## CURRICULUM VITAE ET STUDIORUM

**Saviana Antonella Barbati, PhD**

## EDUCATION AND TRAINING

2011 – 2014 PhD in Biophysics (XXVII cycle) discussed on february 25th 2015 at Università Cattolica Medical School of Rome.
PhD thesis: "*Modulation of adult Neurogenesis: from epigenetics to behavior*";

2003 – 2011 Master's degree in Neurobiology, 110 *summa cum laude*/110, Faculty of Mathematics, Physics and Natural Sciences, La Sapienza University of Rome. Masters degree experimental thesis: *"Gene expression of the Gamma secretase complex in a reeler mouse model for the study of autism".*
Bachelor's degree experimental thesis: "*Progranulin: new gene in the frontotemporal dementia"*;

## WORK EXPERIENCE

10/2022 – 09/2023 Post-doc at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Prof. Claudio Grassi, working on project that aims to study interaction between cholinergic and glutamatergic synaptic transmission in the tripartite synapse in the pathophysiology of Alzheimer's disease. (fellowship PRIN 2020).

07/2022 – 10/2022 Collaboration contract at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Prof. Claudio Grassi, on a project aim to study the alterations brain plasticity in response to cerebral ischemia damage and the mechanisms underlying functional recovery following the treatment with exosomes derived from mesenchymal cells from bone marrow (fellowship on a TJU project).

01/2022 – 06/2022 Collaboration contract at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Prof. Claudio Grassi, to study " Mechanisms of damage and early biomarkers in the risk of hearing function from exposure to oto/neurotoxic agents: animal experimentation models and cochlear imaging on exposed objects and neurological patients with numerical simulations of cochlear function and analysis of metabolic profiles also using machine learning techniques " (Borsa su progetto di ricerca INAIL).

2018- 2021 Post-doctoral Research Associate (UK-Dementia Research Institute) in the Department of Basic and Clinical Neuroscience at King's College London under the supervision of Prof. Kwangwook Cho, working on a project focused on understanding synapse weakening in the pathophysiology of Alzheimer's disease

2016 – 2018 Post-doc at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Prof. Claudio Grassi, working on a project focused on understanding the effects of transcranial Direct Current Stimulation (tDCS) on synaptic plasticity in the mouse primary motor cortex (M1) and its use as adjuvant of standard rehabilitation strategies for stroke.

2014 – 2015 Post-doc at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Dr. Simona Nanni, working on a project focused on understanding the epigenetic regulation mechanisms induced by diabetes and metabolic diseases on cardiomyopathies.

2011-2014 PhD at Human Physiology Institute, Università Cattolica Medical School in Rome, under the supervision of Prof. Claudio Grassi, working at the project:" Effects of Extremely Low Frequence Electromagnetic Fields on Neural Stem cells *in vitro* and *ex vivo*"

2006 – 2011 Thesis experience at Laboratory of Dr Annamaria Confaloni, Clinic for the diagnosis and treatment of degenerative diseases of the central nervous system, Cell biology and neuroscience department, National Institute of Health

## EXPERIENCE ABROAD

In 2017, Dr. Saviana Antonella Barbati carried out research at the "Laboratory for Mental Biology" of Prof. Takumi Toru, RIKEN Brain Science Institute (Wako, Saitama, Japan), as part of the "RIKEN BSI Summer" program Program 2017" (June-August 2017).

• From 2018 to 2021, Dr. Saviana Antonella Barbati carried out study and research activities in the laboratory of Prof. Kei Cho as Research Associate of the UK Dementia Research Institute at the Basic and Clinical Neuroscience department of King's College London.

## PROFESSIONAL COURSES

10/2017 "Basic statistics" course at Università Cattolica del Sacro Cuore, Roma

06/2016 Microsurgical Training for the intraluminal middle cerebral artery occlusion (MCAO) for ischemic stroke on rodents model at Caen University, Normandie, France.

04/2009 Theoretical and practical course to work with animal models, knowledge of the legislation governing animal testing, handling of the main animal models used in laboratory practice. (released by Biological Service and for the Management of Animal experimentation, Istituto Superiore di Sanità)

03/2008 Safety training course for PHYSICAL, CHEMICAL and BIOLOGICAL risks in the lab. (released by Prevention and Protection Service, Istituto Superiore di Sanità)

## AWARDS AND SCHOLARSHIPS

25-10-2017 Premio pubblicazione di alta qualità 2017, per l'articolo "Epigenetic modulation of adult hippocampal neurogenesis by extremely-low frequency electromagnetic fields, Leone L, et al.2014, Mol Neurobiol., 49:1472-1486, ISSN:0893-7648, doi: 10.1007/s12035-014-8650-8."

Sept 2017: Award prize for the best poster presented during Italian society for Neurosciene meeting (SINS), Lacco Ameno, Ischia Island- Naples, Italy, October 1-4, 2017.

Aug-Sept 2017: Invited researcher in the RIKEN Brain Science Institute (Lab name: Mental Biology, Lab Head: Toru Takumi).

Jun-Aug 2017: Selected in a global competition among young scientists worldwide to be a Summer Intern in the RIKEN Brain Science Institute (Lab name: Mental Biology, Lab Head: Toru Takumi).

03-05-2012 Prize for the best poster having the first author under 40 within the Biological Area during the Research Day at Università Cattolica del Sacro Cuore (Rome).

2012- 2014: Tutor of student of the Biotechnology graduate program under the assignment given by the Università Cattolica Medical School of Rome.

2011-2014: PhD in Biophysics at Università Cattolica del Sacro Cuore, Rome.

