

BIO SKETCH

NAME : REAUX LE GOAZIGO Annabelle

POSITION TITLE : CR1 INSERM Researcher

EDUCATION / TRAINING

INSTITUTION AND LOCATION	DEGREE	Month/Year	FIELD OF STUDY
Institut de la Vision, UMRS 968, Paris	CR1 INSERM position	Avril 2012	Chemokine and opioid in the modulation of corneal pain
CrICM, Pitrié Salpetriere Paris	CR1 INSERM position	Janvier 2008 - Mars 2012	Chemokines and opioid interactions in the modulation of spinal pain
College de France-INSERM U691, Paris	CR2 INSERM position	Nov 2002- Dec 2007	Central interaction between the renin angiotensin and apelin systems in the control of blood pressure
McGill University, Montréal, Canada	Post doctoral position	2002	Neuroanatomy
Semmelweiss University, Budapest, Hungary	Post doctoral position	2001	Neuroanatomy
Paris XII-University Collège de France, Paris	PhD Neurosciences	1997-2001	Neuroanatomy and physiology
University Paris XII-	Master Degree 2	1996-1997	Physiology
Paris XII-University	Master Degree 1	1994-1995	Physiology

POSITIONS AND EMPLOYMENTS

From April 2012	<p>UMR S 968 Inserm/ UPMC/ CNRS 7210 – Institut de la Vision- Paris, France Director: Pr José-Alain Sahel Team S12: Pr C. Baudouin/ Dr S. Melik Parsadaniantz CR1 INSERM researcher</p> <p>In the team, I develop a new research project, which is dedicated to the understanding of the corneal pain at a neuroanatomical and physiological point of views. In this project, I also focus on the interactions between CXCR4 and opioid receptors in trigeminal sensory neurons supplying the corneal innervation.</p> <p>-Responsibilities,tasks Scientific Board University Pierre and Marie Curie (UPMC Paris Sorbonne), Scientific Committee- Letter for Neuroscience Laboratory and Technical Board/Committee, Teaching ESPCI, Grandes Ecoles</p>
January 2008 – March 2012	<p>Centre de Recherche du Cerveau et de la Moelle - INSERM U975 - Pitié Salpêtrière – Paris, France. Director: B. Zalc Pain Team CR1 INSERM researcher</p> <p>In the Pain Team, my researches focused on the implications of the chemokine CXCL12 and its receptor CXCR4 in spinal pain signaling. My work has provided new evidence about the interactions between CXCR4 and opioid receptors in the modulation of morphine analgesia</p>

2003 –2007	INSERM U691 - Collège de France- Paris, France CR2 INSERM researcher Implication of neuropeptides (angiotensin, apelin) and their receptors in the neuromodulation of cardiovascular and metabolism functions.
2002	Laboratory of Pr Alain Beaudet- Mc Gill University, Montreal, Canada Post-doctoral position <i>Neuroanatomical and physiological studies on apelin and vasopressin in rodent brain. In vivo internalisation of GPCRs</i>
2001	Laboratory of Pr Miklos Palkovits, Semmelweis University – Budapest-Hungary Post-doctoral position <i>Topographical distribution of neuropeptides and GPCRs in rodent and human brains.</i>
1997- 2001	Collège de France- INSERM U36 – Paris, France Chaire de Médecine expérimentale –Director Pr. Pierre Corvol PhD Student - Neurosciences PhD - INSERM Unit 36 - Collège de France – Paris, <ul style="list-style-type: none"> • Role of aminopeptidase A in the production of brain Angiotensin III: use of APA inhibitors as antihypertensive drugs • Physiological role of apelin, a new neuropeptide, in the rat brain.

Scientific Interests:

Chemokines and opioids play major roles in regulating immune, inflammatory and neuronal responses in peripheral and central pain pathways. Recent studies provide insights into the functional interactions between chemokine and opioid receptors and their role in pain modulation. Such crosstalk between these two systems may provide a molecular and cellular framework for the development of novel analgesic therapies for the management of acute and/or chronic pain.

