



BIOGRAPHICAL SKETCH

NAME <i>Gabriele BAJ</i>		POSITION TITLE <i>Assistant Professor - RTDa</i>	
EDUCATION			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University of Milan	Graduated in Biotechnology	2003	Neural stem cells biology and signal transductions pathways
University of Trieste, Italy. B.R.A.I.N. Centre for Neuroscience	PhD in Neuroscience	2007	Biology of neurotrophic factors

A. Personal Statement

I was recently enrolled as assistant professor and I am actively working to open new research paths. I have spent several year in acquiring at least part of the skills and the knowledge required to pursue such ambitious task (please see courses in CV). The research conducted during the last 10 years allowed me to understand the necessity of using a multiple approach to dissect biological problems. I am planning to study the possibility to ameliorate Rett syndrome neurological deficits using Neuritin. To achieve this goal I will use a broad range of techniques, all of them already experience in my previous research activities (see full bibliography). I will use In situ hybridization to study mRNA regulation and translation in pathological conditions. High resolution microscopy will be applied to study morphological modulations and viral infection to modify the dis-regulated expression and localization of Neuritin. In the end, also the experience acquired with the mouse animal model of RTT will be essential to test the recovery in vivo using also behavioral and physiological test.

B. Positions and Honors

RESEARCH AND PROFESSIONAL EXPERIENCE

Nov16-present **University of Trieste, Italy. Life Sciences Dpt.**

- Researcher at fixed term
- Lecturer for the course of Cellular Neurobiology and for the course of Optical Microscopy
- Reviewer for Experimental Brain Research, Scientific Reports and Neuroscience, International Journal of Developmental Neuroscience
- Manager for the facility of standard and confocal microscopy of the University of Trieste.
(<http://www.units.it/confocal>)

Apr07- Nov16 Post Doc (Fellowship Umberto Veronesi 2015) under the supervision of Dr. Enrico Tongiorgi

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- Jun - Oct13 Invited researcher at **McMaster University, Department of Psychiatry and Behavioural Neurosciences , Hamilton , Ontario, Canada**, under the supervision of Prof. Margaret Fahnestock.
- Nov08 - Dec09 Invited researcher at **Institute of Clinical Neuroanatomy, Goethe-University Frankfurt**, under the supervision of Prof. Thomas Deller
- Jul05 - Mar06 **New York University, Skirball Institute of Biomolecular Medicine.U.S.A.** Invited as a visiting PhD student for a scientific collaboration in the Molecular Neurobiology Lab under the supervision of Prof. Moses Chao.
- Mar - Nov03 **University of Milan, Italy.** Fellowship (6 months) of "MILANO RICERCHE" to carry out experiments for the optimization of neural stem cells transplantation methods in a mouse model for Huntington disease. Laboratory of Prof. Elena Cattaneo.
- Aug00 - Jan01 **University of Paris VI, "Pierre et Marie Curie, France"**. Obtained a fellowship of the European exchange program ERASMUS to spend a 6 months stage in the Laboratory of Biochemistry and Organic Chemistry headed by Prof. Andrée Marquet

FELLOWSHIP AND AWARDS

- Mar 2015 Post-Doctoral Fellowship from Umberto Veronesi Foundation – Grants 2015
- Nov 2014 Winner of the Bioeconomy Rome 2014- Award received from the Italian's Republic President Giorgio Napolitano at the Quirinale 16th Nov 2014
- Mar 2013 Fellowship from Banca del Monte di Lombardia for the "Progetto Professionalità
- Mar 2013 Co-Author of the poster winner as "best poster" at XVII Telethon Convention, Italy
- Nov 2011 Selected for oral presentation on the subject of: "Molecular Mechanisms of BDNF translation in dendrites" at the symposium "[Signaling by Neurotrophins](#)", Society for Neuroscience Meeting 2011 Washington DC
- Nov 2010 Patent PCT number PCT/EP2010/067081 "Method for the selection of compounds useful for the treatment of neuropsychiatric and neurodegenerative diseases"
- Nov08-Dec09 Fellowship from Vigoni Project for scientific exchange Italy-Germany
- Jun06 Award StartCup2006 for the Project "Neuroscrin from neurons to memory" Selected as one of the best ten business plan at the University of Trieste (team: Leone E, Baj G, Vicario A)
- Jul05-Mar06 Italian Society of "Biochemica Clinica e Biologia Molecolare" (SIBioC) for the period of training spent at the New York University
- Mar-Nov03 Fellowship from the association "MILANO RICERCHE

