BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Yamina A. Berchiche	Postdoctoral fellow
eRA COMMONS USER NAME (credential, e.g., agency login) BER	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of Montreal, Qc, Canada	B.Sc	06/03	Biochemistry
University of Montreal, Qc, Canada	M.Sc	03/06	Biochemistry
University of Montreal, Qc, Canada	Ph.D	05/11	Biochemistry

A. Personal Statement:

My graduate studies focused on structure/function relationships of chemokine receptors CXCR4,CXCR7 and CXCR2, members of the heptahelical transmembrane GPCRs.To portray and better understand the molecular pharmacology of these valuable drug targets, I developed expertise in quantitative Bioluminescence Resonance Energy Transfer (BRET) in live cells during collaboration with Dr Michel Bouvier's team at the University of Montreal in 2004. Our finding were published **Journal of Biological Chemistry** in March 2005. Moreover, using BRET I monitored ligand effects in different conformational and functional readouts. Our results on CXCR4 were published in the **Journal of Biological Chemistry** in 2007. The work on CXCR7 was published in the journal **Molecular Pharmacology** in 2009, and our latest findings on CCR2 and its 7 natural ligands were accepted for publication in November 2010 in the journal **Molecular Pharmacology**.

I also had the chance to get involved in different collaborations, among others with Dr Brakier-Gingras at the department of biochemistry at the University of Montreal, and with Dr. Galipeau from McGill University. These efforts led to coauthorships in the journal **Virology** (2005) and **Journal of Immunology** (2009).

Besides my training, from 2004 to 2005 I volunteered at the Sainte-Justine's Hospital, a paediatric hospital. My role consisted in playing with the children so they can, even for a moment, forget about their illness. I also participated as a speaker (2003-2008), in meetings with high school students to promote higher education. These conferences are part of a program sponsored by the University of Montreal (SEUR, Sensibilisation aux Études Universitaires et à la Recherche). I was an invited speaker in 2006 at Collège Jean-De-Bréboeuf and in 2009 at Collège Marie-De-France where I had the opportunity to meet with high school students interested in a scientific career. In 2008, I also attended the workshop organized by the Canadian Institutes of Health Research (CIHR)- Synapse youth connection program, intended to acquire better skills to promote science among young students.

Moreover, I actively participated in the scientific meetings of the immunology and virology axis of Sainte-Justine Hospital's research centre 2003-2010. I also volunteered at the 12th International Congress of Immunology in 2004 and by doing I had the opportunity to assist to most of the conferences. In addition, I was an active member of the research centre student committee representing the students of the immunology and virology axis from 2005 to 2007.

Furthermore, I also supervised 3 undergraduate summer students and I trained 3 graduate students and 2 postdoctoral fellows by sharing my BRET technology expertise. I also taught third year undergraduate students at the department of microbiology of the University of Montreal as part of the lesson on chemotactic cytokines (MCB3964- 2006 to 2010). I also taught first year undergraduate students at the biochemistry department in their first laboratory course (BCM1521-Winter 2009) and I tutored third year undergraduate students during their molecular physiology course for 2 consecutive years (BCM3513-Winter 2009 and 2010).

I joined the Sakmar laboratory in August 2011. Dr Sakmar's team established ground-breaking new methods to site-specifically incorporate small fluorescent probes in GPCRs. They pioneered the use unnatural amino acid mutageneis for labeling of chemokine receptors, and successfully introduced keto and azido-containing unnatural amino acids at various sites in two chemokine receptors, CCR5 and CXCR4.The labeling

strategies developed in Dr Sakmar's laboratory are advantageous due to the small size of the label causing minimal perturbation to the GPCR during biogenesis and processing. These techniques will thus permit much higher resolution compared to fluorescent-based techniques, such as BRET, that involve tagging proteins with fluorophores during biogenesis to form fusion proteins. These tools, while powerful, provide poor spatial resolution as they involve the use of large probes that may alter the properties of the studied proteins. The Sakmar laboratory is thus an outstanding scientific environment for the pursuit of my career.