We recently provide evidence that heterologous desensitization between opioid receptors and CXCR4 occurs in the DRG and the spinal cord. CXCR4, the receptor of CXCL12, is coexpressed with MOR and DOR in rat sensory neurons of the DRG and in spinal neurons. Activation of CXCR4 by acute intrathecal administration of CXCL12 strongly decreased the analgesic efficacy of subcutaneous morphine via the activation of Src family pathway (SFK). This raises the exciting possibility that manipulating the CXCL12-CXCR4-SFK axis can be used to benefit those who suffer from debilitating pain by promoting opioid-based analgesia or possibly, preventing opioid tolerance (Melik-Parsadaniantz et al 2014, Nature Review Neurosciences).

At the Institut de la vision, our researches are dedicated to decipher the molecular and cellular mechanisms that are implicated in the chronicity of ocular pain in various animal models. My researches also investigate whether CXCL12/CXCR4 couple participates in corneal pain and the possible interactions between CXCR4 and opioids receptors in trigeminal neurons that supply the corneal innervation. Finally we also study the neuro-immune interactions between corneal activated immune cells and corneal nerves and the balance between pro- and anti-algesic factors during ocular pain.

A translational research between the team and a clinical department (CIC 503, Quinze-Vingts National Ophthalmology Hospital) has begun. This research project will help to better understand the mechanisms of this pathology by identifying new mechanisms and biomarkers linking inflammatory cells and peripheral nerves. Our researches will help to translate pre-clinical and clinical results into solutions for the benefit of the million of patients suffering from dry eye disease.

Other Experiences and Professional Memberships :

Scientific and Administration board and committees

Scientific Board of Pierre and Marie Curie University (UMPC) (2012- 2016)

Laboratory and Technical Committees at the Institut de la Vision (from 2014).
Scientific Committee of the Letter of Neurosciences (from 2009)
Scientific Board of French Society of Neuroendocrinology (2004-2009)
Treasurer of the French Society of Neuroendocrinology (2005-2008)

Membership

Society for Neuroscience (SFN), French Society for Neurosciences, French Society of Neuroendocrinology, Association for Research in Vision and ophthalmology (ARVO)

Teaching

2004-2014 **Ecole Supérieure de Physique et Chimie Industrielle** (ESPCI, ParisTech, Grandes Ecoles)
12 h/year
2007-2010 MASTER of BIO INGENIERY - Ecole Supérieure de Physique et Chimie Industrielle (ESPCI, ParisTech, Grandes Ecoles) 10h/year

Selected Peer-reviewed Publications:

2014

Melik Parsadaniantz S, Rivat C, Rostene W, **Reaux-Le Goazigo A**. Opioid and chemokine receptor crosstalk : a promising target for pain therapy. **Nature Review Neuroscience**. **2014 In press**

Van Steenwinckel J, Auvynet C, Sapienza A, **Reaux-Le Goazigo A**, Combadiere C, Melik Parsadaniantz S. Stromal cell-derived CCL2 drives neuropathic pain states through myeloid cell infiltration in injured nerve. *Brain, behavior, and immunity*. 2014

Rivat C, Sebaihi S, Van Steenwinckel J, Fouquet S, Kitabgi P, Pohl M, Melik Parsadaniantz S, **Reaux-Le Goazigo A** Src family kinases involved in CXCL12-induced loss of acute morphine analgesia. **Brain Behav Immun**. 2014 May;38:38-52.

2013

Dauvergne C, Molet J, **Reaux-Le Goazigo A**, Mauborgne A, Mélik-Parsadaniantz S, Boucher Y, Pohl M. Implication of the chemokine CCL2 in trigeminal nociception and traumatic neuropathic orofacial pain. **Eur J Pain**. **2013** 1532-2149.2013

Reaux-Le Goazigo A, Van Steenwinckel J, Rostène W, Mélik Parsadaniantz S. Current status of chemokines in the adult CNS. **Prog Neurobiol**. **2013** May; Review.

