Name: Rosalina Fonseca
Date of birth: 31/12/1976
Nationality: Portuguese
Married (two children: 6 and 2 years)

ORCID RESEARCHER ID: orcid.org/0000-0003-0884-6441

POSITION TITLE: Principal Investigator

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
School of Science, University of Lisbon, Portugal	**4-years BCs** (Final mark: 17 out of 20)	07/1998	Biology
Ludwig-Maximilians Universitaet, Munchen, Germany	**Ph.D**. in Neurobiology	04/2005	Neuroscience
Behavioral Neuroscience, Instituto Gulbenkian de Ciência, Portugal	Post-doctoral Fellow	09/2007	Neuroscience
Neurobiology of Action laboratory, Instituto Gulbenkian de Ciência, Portugal	EMBO Post-doctoral Fellow	09/2009	Neuroscience
Neurobiology of Action laboratory, Champalimaud Foundation, Portugal	Clinical Research Fellow	09/2012	Neuroscience
School of Medicine, University of Lisbon, Portugal	**MD degree** Medicine (Final mark: 16 out of 20)	06/2012	Medicine
Beatriz Angelo Hospital, Lisbon, Portugal	General Clinical Residency	12/2013	Medicine
São Bernardo Hospital, Setúbal, Portugal	Psychiatry Residency	06/2015	Psychiatry

A. Scientific Statement

During my PhD, I acquired a strong background in electrophysiology and imaging techniques. During the final period of my PhD, I was able to implement a new research project, imaging pre and post-synaptic alteration during plasticity and train a PhD student that concluded the project. During my post-doctoral training, I pursued the hypothesis that long-term maintenance of synaptic plasticity is dependent on a transient modulation of the synaptic actin cytoskeleton. I secured independent funding that allowed me to implement extracellular and patch-clamp recordings in brain slices, two techniques that were not available at the host institution. My role included conceiving the project, secure funding, acquire all the equipment, establishing the laboratory and conducting the experiments. This project resulted in two single-author publications. Additionally, I participated in several courses of the PhD program at the Gulbenkian Institute of Science and the Champalimaud Foundation Since 2013, I transitioned to an independent position as a Research Fellow and I was offered a position as a principal investigator in June 2015.

During my training in neuroscience, I became exceedingly interested in the neurophysiologic modifications that occur in neurological and psychiatric diseases. From 2006-2007, I participated in an exploratory clinical project where I had my first contact with psychiatric patients. Above all, this project allowed me to obtain training in designing behavioural tasks and recordings of EEG-based evoked potentials in control and patient groups. This has also motivated me to obtain further training in clinical research. To this end, I enrolled in the Medical School in 2006 and obtained a medical degree in 2012. I have also practised medicine for two years, the first year as general medicine resident and the second year as a psychiatry resident. I am strongly convinced that understanding how psychiatric diseases develop will require a multi-disciplinary approach combining basic with clinical research. Having acquired practical knowledge both in neuroscience basic research and clinical practice, I am in a privileged position to bridge these two approaches.

Group site:
http://www.igc.gulbenkian.pt/rfonseca

Positions and Honours

Positions:

2015 **FCT Investigator Program** – Starting position
2014-2015 **Psychiatry Residency**, São Bernardo Hospital, Setúbal, Portugal
2013-2014 **General Medicine Residency**, Beatriz Angelo Hospital, Lisbon, Portugal
2009-2012 **Clinical Research Fellow**, Neurobiology of Action Laboratory, Champalimaud Foundation, Portugal
2007-2009 **EMBO Long Term Fellow**, European Molecular Biology Organization, EMBO.
2006-2007 **FCT Postdoctoral Fellow**, Portuguese Research Council (FCT).
2000-2004 **FCT Ph.D. fellowship** integrated under the scope of the International Gulbenkian Ph.D. program in Biomedicine (15 students selected out of 100 candidates), Portuguese Research Council (FCT).

Honors:

2015 **Early Career Psychiatrists fellowship**, European Psychiatric Association.
2006 **L'Oreal award for women in Science**, Unesco, L'Oreal Foundation and Portuguese Research Council (FCT). This prize aims to distinguish promising young women in science, developing research in Portugal. In 2006, 4 of these awards were attributed.
2006 **Otto-Hahn-Medaille** for promising researchers, Max-Planck- Gesellschaft for Science Development. This award aims to distinguish young researchers in the field of biological or social sciences at the level of PhD or post-doc, developing their research in any institute of the Max-Planck Society. Each year is attributed up to 30 awards.