B. Distinctions and Credentials:

Distinctions

09/2007 Poster presentation award, 8th Annual Great Lakes GPCR Retreat, Canada
05/2007 Poster presentation award, Research Centre / Sainte-Justine's Hospital, Canada
01/2003 Undergraduate poster presentation award, University of Montreal, Canada

Scholarships

2011-2013 FRSQ (Fonds de la recherche en santé du Québec), postdoctoral research award, Canada
2006-2009 CIHR (Canadian Institutes of Health Research), doctoral research award, Canada (Started on 09/2006)
2006-2009 FRSQ (Fonds de la recherche en santé du Québec), doctoral research award, Canada (Declined after 09/2006)
2003-2006 Ste-Justine's UHC Foundation, master's research award, Canada
Summer 2002 COPSE (Comité d'organisation du programme des stages d'été)/University of Montreal, Undergraduate studies research award, Canada

Research and travel awards

12/2009 Department of Biochemistry/University of Montreal, research award, Canada
09/2009 Faculty of Graduate&Postdoctoral Studies/University of Montreal, research award, Canada
09/2009 Foundation of Stars/Children's Health Research, research award, Canada
05/2008 Keystone Symposia, travel award, USA
12/2007 Department of Biochemistry/ University of Montreal, research award, Canada
12/2005 Department of Biochemistry/ University of Montreal, research award, Canada
01/2004 Luigi Liberatore award/ University of Montreal, research award, Canada

C. Peer-reviewed Publications:

1) Berchiche Y.A., Gravel S., Pelletier M-E., Ste-Onge G., Heveker N. *Different effects of the different natural CCR2 ligands on β-arrestin recruitment, Gαi signalling and receptor internalizations.***(2011) Molecular Pharmacology** 79(3):488-98.

I performed all experiments except the binding and endocytosis assays of this work (5 out of 7 figures). I also contributed to this work with the experimental design, data analysis and writing of the manuscript.

2) Gravel S. Maloyf C., Boulais P., **Berchiche Y.A**., Oishi S., Fujii N., Leduc R., Sinnett D., Heveker N. The Peptidomimetic CXCR4 antagonist TC14012 Recruits Beta-Arrestin to CXCR7-Roles of Receptor Domains. **(2010) Journal of Biological Chemistry** 285(49):37939-43.

I performed the initial experiments that started the project. I contributed to this work with the experimental design of the BRET experiments.

3) Kalatskaya I*, **Berchiche Y.A.***, Gravel S, Limberg B. J., Rosenbaum J.S, Heveker N. *AMD3100 is a CXCR7 Ligand with Allosteric Agonist Properties.* **(2009) Molecular Pharmacology** 75:1-8.

I contributed to this work with 2.5 out of 5 figures. More specifically, figure 1 showing CXCR4 and CXCR7 homodimer BRET saturation curves; figure 2C assessing ligand effect on receptor homodimer BRET and figure 5 showing ligand effect on β-Arrestin 2 recruitment to CXCR7 as measured by BRET. I also contributed to this work with data analysis and writing of the manuscript.

4) Rafei M., **Berchiche Y.A.**, Birman E., Boivin MN., Young Y.K., Wu J. H., Heveker N., *Galipeau J. An Engineered GMCSF-CCL2 Fusokine is a Potent Inhibitor of CCR2-driven Inflammation as Demonstrated in a Murine Model of Inflammatory Arthritis*. **(2009) Journal of Immunology** 183(3):*1759-66*.

I contributed to this work with BRET experiments assessing ligand effect on CCR2 receptor homodimer conformation; on CCR2/β-Arrestin2 recruitment (figure 1) and with the corresponding data analysis and writing of the manuscript.

5) Berchiche Y.A., Chow K.Y, Lagane B., Leduc M., Percherancier Y., Fujii N., Tamamura H., Bachelerie F., Heveker N. *Direct Assessement of CXCR4 Mutant Conformations Reveals Complex Link between Receptor Structure and Gαi Activation.* **(2007) Journal of Biological Chemistry** 282, 5111-5115

I made the CXCR4 receptor mutants and their BRET variants used in this work. I performed all the experiments with the exception of GTPγS binding in figure 1B.

6) Desjardins S., **Berchiche Y.A.**, Haddad E., Heveker N. *CXCR4 -Récepteur de chimiokine aux talents multiples.* (2007) **Médecine Sciences**, in a special edition to commemorate the 100th Anniversary of Sainte-Justine's Hospital, Montréal, Québec. **Review**

7) Dulude D., **Berchiche Y.A.**, Gendron K., Brakier-Gingras L., Heveker N. *Decreasing the frameshift efficiency translates into an equivalent reduction of the replication of the human immunodeficiency virus type 1*. **(2006) Virology**. Volume 5; 345(1):127-36

I contributed to this work with 2 out of 5 figures. Figure 5 shows the single-round infectivity assay of HIV-1 and mutants with an altered frameshift efficacy and figure 6 assesses their replication kinetics. I performed these experiments were done in the biosafety level 3 facilities of the Research Centre.