2012

Reaux-Le Goazigo A, Rivat C, Kitabgi P, Pohl M, Melik Parsadaniantz S. Cellular and subcellular localization of CXCL12 and CXCR4 in rat nociceptive structures: physiological relevance **Eur J Neurosci**. 2012 Sep;36(5):2619-31

2011

Belkouch M, Dansereau MA, **Reaux-Le Goazigo A**, Van Steenwinckel J, Beaudet N, Chraïbi A, Melik-Parsadaniantz S, Sarret P. The chemokine CCL2 increases Nav1.8 sodium channel activity in primary sensory neurons through a G β γ -dependent mechanism. **J Neurosci** **2011** Dec 14;31(50):18381-90.

Annabelle Reaux-Le Goazigo, Laurence Bodineau, Nadia De Mota, Lydie Jeandel, Nicolas Chartrel, Claude Knäuf Carine Raad , Philippe Valet , Catherine Llorens Cortes. Apelin and the proopiomelanocortin system: a new regulatory pathway of hypothalamic α -MSH release. **Am J Physiol Endocrinol Metab**. 2011 Nov;301(5):E955-66

Rostène W, Dansereau MA, Godefroy D, Van Steenwinckel J, **Reaux-Le Goazigo A**, Mélik-Parsadaniantz S, Apartis E, Hunot S, Beaudet N, Sarret P. Neurochemokines: a menage a trois providing new insights on the functions of chemokines in the central nervous system. **J Neurochem**. **2011** Sep;118(5):680-94. Jul 21.

Juliette Van Steenwinckel, **Annabelle Reaux-Le Goazigo**, Blandine Pommier, Annie Mauborgne, Marc Andre Dansereau, Patrick Kitabgi, Philippe Sarret, Michel Pohl, and Stephane Melik Parsadaniantz. CCL2 Released from Neuronal Synaptic Vesicles in the Spinal Cord Is a Major Mediator of Local Inflammation and Pain after Peripheral Nerve Injury. **J Neurosci**. **2011** Apr 13;31(15):5865-75.

2009

Reaux-Le Goazigo A and Melik-Parsadaniantz S. Chapitre intitulé « La chimiokine CCL2 et son récepteur CCR2 : nouvelles cibles thérapeutiques dans le traitement des douleurs chroniques ? » **Review Douleurs-** Masson Elsevier – French

2007

Chartrel N, Alvear-Perez R, Leprince J, Iturrioz X, **Reaux-Le Goazigo A**, Audinot V, Chomarar P, Coge F, Nosjean O, Rodriguez M, Galizzi JP, Boutin JA, Vaudry H, Llorens-Cortes C. Comment on "Obestatin, a peptide encoded by the ghrelin gene, opposes ghrelin's effects on food intake". **Science**. 2007 Feb 9;315(5813):766; author reply 766.

Annabelle Reaux-Le Goazigo, Xavier Iturrioz and Catherine Llorens-Cortes
Apelin and receptor. "New Encyclopedia of Neuroscience". Review. Elsevier Editeur en chef Larry Squire

2006

Reaux-Le Goazigo A, Alvear-Perez R, Zizzari P, Epelbaum J, Bluet-Pajot M-T and Llorens-Cortes C. Cellular localization of apelin and its receptor in the anterior pituitary: evidence for a direct stimulatory action of apelin on ACTH release. **Am J Physiol Endocrinol Metab**. 2007 Jan;292(1):E7-15. Epub 2006 Aug 8.

Iturrioz X, **Reaux-Le Goazigo A**, Hus-Citharel A, De Mota N, Bodineau L, Frugière A, El Messari S, Chartrel N, Kordon C, Beaudet A, Vaudry H, Moos F, Llorens-Cortes C. Central Neuropeptide Receptors Involved in Water Balance: Application to Apelin Research and Perspectives in Endocrine Interactions. **Fondation IPSEN** Edité mi-2006 par Springer-Verlag Berlin Heidelberg, pp 79-92.

