June 2014** | **PhD** in Neuroscience  “*Surface diffusion of the astrocytic glutamate transporter GLT-1 shapes synaptic transmission.”* | **Dr. Stéphane Oliet &**  **Dr. Laurent Groc**,  University of Bordeaux, France. |
| **Sept. 2006 – June 2010** | **B.A. (Science) Honors** in Human Physiology  *“Neuroinflammatory effects of HMGB-1 in the hippocampus.”* | **Dr. Marina Lynch**  Dept. of Physiology  Trinity College Dublin, Ireland. |

**Research Publications**

1. Brandão A, Adedipe I, Murphy-Royal C. The neuroglial links between diabetes and mental health disorders. **In Preparation**. Invited Review in Frontiers in Endocrinology.
2. Depauuw-Holt L, Spray D, Murphy-Royal C\*, Stout R\*. *Gap junctions: Key metabolic supply routes of the neuron-glia unit.* **In Preparation** Invited Review Frontiers in Neuroscience. \*shared senior author
3. Institoris A, Murphy-Royal C, Tarantini S, Yabluchanskiy A, Haidey J., Csiszar A, Ungvari Z, Gordon G. *Whole-brain irradiation impairs astrocytic calcium signaling but preserves astrocyte-astrocyte coupling.* **Submitted Geroscience**.
4. Lau B, Murphy-Royal C, Kaur M, Qiao M, Gordon G, Bains S, Borgland S. *Diet-induced astrocytic modulation of endocannabinoid-mediated plasticity within the orbitofrontal cortex*. **Under Review Cell Reports.** Bioarxiv. doi: 10.1101/2020.05.01.073205
5. Murphy-Royal C, Johnston AD, Boyce AK, Diaz-Castro B, Zhang O, Institoris I, Peringod G, Thompson R, Khakh BS, Bains JS, Gordon GR. *Stress gates an astrocytic energy reservoir to impair synaptic plasticity.* **Nature Communications**. (2020) doi: 10.1038/s41467-020-15778-9
6. Murphy-Royal C, Gordon GR, Bains JS. Astrocytic adaptations to stress – implicating glia in the central stress response. **Glia** (2019) doi: 10.1002/glia.23610
7. Crosby K, Murphy-Royal C, Wilson SA, Gordon GR, Bains JS, Pittman Q. Cholecystokinin switches the plasticity of GABA synapses in the dorsomedial hypothalamus via astrocytic ATP release. **Journal of Neuroscience** Aug 14, 0569-18(2018) doi: 10.1523/JNEUROSCI.0569-18.2018
8. Murphy-Royal C & Gordon GR. *Is the threshold for astrocyte activation central to the Astrocyte-Neuron Lactate Shuttle?* **Journal of Physiology** (2018) link: goo.gl/4VFk55
9. Mehina E, Murphy-Royal C, Gordon GR. *Steady-state free Ca2+ in astrocytes is decreased by experience and impacts arteriole tone*. **Journal of Neuroscience**. Aug 23, 37(34), 8150-8165 (2017) doi: 10.1523/JNEUROSCI.0239-17.2017
10. Murphy-Royal C, Dupuis JP, Groc L, Oliet SHR. *Astroglial glutamate transporters in the brain: Regulating neurotransmitter homeostasis and synaptic transmission*. **Journal of Neuroscience Research** Nov, 95(11), 2140-2151 (2017) doi: 10.1002/jnr.24029
11. Ciapelloni S\*, Murphy-Royal C\*, Dupuis JP, Oliet SHR, Groc L. *Dynamics of surface neurotransmitter receptors and transporters in glial cells: single molecule insights*. **Cell Calcium** Nov, 67, 46-52(2017) doi: 10.1016/j.ceca.2017.08.009 \*equal contribution

# Murphy-Royal C, Dupuis JP, Varela JA, Pinson B, Baufreton J, Groc L, Oliet SHR. Surface diffusion of astrocytic glutamate transporters shapes synaptic transmission. **Nature Neuroscience** Jan 12, 18, 219-226 (2015) doi: 10.1038/nn.39901

* Cover image
* *News & Views* by Dr. Robert Edwards, UCSF – *Mobile binding sites regulate neurotransmitter clearance. Nature Neuroscience 18 166-168 (2015) doi: 10.1039/nn.3931*

# Costello DA, Watson MB, Cowley TR, Murphy N, Murphy Royal C, Garlanda C, Lynch MA. Interleukin-1alpha and HMGB1 mediate hippocampal dysfunction in SIGIRR-deficient mice. **Journal of Neuroscience** Mar 9;31(10):3871-9 (2011) doi: 10.1523/Jneurosci.6676-10.2011