8) Percherancier Y., **Berchiche Y.A.**, Slight I., Volkmer-Engert R., Tamamura H. , Fujii N., Bouvier M., Heveker N. *Bioluminescence Resonance Energy Transfer Reveals Ligand-Induced Conformational Changes in CXCR4 Homo- and Heterodimers.* **(2005) Journal of Biological Chemistry** 280: 9895-9903.

I learned the techniques used in the paper, mostly BRET, by participating in Yann Percherancier's experiments. He was a postdoctoral fellow in Michel Bouvier's laboratory. Working with Dr Percherancier allowed me to acquire the skills to do BRET experiments and to independently reproduce all the experiments shown is this paper.

Poster presentations (selected from 23 poster presentations- 13 international and 10 local)

1) **Berchiche Y.A.**, Gravel S., Pelletier M-E., Ste-Onge G.,Kalatskaya I and Heveker N. *Using bioluminescence resonance energy transfer (BRET) to study chemokine receptor conformation/function relationships.* The 13th Annual Joint Meeting, **Great Lakes GPCR Retreat** and le Club des Récepteurs à Sept Domaines Transmembranaires du Québec. Montebello, Québec, Canada. **October 2011**

2) **Berchiche Y.A.**, Gravel S., Pelletier M-E., Ste-Onge G., Heveker N. *Different effects of the different natural CCR2 ligands on β-arrestin recruitment, Gαi signalling and receptor internalizations.* The 12th Annual Joint Meeting, **Great Lakes GPCR Retreat** and le Club des Récepteurs à Sept Domaines Transmembranaires du Québec. Toronto, Ontario, Canada. **October 2010**

3) **Berchiche Y.A.**, Gravel S., Pelletier M-E., Heveker N. *Arrestin recruitment to CCR2 induced by its different chemokine ligands-evidence against functional redundancy.* **Gordon Research Conference: Molecular Pharmacology,** Il Ciocco, Italy, **May 2010**

4) **Berchiche Y.A.**, Kalatskaya I., Gravel S., Heveker N. *Use of BRET for the structure-function analysis of chemokine receptors*. **Gordon Research Conference: Chemotactic Cytokines**, Aussois, France. **September 2008**

5) **Berchiche Y.A.**, Gravel S., Heveker N. *Structure/Activity of chemokine receptor CCR2 trigerred by its 7 natural ligands*. **Keystone Symposia on G Protein-Coupled Receptors**: New Insights in Functional Regulation and Clinical Application, **In collaboration with Science Foundation Ireland; Part of the Translational Medicine Series.** INEC-Ireland's National Events & Conference Centre, Killarney, Co. Kerry, Ireland. **May 2008**

6) **Berchiche Y.A.**, Gravel S., Heveker N. *Fuctional Selectivity of the 7 Natural Ligands of the Chemokine Receptor CCR2*. The 8th Annual Joint Meeting, **Great Lakes GPCR Retreat** and le Club des Récepteurs à Sept Domaines Transmembranaires du Québec. London, Ontario, Canada. **September 2007**. **I won a poster presentation award**

7) **Berchiche Y.A.**, Chow K.Y, Lagane B., Leduc M., Percherancier Y., Fujii N., Tamamura H., Bachelerie F., Heveker N. *Direct Assessement of CXCR4 Mutant Conformations Reveals Complex Link between Receptor Structure and Gαi Activation*. **Gordon Research Conference: Molecular pharmacology**, Ventura, Californie, USA, **January 2007**

8) Leduc M., **Berchiche Y.A.**, Chemtob S., Heveker N. *Dimerization of Prostaglandine Receptors*. The 7th Annual Joint Meeting, **Great Lakes GPCR Retreat** et le Club des Récepteurs à Sept Domaines Transmembranaires du Québec, Detroit, Michigan, USA. **October 2006**

9) **Berchiche Y.A.**, Percherancier Y, Slight I, Bouvier M, Heveker N. *Structure-Activity of CXCR4 mutants*. **Gordon Research Conference: Molecular pharmacology**, Il Ciocco, Italy. **May 2005**

D. Research Support

Not applicable.