Iturrioz X, **Reaux-Le Goazigo A**, Llorens-Cortes C. Apelin : discovery, distribution and physiological role. **Handbook of Biologically Active Peptides** Edité par Elsevier 2006 787-793.

2005

Reaux-Le Goazigo A, Iturrioz X, Fassot C, Claperon C, Roques BP, Llorens-Cortes C.
Role of Angiotensin III in Hypertension. **Curr Hypertens Rep**. 2005 Apr;7(2):128-34.

2004

Reaux- Le Goazigo A, Morinville A, Burlet A, Llorens-Cortes C, Beaudet A. Dehydration-induced cross-regulation of apelin and vasopressin immunoreactivity levels in magnocellular hypothalamic neurons. **Endocrinology**. 2004 Sep;145(9):4392-400.

De Mota N*, **Reaux-Le Goazigo A***, El Messari S*, Chartrel N, Roesch D, Dujardin C, Kordon C, Vaudry H, Moos F, Llorens-Cortes C. Apelin, a potent diuretic neuropeptide counteracting vasopressin actions through inhibition of vasopressin neuron activity and vasopressin release.

Proc Natl Acad Sci U S A. 2004 Jul 13;101(28):10464-9. * contributed equally to this work.

Fournie-Zaluski MC, Fassot C, Valentin B, Djordjijevic D, **Reaux-Le Goazigo A**, Corvol P, Roques BP, Llorens-Cortes C. *Brain renin-angiotensin system blockade by systemically active aminopeptidase A inhibitors: a potential treatment of salt-dependent hypertension*. **Proc Natl Acad Sci U S A**. 2004 May 18;101(20):7775-80.

2002

Reaux A, Gallatz K, Palkovits M, Llorens-Cortes C. *Distribution of apelin-synthesizing neurons in the adult rat brain*. **Neuroscience**. 2002;113(3):653-62.

2001

Reaux A, De Mota N, Skultetyova I, Lenkei Z, El Messari S, Gallatz K, Corvol P, Palkovits M, Llorens-Cortes C. Physiological role of a novel neuropeptide, apelin, and its receptor in the rat brain. **J Neurochem**. 2001 May;77(4):1085-96.

Reaux A, Fournie-Zaluski MC, Llorens-Cortes C. Angiotensin III: a central regulator of vasopressin release and blood pressure.

Trends Endocrinol Metab. 2001 May-Jun;12(4):157-62. Review.

Iturrioz X., **Reaux A.**, Fournie-Zaluski M.C, Roques B.P., Corvol P. And Llorens Cortes C. *Importance of aminopeptidase A in the central control of arterial blood pressure*. **Cell-surface aminopeptidases : basic and clinical aspects**. ELSEVIER SCIENCE pp.31-38, 2001

2000

Reaux A, Iturrioz X, Vazeux G, Fournie-Zaluski MC, David C, Roques BP, Corvol P, Llorens-Cortes C. *Aminopeptidase A, which generates one of the main effector peptides of the brain renin-angiotensin system, angiotensin III, has a key role in central control of arterial blood pressure*. **Biochem Soc Trans**.

2000;28(4):435-40.

1999

Reaux A, Fournie-Zaluski MC, David C, Zini S, Roques BP, Corvol P, Llorens-Cortes C. Aminopeptidase A inhibitors as potential central antihypertensive agents. **Proc Natl Acad Sci U S A**. 1999 Nov 9;96(23):13415-20.

Reaux A, de Mota N, Zini S, Cadel S, Fournie-Zaluski MC, Roques BP, Corvol P, Llorens-Cortes C. PC18, a specific aminopeptidase N inhibitor, induces vasopressin release by increasing the half-life of brain angiotensin III. **Neuroendocrinology**. 1999 May;69(5):370-6.