Contribution to Science

1. Synaptic competition: During my graduate work in Dr. Tobias Bonhoeffer's laboratory in the Max Planck Institute of Neurobiology, I have uncovered a new property of synaptic plasticity maintenance, namely that synapses can compete for intracellular proteins (Neuron, 2004). This work was the first demonstration that synapses can engage in synaptic competition and has been widely acknowledged and expanded by colleagues resulting in multiple citations. Additionally, I was able to show that the maintenance of synaptic plasticity was an intricate balance linked to protein degradation (Neuron, 2006) and modulated by synaptic activation (Nature Neuroscience, 2006). This latter work has also provided the first cellular evidence for the reconsolidation theory of memory and has launched a vivid discussion on the dynamics of memory maintenance. This work was distinguished with two awards, the Otto-Hahn-Medaille for the most promising young researcher, from the Max Planck Foundation for Science Development and the L'Óreal award for Women in Science.

Rosalina Fonseca, Ramunas M Vabulas, Tobias Bonhoeffer, U Valentin Nägerl (2006) "A balance of protein synthesis and proteasome-dependent degradation determines the maintenance of LTP" Neuron, 2006, 52: 239-245. **Citations: 187, IF (5Y): 16.485, Q1 (top 2%) in Neurosciences.**

Rosalina Fonseca, U Valentin Nägerl, and Tobias Bonhoeffer (2006) "Neuronal activity determines the proteins synthesis-dependence of late-phase LTP", Nat Neuroscience, 2006, 9:478-480. **Citations: 91, IF (5Y): 16.273, Q1 (top 2%) in Neurosciences.**

Rosalina Fonseca, U Valentin Nägerl, Richard G.M. Morris and Tobias Bonhoeffer (2004) "Competing for memory: hippocampal LTP under regimes of reduced protein synthesis", Neuron, 2004, 44: 1011-1020. **Citations: 125, IF (5Y): 16.485, Q1 (top 2%) in Neurosciences.**

2. Role of Actin dynamics in synaptic-specific allocation of synaptic plasticity-related proteins: During my post-doctoral training, I addressed the hypothesis that synaptic activation leads to a structural change of the synapse that turns it permissive to synaptic plasticity, providing a local molecular signal for the capture of proteins. I have shown that pharmacological modulation of actin dynamics bi-directionally interferes with the synaptic capture of proteins, suggesting that modulation of actin dynamics, through CaMKII activation, constitutes an activity-dependent mechanism for input-specific synaptic capture of proteins (EJN 2012). Further, we have evidence that an identical mechanism operates in LTD, supporting the hypothesis that synaptic-specific modulation of actin cytoskeleton underlies protein allocation to synapses upon plasticity. Together with Dr. Valentin Nägerl in Bordeaux, we are addressing this question using state of the art imaging approaches to follow sub-cellular actin dynamics in synapses.

Rosalina Fonseca (2012) "Activity-dependent actin dynamics are required for the maintenance of long-term plasticity and for synaptic capture" EJN 2012, 35:195–206. **Citations: 19, IF (5Y): 3.928.**

Szabo, E., Manguinhas, R., Fonseca, R., "The interplay between neuronal activity and actin dynamics mimic the setting of an LTD synaptic tag" Scientific Reports, **2016**

3. Role of synaptic cooperation in memory maintenance: Synaptic cooperation and competition have strong implications in our current view of memory acquisition and maintenance. These two synaptic integration mechanisms allow events, separated in time by several minutes, to be associated as long-term memories. To address the significance of the rules observed at the cellular level to memory maintenance, I approached this question in a system very well know from the anatomically and behaviorally point of view. I was able to show that the thalamic and cortical synapses projecting to pyramidal neurons of the lateral amygdala also engage in synaptic cooperation. I also found that the endocannabinoid signalling plays a crucial role in determining the temporal window for synaptic cooperation (Neuropsychopharmacology 2013). Having developed a robust *in-vitro* model, we are now in the position to take this question further and test behaviorally whether synaptic cooperation and competition are involved in memory acquisition and maintenance.

Rosalina Fonseca (2013) "Asymmetrical synaptic cooperation between cortical and thalamic inputs to the amygdala", Neuropsychopharmacology 2013, 38: 2675-2687; **Citations: 4, IF (5Y): 8.518, Q1 (top 3%) in Pharmacology & Pharmacy, (top 6%) in Psychiatry and (top 7%) in Neurosciences.**

Rosalina Fonseca (2015), Synaptic cooperation and competition: two sides of the same coin? Chapter in book "Synaptic Tagging and Capture. From Synapses to Behavior" Edited by Sajikumar, Sreedharan (Ed.). Elsevier https://www.springer.com/biomed/neuroscience/book/978-1-4939-1760-0?slideDownLoginPanel

Drumond, A., Madeira, N., Fonseca, R., (2016), "Endocannabinoid signaling and memory dynamics: A synaptic perspective" Neurobiology of Learning and Memory, **2016** (http://www.sciencedirect.com/science/article/pii/S1074742716301319).