**Funding**

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| **June 2020 – June 2023** | **CHUM Foundation**  Startup funds from private donation to my lab to study the link between astrocytes and development of anxio-depressive disorders | | | $1,000,000 cad | | |
| **Jan. 2020 – Jan 2022** | **NARSAD Young Investigator Award**  Independent fellowship to study the role for astrocytes in chronic stress disorders | | | $70,000 usd | | |
| **Apr. 2017 – June 2020** | **U. Calgary Brain and Mental Health Research fund** to Dr. Jaideep Bains’ lab from University of Calgary based on my postdoctoral project | | | $220,000 cad | | |
| **Apr. 2016 – Apr. 2019** | **Alberta Innovates Health Solutions**  3-year Postdoctoral fellowship | | | $150,000 cad  + $5,000 annual expenses | | |
| **Jul. 2015 – Jul. 2017** | **Campus Alberta Neuroscience**  2-year Postdoctoral fellowship | | | $50,000 cad  + $8,000 annual expenses | | |
| **May 2015** | **Marie Curie Alumni Association**  Micro Travel Grant | | | €400 | | |
| **Nov. 2013 – Apr. 2014** | **Fondation de la Recherche Médicale**  Salary award for a 9-month PhD extension from private funding agency | | | €14,000 | | |
| **Aug. 2010- Aug. 2013** | **Marie Curie PhD Fellowship**  3-year PhD fellowship from the European Union under the *“Edu-Glia”* program. AEuropean network to study Neuron-Glia interactions | | | €104,000  + €12,000 annual expenses | | |
| **June -Aug. 2009** | **Science Foundation Ireland undergraduate research experience**  Salary award to fund summer internship in Dr. Marina Lynch’s lab. | | | €2000 for 8 weeks | | |
| ***Under Review*** | ***Arthritis Society*** *Strategic Operating Grant*  *Co-PI on team grant with Dr. Jo Anne Stratton (McGill) and Dr. Robert Bonin (UofT)* | | | *3 years, $300,000 cad total* | | |

**Awards & Honours**

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| **May 2018** | **Best oral presentation**  6th Neurometabolic Club meeting | Vancouver,  Canada |
| **May 2014** | **Best oral presentation**  7th International Young Scientist Symposium  European Institute of Chemistry & Biology | Bordeaux,  France |
| **Oct. 2013** | **Best Poster prize**  Neurocentre Magendie annual meeting | Bordeaux,  France |
| **Aug. 2011** | **Best Poster prize**  International Society for Neurochemistry meeting  “Glial cells in (patho)physiology” | Ljubljana,  Slovenia |

**Teaching Experience**

1. Lecturer. Undergraduate Neuroscience program – Astrocytes and the Tripartite Synapse. University of Calgary (2019).
2. Lecturer. Neuro 1 – Astrocytes and the Tripartite Synapse. University of Calgary Graduate program (2018).
3. Lecturer. Neuro 0 – Introduction to cell signalling and pharmacology. University of Calgary REALISE program (2018).
4. Lecturer. Seminar preparation for graduate students (2017).
5. Instructor. Hands-on demonstration of electrophysiology & two-photon imaging for graduate students in Neuroscience at U. Calgary and U. Lethbridge (2014-2020).
6. Honors student supervision 2019/2020 – Ife Adedipe, undergraduate student enrolled in University of Calgary Bachelors of Neuroscience program.
7. Summer student supervision

* 2015 Aaron Lanz (University of Calgary). Markin Fellowship awarded. *Characterization stress effects on astroglial glutamate transporters.* Aaron was a Master’s student in Jaideep Bains/Grant Gordon labs, and has begun graduate studies at NYU.
* 2019 Oliver Zhang (Queens University). Alberta Innovates fellowship awarded. *Contribution of astrocytes to stress-induced memory impairment in vivo*.

1. I have been responsible for hands-on lab training of new trainees, particularly those wishing to learn two-photon imagining with patch-clamp electrophysiology.

