

RESEARCH ASSISTANT IN NEUROIMMUNOLOGY

Location

Laval University, Quebec City, Canada

Research projects

1) Regulatory B cells in a new model of multiple sclerosis

B cells contribute to multiple sclerosis (MS); depleting them improves clinical outcomes. However, current drugs deplete most B cells, including regulatory B cells (Bregs) with beneficial anti-inflammatory properties. Studying Bregs could lead to more specific and safer therapies. Recently, we found a population of Bregs in a new mouse model of MS. In this project, our goal is to determine the nature, anatomical distribution and function of these Bregs. This project will help not only to understand Bregs, but also to identify new biomarkers and therapeutic strategies for autoimmune diseases like MS.

2) A novel dendritic cell-specific protein in demyelinating autoimmune diseases

Dendritic cells (DCs) orchestrate the activity of T cells, which play a central role in multiple sclerosis (MS). A major challenge in the field is to discover DC-specific molecules that would allow to identify and target DCs with accuracy and that would help to explain their unique properties. We have recently found a novel cell-surface protein of unknown function that is exclusively produced by DCs in a mouse model of MS. The goal of this project is to clarify the function of that protein, while exploiting it as a tool to better understand DCs and autoimmune demyelination. This project will provide fundamental, applicable and patentable knowledge about that protein as well as valuable tools for future studies.

Job description, tasks and responsibilities

As part of the above projects, the research assistant will:

- 1) Work under minimal supervision in areas such as experimental data collection, result analysis, evaluation of scientific literature;
- 2) Prepare and perform research protocols;
- 3) Set up and administer research tools;
- 4) Develop new methods;
- 5) Supervise the laboratory work of students;
- 6) Perform bibliographic searches on projects, methods and tools;
- 7) Perform administrative tasks;
- 8) Contribute to the writing of scientific articles and grant applications.

Requirements

- 1) Master's degree in molecular biology, immunology, neuroscience or a related field;
- 2) Advanced knowledge of the nervous and immune systems;
- 3) Sense of organization, great autonomy and ability to work in a team;
- 4) Master many of the following techniques:
 - Recombinant DNA technology (molecular biology)
 - Gene editing by CRISPR-Cas9
 - Flow cytometry
 - Immunohistochemistry/immunofluorescence
 - Confocal microscopy
 - Mouse manipulations (e.g. injection, tissue sampling, surgery)
 - ELISA
 - Cell culture

How to apply?

Submit your CV, academic records and motivation letter by e-mail to:

Luc Vallières, Ph.D., Professor

CHU de Québec – Université Laval, 2705 boulevard Laurier, Québec, Canada, G1V 4G2

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More information

To learn more about our organization and city, please visit the following sites:

- Research center: <http://www.crchuq.ca/en>
- Laval University: <http://www2.ulaval.ca/en/home.html>
- Quebec City: <http://www.ville.quebec.qc.ca/en/index.aspx>

Selected publications

- 2017 Hawkins RFW, Patenaude A, Dumas A, Jain R, Tesfagiorgis Y, Kerfoot S, Matsui T, Gunzer M, Poubelle PE, Larochelle C, Pelletier M, Vallières L. ICAM1+ neutrophils promote chronic inflammation via ASPRV1 in B cell-dependent autoimmune encephalomyelitis. *JCI Insight*. 2:96882.
- 2017 Casserly CS, Nantes JC, Whittaker Hawkins RF, Vallières L. Neutrophil perversion in demyelinating autoimmune diseases: Mechanisms to medicine. *Autoimmun Rev*. 16:294–307.
- 2015 Bozoyan L, Dumas A, Patenaude A, Vallières L. Interleukin-36 γ is expressed by neutrophils and can activate microglia, but has no role in experimental autoimmune encephalomyelitis. *J Neuroinflammation*. 12:173.
- 2014 Dumas A, Amiable N, de Rivero Vaccari JP, Chae JJ, Keane RW, Lacroix S, Vallières L. The inflammasome pyrin contributes to pertussis toxin-induced IL-1 β synthesis, neutrophil intravascular crawling and autoimmune encephalomyelitis. *PLoS Pathog*. 10:e1004150.

- 2012 Roy M, Richard JF, Dumas A, Vallières L. CXCL1 can be regulated by IL-6 and promotes granulocyte adhesion to brain capillaries during bacterial toxin exposure and encephalomyelitis. *J Neuroinflammation*. 9:18.
- 2011 Richard JF, Roy M, Audoy-Remus J, Tremblay P, Vallières L. Crawling phagocytes recruited in the brain vasculature after pertussis toxin exposure through IL6, ICAM1, and ITGαM. *Brain Pathol*. 21:661–671.
- 2008 Audoy-Remus J, Richard JF, Soulet D, Zhou H, Kubes P, Vallières L. Rod-Shaped monocytes patrol the brain vasculature and give rise to perivascular macrophages under the influence of proinflammatory cytokines and angiopoietin-2. *J Neurosci*. 28:10187–10199.
- 2003 Vallières L, Sawchenko PE. Bone marrow-derived cells that populate the adult mouse brain preserve their hematopoietic identity. *J Neurosci*. 23:5197–5207.