Rosalina Fonseca (2016), "The aging memory: modulating epigenetic modifications to improve cognitive function" Review, Neurobiology of Learning and Memory, 133, pages 182-184.
My bibliography: http://www.ncbi.nlm.nih.gov/sites/myncbi/1FEW-5fkGdBkJ/bibliography/50858098/public/?sort=date&direction=ascending.

Research Support

Ongoing projects:

2017-2020 Role: PI, "Synaptic competition and cooperation in reward learning: the role of hippocampal and prefrontal inputs to the nucleus accumbens" Bial Foundation, 49.000 euros.

2017-2019 Role: PI, "Fear not to remember: Impact of acute stress in amygdala synaptic cooperation, **NARSAD Young Investigator Grant,** Brain and Behavior Research Foundation, 70.000 USD.

2016-2019 Role: PI, Rules of memory allocation: the role of actin dynamics in synaptic cooperation and competition, Fundação para a Ciência e Tecnologia (FCT – Portuguese Research Council), 200.000 Euros.

2015-2018 Role: PI, The synaptic tag: a structural hypothesis, FCT Investigator, Fundação para a Ciência e Tecnologia (FCT – Portuguese Research Council), PI Salary + 50.000 Euros installation grant.

Completed projects:

2007-2011 Role: PI. Synaptic plasticity in the Amygdala: rules of heterosynaptic plasticity in the lateral nucleus of the amygdala. PTDC/SAU-NEU/65950/2006, Portuguese Research Council FCT, Portugal (120.000 euros).

2001-2006 Role: as Team Member. HSFP research grant with the title "Towards an understanding of reconsolidation" awarded to a multi-disciplinary team composed of the laboratories of Dr. Tobias Bonhoeffer, Dr. Joseph LeDoux, Dr. Karim Nader, Dr. Richard Morris e Dr. Yadin Dudai.

Supervision of undergraduate and graduate students (current member in bold):

10/2016 to 09/2019 **Post-doctoral fellow**, Nuria Farias, Cellular and Systems Neurobiology group, Instituto Gulbenkian de Ciência, Lisboa, Portugal

07/2016 to 09/2016 **Psychiatric resident,** João Vian, Psychiatry residency rotation, Santa Maria Hospital, Lisbon Portugal

01/2016 to 05/2016 Undergraduate student, Ana Martins, Master in Biomedical Engineering, Sciences and Technology school, New University of Lisbon, Portugal.

01.2016 to present **Research Fellow**, Natália Madeira, Cellular and Systems Neurobiology group, Instituto Gulbenkian de Ciência, Lisbon, Portugal

06.2015 to present **Master Student**, Ana Drumond, Master in Neuroscience, University of Lisbon.

03.2015 to 12.2015 Undergraduate student, Rita Manguinhas, BCs in Biochemistry, Sciences and Technology school, New University of Lisbon, Portugal. Bachelor Thesis: "Role of actin dynamics in the maintenance of synaptic plasticity".

02. 2015 to 04.2015 Undergraduate student, Lidia Caley, Master in Medicine, Algarve University, Portugal.

05.2014 to 05.2015 Research fellow, Eszter Szabo, Cellular and Systems Neurobiology group, Instituto Gulbenkian de Ciência, Lisboa, Portugal

2004 – 2005 PhD Student, Nadine Becker, co-supervision with Dr. Valentin Nagerl, Synapses-Circuit-Plasticity Department, Max-Planck Institute for Neurobiology, Munich, Germany.

Major present collaborations:

Dr. Rui Costa, Systems approach to synaptic tagging and capture, Neurobiology of Action laboratory, Champalimaud Foundation, Portugal.
Dr. U. Valentin Nägerl, Morphological aspects of synaptic plasticity, Synaptic Plasticity and Super-resolution Microscopy, Université de Bordeaux, France.
Dr. Gal Richter-Levin, Cellular plasticity in a model of post-traumatic stress disorder, Haifa University, Israel.
Dr. Stephen Martin, Division of Neuroscience, University of Dundee.

Invited presentation in conferences and graduate schools:

2015 Fonseca R. "The nature of the synaptic tag: a structural hypothesis", Hippocampal Spring Meeting, Taormina, Italy.
2015 Fonseca R. "The nature of the synaptic tag: a structural hypothesis", NPlast Meeting, Utrecht University, Holland.
2006 Fonseca R., Nägerl U.V., and Bonhoeffer T: "Neuronal activity determines the proteins synthesis-dependence of late-phase LTP", The Phenomenology of Reconsolidation, The Banbury Center, Cold Spring Harbor Laboratory, USA.
2004 Fonseca R., Nägerl U.V., Morris R.G.M. and Bonhoeffer T: "Competitive interactions between potentiated synapses", Symposium, "Synaptic Tagging, Synaptic Capture: Key to Memory encoding?", International Graduate School of Neuroscience (IGSN), Ruhr University, Bochum, Germany.