**Oral Presentations**

1. Neuroscience for Mental Health Seminar Series, Douglas Research Centre, Montréal, Canada. *Astrocytic regulation of the synaptic response to stress*. 23rd November 2020.
2. Seminar at McGill University Montreal Health Centre Research Institute, Montréal, Canada. 16th January 2020.
3. Seminar at CR-CHUM Université de Montréal, Faculté de Médicine, Montréal, Canada. *Stress, astrocytes, and brain bioenergetics*. 20th June 2019.
4. Seminar at Université de Montréal - Faculté de Médicine Dentaire/Département de Neurosciences, Montréal, Canada. *Experience-dependent astrocyte plasticity regulates neuronal circuitry.* 28th March 2019.
5. Seminar (by Skype), University of Bristol, UK. *Stress-induced functional and structural plasticity of astrocytes regulates cortical LTP*. 21st March 2019.
6. Gordon Research Seminar on Glial biology: Functional Interactions Among Glia and Neurons. Ventura, CA, USA. *Bioenergetic control of synaptic plasticity by astrocytes during acute stress*. 2nd March 2019.
7. Seminar at McGill University Health Centre Research Institute, Division of Endocrinology and Metabolism, Royal Victoria Hospital, Montreal, Canada. *Astrocytes regulate the central response to stress by limiting energy availability.* 15th August 2018.
8. Seminar at McGill Centre for Research in Neuroscience, Montreal General Hospital, McGill University, Montreal, Canada. *The role of astrocytes in the central stress response.* 13th August 2018.
9. Neurobiology of Stress, Banff, Canada. *Stress-induced astrocyte dysfunction limits synaptic plasticity.* 8th June 2018.
10. Canadian Neurometabolic Club, Vancouver, Canada. *Astrocyte dysfunction underlies the stress-induced impairment in synaptic plasticity.* 13th May 2018.
11. Seminar at L’Institut National de la Recherche Agronomique (INRA), Université de Bordeaux, France. *Stress-induced impairment of astrocyte function impairs synaptic plasticity.* 4th December 2017.
12. Young Scientist Symposium, European Institute of Chemistry & Biology, Bordeaux, France. *Diffusion of astrocytic glutamate transporters shapes synaptic transmission.* 20th May 2014.
13. Final Edu-GLIA meeting, Leipzig, Germany. *Surface diffusion of GLT-1 shapes synaptic transmission.* 1st July 2013.
14. Annual doctoral school meeting, Arcachon, France. *Lateral diffusion of astrocytic GLT-1 shapes the timecourse of synaptic glutamate.* 10th April 2013.
15. 11th Synapse day meeting, Bordeaux, France. *GLT-1 surface mobility controls the timecourse of synaptic glutamate.* 29th March 2013.
16. NeuroCentre Magendie annual symposium, Bordeaux, France. *Surface diffusion of astrocytic GLT-1 impacts synaptic transmission.* 14th September 2012.
17. Edu-GLIA meeting, Margaux, France. *Activity-dependent surface mobility of astrocytic glutamate transporters.* 25-27th August 2012.
18. Edu-GLIA mid-term review meeting, Lake Bled, Slovenia. *Surface dynamics of the astroglial glutamate transporter GLT-1.* 24-27th August 2011.
19. Edu-GLIA meeting, Saro, Sweden. *Using single-particle trafficking techniques to reveal complexity in astrocyte function.* 10-11th June 2011.

**Outreach and Knowledge Transfer**

1. Scientific advisor for the Convergence Initiative. 2020-present – www.convergenceinitiative.org
2. Invited speaker at webinar – ‘Starting a lab during the 2020 covid-19 pandemic’ organized by Cell Press. Aug. 2020
3. Editor and writer for HeadStuff online magazine’s science section. 2014-2015. www.headstuff.org