ATTENDED COURSES

- June 04 University of Rome "La Sapienza" 3 days course: "*The RNA world: from basic science to applied research*"
- June 05 "*FEBS advanced course: Advanced light microscopy (05-23C)*" Practical & Lecture Course Semmering, Austria, with FEBS fellowship
- Nov 05 Short Course "*Vectors and RNA Interference for Neuroscience*". Washington DC, SfN,
- Mar 06 "*Nikon Digital Microphotography Course*". Trieste March 21

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June 07	"BCI Bioinformatics course" –CBM Trieste
May 08	"EBI Bioinformatics course" – Genome Wellcome Trust-EBI center-Hinxton, UK
Nov 08	Theoretical Course "Mouse Behavioral Phenotyping" International Centre for Genetic Engineering and Biotechnology-Trieste
Sept 09	Summer School on Biomarkers 2009 AREA Science Park, Trieste
Jul 13	"Learning and Memory" course at Cold Spring harbor Laboratories – New York-USA
Sept 13	"OPTICAL MICROSCOPY AND IMAGING IN THE BIOMEDICAL SCIENCES" course at Marine Biological Laboratories, Woodshole, MA, USA
Oct 13	"Stem Cell Training LifeLab" course at Life Technologies Centers – Glasgow, UK

C. Contribution to Science

My scientific research activity is focused on the development of neuronal cells. In particular my main aim is to study the processes that regulate the formation of an adult brain from undifferentiated cells. These processes are of general interest because are commonly affected in neurodevelopmental disorders. The studies, with particular attention to comparative analysis between neurons of mice, rats and humans have allowed a new definition of the characteristic steps of the development and neuronal differentiation in vitro. I have used quantitative measures derived from this new "developmental staging system" of primary neuronal cultures to understand in which moments of the development (and maintenance of neuronal functions) the pathology known as Rett Syndrome will show its characteristic deficits. **Ref 10,18.**

Previously, I studied the role of a neurotrophic factor, Brain-derived neurotrophic factor (BDNF), which regulates the process of maturation of neurons from the phase of initial selection and survival until the differentiation into mature neuron. From my research, with the essential help of colleagues and the mentoring of my principal investigator, Prof. Enrico Tongiorgi, I was able to bring the innovative concept of "space code and amount of BDNF mRNA variants". According to this new paradigm, the various forms of BDNF mRNA, generated by alternative splicing, have to be localized in distinct regions of the neuron (cell body, proximal region or peripheral region of neuronal dendritic extensions) to influence the selective growth of the proximal or distal portions of the dendritic tree. **Ref 4,7,21,26.**

In our laboratory, we were also able to demonstrate that the spatial code can be modulated by treatment with antidepressant medications and physical activity that increase the production of BDNF to synapses. I have therefore developed a test on human cell cultures (patented, PCT number PCT/EP2010/067081, WO 2012062354 A1) to identify natural or synthetic compounds capable of modulating the spatial code of BDNF and thus obtain more targeted effects on neuronal circuits comparing with the drugs currently on the market. Finally, I have analyzed the various protein fragments of BDNF in the serum of patients with schizophrenia and multiple sclerosis highlighting of significantly different levels compared to healthy and between these two conditions, indicating that such variations in the levels are specific to each disease and can be used as a biomarker, also in response to therapies. **Ref 14,16,19,24.**

Bibliography

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Trieste, 16 November 2018

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