Oral presentation in conferences:

2011 Fonseca R. "Cooperation between thalamic and cortical inputs to the lateral amygdala (LA) nucleus", 11th Annual Meeting of the Portuguese Society of Neuroscience, Lisbon, Portugal.

2007 Fonseca R., Nägerl U.V., Morris R.G.M. and Bonhoeffer T: "Competitive interactions between potentiated synapses", 2007, Portuguese Society of Neuroscience, Ofir, Portugal.

2004 Fonseca R., Nägerl U.V., Morris R.G.M. and Bonhoeffer T: "Competitive interactions between potentiated synapses", 2004, Channels, Receptors and Synapses, CSHL meeting, Cold Spring Harbour Laboratory, USA

B. Teaching experience

Master Program classes:

2016: Principles of synaptic plasticity in the brain: visual cortex and critical periods, Development Neurobiology, master in Evolutive and Developmental Biology, Science School, UL.

2015: Principles of synaptic plasticity in the brain, Development Neurobiology, master in Evolutive and Developmental Biology, Science School, UL.

PhD Program in Neuroscience:

06/2016 Principles of synaptic plasticity in the brain, International Neuroscience Doctoral Program, Champalimaud Foundation. **Head:** Inbal Israely, Rosalina Fonseca
Faculty: Rosalina Fonseca, Gulbenkian Institute of Science, Inbal Israely, Champalimaud Foundation.

02/2011 Learning and Plasticity, International Neuroscience Doctoral Program, Champalimaud Foundation. **Head:** Inbal Israely, Marta Moita

Faculty: Rosalina Fonseca, Gulbenkian Institute of Science, Inbal Israely, Champalimaud Foundation, Steven Kushner, Erasmus Medical Center, Rotterdam.

03/2008 Learning: Evolving Behavioural Plasticity, Champalimaud Foundation Neuroscience PhD Program. **Head:** Rosalina Fonseca, Marta Moita, Sara Magalhães.
Faculty: Valentin Naegerl, Max Planck Inst Neurobiology, Germany; Simon Rumpel, Inst. of Molecular Pathology, Austria; Fred Mery, CNRS, Gif-sur-Yvette, France; Josh Dubnau, Cold Spring Harbour Lab, USA; Carel ten Cate, Leiden U, The Netherlands; Eric Jarvis, Duke U, USA; Luc-Alain Giraldeau, U Quebec à Montréal, Canada.

02/2004 Neuroscience Course, IV Gulbenkian PhD Program in Biomedicine. **Head:** Rosalina Fonseca, Miguel Vaz Afonso. **Faculty:** Gouping Feng, PhD, Department of Neurobiology, Duke University Medical Center, USA; Justin Crowley, PhD, Carnegie Mellon University, USA; Karim Nader, PhD, McGill University, Montreal, Canada.

02/2003 Neuroscience Course, III Gulbenkian PhD Program in Biomedicine. **Head:** Rosalina Fonseca, Miguel Vaz Afonso. **Faculty:** Miguel Vaz Afonso, Rosalina Fonseca, Albrecht Kossel, PhD and Mark Huebener, PhD, Max-Planck Institute of Neurobiology, Munich, Germany.

Under-graduated teaching

1998–99 Biology teacher, 10º and 12º grades, Dona Filipa de Lencastre School, Lisboa.

Jury in thesis evaluation:

Member (and arguer) of the Jury of the Ph. D. thesis: “Intra-axonal translation of beta-actin mRNA underlies presynaptic differentiation”. Student: Joana Reis Pedro. Tutor: Dr. Ramiro Almeida, Neuroscience and Disease - Growth factor signalling and Brain Ischemia Laboratory, Center for Neuroscience and Cell Biology, University of Coimbra.

Member (and tutor) of the Jury of the Bachelor thesis: “Role of actin dynamics in the maintenance of synaptic plasticity”. Student: Rita Manguinhas. Tutors: Drª Rosalina Fonseca, Department of Chemistry and Biochemistry, Science School, New University of Lisbon, 2015.

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Member (and arguer) of the Jury of the Master thesis: “The influence of epilepsy in synaptic plasticity in the hippocampus: neuroprotective role of VIP and its receptors”. Student: Armando Cruz. Tutors: Drª Diana Cunha Reis and Dr Rodrigo Almeida, Department of Chemistry and Biochemistry, Science School, University of Lisbon, 2012.