**Conference Poster Presentations**

1. Murphy-Royal C, Boyce AK, Diaz-Castro B, Khakh BS, Thompson RJ, Bains JS, Gordon GR. *Stress gates an astrocytic energy reservoir to impair cortical synaptic plasticity.* Abstract and poster at the **Hotchkiss Brain Institute Research day**,Calgary, Canada, May 2019
2. Murphy-Royal C, Boyce AK, Diaz-Castro B, Khakh BS, Thompson RJ, Bains JS, Gordon GR. *Stress gates an astrocytic energy reservoir to impair cortical synaptic plasticity.* Abstract and poster at the **Canadian Association for Neuroscience**,Toronto, Canada, May 2019
3. Murphy-Royal C, Boyce AK, Diaz-Castro B, Khakh BS, Thompson RJ, Bains JS, Gordon GR. *Bioenergetic control of synaptic plasticity by astrocytes following acute stress.* Abstract and poster at the **Gordon Research Conference on Glia,** Ventura, USA, March 2019
4. Lau BK, Murphy-Royal C, Gordon GR, Bains JS, Borgland SL. *Modulation of the endocannabinoid-mediated plasticity within the orbitofrontal cortex by a palatable diet.* Abstract and poster at the **Society for Neuroscience**, San Diego, USA, November 2018
5. Murphy-Royal C, Diaz-Castro B, Khakh BS, Bains JS, Gordon GR. *Astrocytes mediate the central response to stress by limiting synaptic energy availability.* Abstract and poster at the **Cold Spring Harbor Glia Conference,** New York, USA, July 2018
6. Murphy-Royal C, Diaz-Castro B, Khakh BS, Bains JS, Gordon GR. *Astrocyte dysfunction underlies stress-induced impairments in synaptic plasticity*. Abstract and poster at the **Canadian Association for Neuroscience**, Vancouver, Canada, May 2018
7. Murphy-Royal C, Gordon GR, Bains JS. *Stress-induced functional and structural plasticity in astrocytes.* Abstract and poster at the **Gordon Research Conference on Glia**, Ventura, USA, March 2017
8. Murphy-Royal C, Gordon GR, Bains JS. *Stress-induced functional and structural plasticity in Astrocytes*. Abstract and poster at the **Society for Neuroscience**, San Diego, USA, 12-16th November 2016
9. Murphy-Royal C, Bains JS, *Glutamate transporters control GABA transmission in stress circuits.* Poster at the **Gordon Research Conference on Inhibition**, Lewiston, USA, 16-21st August 2015
10. Murphy-Royal C, Dupuis J, Varela J, Pinson B, Baufreton J, Groc L, Oliet S, *Surface diffusion of astrocytic GLT-1 shapes synaptic transmission*. Poster at **Neurocentre Magendie Annual meeting**, Bordeaux, France, 24-25th Oct 2013
11. Murphy-Royal C, Dupuis J, Pinson B, Baufreton J, Groc L, Oliet S, *Contribution of Astroglial GLT-1 surface dynamics to glutamatergic synaptic transmission*. Abstract and poster at **EuroGlia**, Berlin, Germany, 3-6th July 2013
12. Murphy-Royal C, Dupuis J, Pinson B, Baufreton J, Groc L, Oliet S, *Contribution of Astroglial GLT-1 surface dynamics to glutamatergic synaptic transmission*. Abstract and poster at the **French Society for Neuroscience**, Lyon, France, 21-24th May 2013
13. Murphy-Royal C, Dupuis J, Pinson B, Baufreton J, Groc L, Oliet S, *Surface dynamics of the astrocytic glutamate transporter GLT-1*. Abstract and poster at the **Gordon Research Conference on Glia**, Ventura, USA, 3-8th March 2013
14. Murphy-Royal C, Dupuis J, Pinson B, Baufreton J, Groc L, Oliet S, *Surface dynamics of the astrocytic glutamate transporter GLT-1*. Abstract and poster at the **Society for Neuroscience**, New Orleans, USA, 13-17th October 2012
15. Murphy-Royal C, Groc L, Oliet SHR*. Surface trafficking of the astrocytic glutamate transporter GLT-1.* Abstract and poster at the **12th Doctoral school meeting of University of Bordeaux**, Arcachon, France, 28th March 2012
16. Murphy-Royal C, Groc L, Oliet SHR*. Surface trafficking of the astrocytic glutamate transporter GLT-1.* Abstract and poster at **International Society of Neurochemistry Satellite meeting ‘Glial cells in (patho)physiology’**, Ljubljana, Slovenia, 24-27th August 2011
17. Murphy-Royal C, Groc L, Oliet SHR*. Surface trafficking of the astrocytic glutamate transporter GLT-1.* Abstract and poster at 10th meeting of the **French Society for Neuroscience**, Marseille, France, 24-27th May 2011

**Trainees**

Summer students

1. Aaron Lanz, U Calgary. Awarded Markin research scholarship. Current PhD student at NYU, New York.
2. Oliver Zhang, U Calgary. Awarded Alberta Innovates research scholarship. Current MSc student, U Calgary

Honors students

1. Ifeoluwa Adedipe, U Calgary. Current MSc student in Neuroscience, Université de Montréal.

Graduate students

1. Ifeoluwa Adedipe, U Montreal. Master’s program in Neuroscience (starting winter 2020/21)
2. Lewis Depauuw-Holt, U Montreal. Doctorate program in Neuroscience (starting winter 2020/21)

Postdoctoral fellows

1. Arthur Brandão, U Montreal, CRCHUM, Dept. of Neuroscience (Sept. 2020)

**Peer Review Activities**

1. Frontiers in Behavioural Neuroscience – Reviewing Editor
2. Frontiers in Cellular Neuroscience – Reviewing Editor
3. Biological Psychiatry – reviewer
4. Journal of Neuroscience Research – reviewer
5. Neuropharmacology – reviewer
6. Cell Reports – reviewer
7. US Army Research Office – International grant application review
8. Internal peer review for graduate student CIHR & NSERC fellowships at University of Calgary
9. Committee member for Honors student’s research projects

**Student Committees**

1. Santhosh Nathan, Dr. Grant Gordon lab, University of Calgary. Undergraduate honors thesis committee (MDSC 508) 2019.
2. Matt Machan, Dr. Chantel Debert lab, University of Calgary. University of Calgary. Undergraduate honors thesis committee (MDSC 508) 2019.
3. Raven Yip, Dr. Jong Rho lab, University of Calgary. Undergraduate honors thesis committee (MDSC 508) 2019.
4. David Lau, Dr. Stephanie Fulton lab, CRCHUM Université de Montréal. PhD thesis committee 2020-present