## TEACHING EXPERIENCE

2022- 2023: Lecturer in Neuroscience for the Neuro-Psychomotor Therapy of Developmental Age
Teaching Heart Physiology Practicals in ORGANIC AND FUNCTIONAL SYSTEMS II module for Medicine and surgery course
Teaching Physiology of Excitable Cells Practicals in BIOMEDICAL SCIENCES I module for Medicine and surgery course

2021 – 2022: Lecturer in Neurophysiology (Neurophysiology and Neuroanatomy course) for the Neuro-Psychomotor Therapy of Developmental Age

2012-2014: Svolgimento di attività di tutorato nel corso di Laurea in Biotecnologie Sanitarie, presso la sede di Roma dell'Università Cattolica del Sacro Cuore, con un impegno di 250 ore per le esercitazioni pratiche.

## MAIN RESEARCH TOPICS

The leitmotif of all the scientific production activities of Dr. Barbati are mainly focused on understanding the cellular and molecular mechanisms at the basis of synaptic plasticity in the central and peripheral nervous system in both physiological and in experimental models of pathologies of the nervous system.

In particular:
Study of the molecular mechanisms underlying the synaptic weakening that characterizes the progression of Alzheimer's disease;
Effects of transcranial electrical stimulation (tDCS): (i) on neuronal plasticity synaptic in different brain areas (hippocampus, motor cortex) in mouse models healthy and neurological disease models (Alzheimer's disease and ischemic stroke);
Epigenetic and molecular regulatory mechanisms underlying the modulation of adult neurogenesis;
Effects induced by metabolic and physical stimuli on adult neurogenesis, on plasticity neuronal, on learning and memory.

## CONFERENCES

Dr. Saviana Antonella Barbati has participated in national and international conferences in the field of neuroscience:

- **National conference AIRIC and AINP, 2010**
  Oral presentation:"SORL1 is a risk factor for Alzheimer's Disease in Italian population"; P.Piscopo; G. Talarico; S.Barbati; M.Gaparini; L. Malvezzi Campeggi; E. Piacentini; M.R. Piras; P.Bruno and A.Confaloni, May 2010, Lamezia Terme, Italy
- **IV Conference** for the contribution of Alzheimer's assessment units in the care of patients with dementia (ISS, Rome);
- **SFN 2012,** New Orleans, Louisiana, USA;
- **SFN 2013**, San Diego, California, USA;
- **SFN 2015**, Chicago, Illinois.
  Poster presentation: D-serine accelerates neural stem cell differentiation and NMDA receptor expression ". S.A. Barbati, L. Leone, M. D'Ascenzo, A. Mastrodonato, C. Grassi. 117.02. Society for Neuroscience, SFN 2015, Chicago IL (USA)
- **SINS (Italian society for neuroscience) 2017**, Ischia.
  Poster presentation: "Anodal Transcranial Direct Current Stimulation Enhances Primary Motor Cortex Plasticity and Forelimb Skills in Healthy And Stroked Mice ". S. A. Barbati, S. Cocco, V. Longo, K. Gironi, M. Mainardi, M.V. Podda, C. Grassi. National Congress of Italian Society for Neuroscience, 1-4 October 2017, Lacco Ameno-Ischia;
- **UK DRI Connectome 2018**, Reading; Poster presentation
- **UK DRI Connectome 2019**, Birmingham
  Short oral presentation + poster: "Weakening of M1 muscarinic acetylcholine receptor underlies an Ab mediated pathophysiology of Alzheimer's disease ". S.A. Barbati, JH Yi, SJ Park, S. Mitchell, D. Whitcomb, K. Cho. Conncectome 2019, Birmingham, UK

- **IV International Congress of Psychobiology**, **2022**
  Oral presentation:" Transcranial direct current stimulation promotes neuroplasticity and motor function in healthy and stroke mice" (title of symposium session: "New Therapeutic challenges and future perspectives in cognitive impairment). S.A. Barbati, M. Bolla, F. Paciello, C. Grassi, M.V. Podda. IV International Congress of Psychobiology, Valencia, 20-22 July 2022, Valencia 2022

## LIST OF PUBLICATIONS:

1. Natale, F., Spinelli, M., **Barbati, S. A**., Leone, L., Fusco, S., & Grassi, C. (2022). High Fat Diet Multigenerationally Affects Hippocampal Neural Stem Cell Proliferation via Epigenetic Mechanisms. Cells, 11(17), 2661. doi.org/10.3390/cells11172661

2. **Barbati SA**, Podda MV, Grassi C. Tuning brain networks: the emerging role of transcranial direct current stimulation on structural plasticity. Front. Cell. Neurosci. Sec. Cellular Neuropathology, 2022, doi.org/10.3389/fncel.2022.945777

3. Longo V*, **Barbati SA***, Re A, Paciello F, Bolla M, Rinaudo M, Miraglia F, Alù F, Di Donna MG, Vecchio F, Rossini PM, Podda MV, Grassi C. Transcranial Direct Current Stimulation Enhances Neuroplasticity and Accelerates Motor Recovery in a Stroke Mouse Model. Stroke 53(5):1746-1758, 2022 doi:10.1161/STROKEAHA.121.034200.
(* equal contribution)

4. Natale F, Leone L, Rinaudo M, Sollazzo R, **Barbati SA**, La Greca F, Spinelli M, Fusco S, Grassi C. Neural Stem Cell-Derived Extracellular Vesicles Counteract Insulin Resistance-Induced Senescence of Neurogenic Niche. Stem Cells. 31;40(3):318-331,2022 doi: 10.1093/stmcls/sxab026.

5. Regan P., Mitchell S, Kim SC, Lee YB, Yi J, **Barbati SA,** Shaw C, Cho K. Regulation of synapse weakening through interactions of the microtubule associated protein tau with PACSIN1. J Neurosci. 41(34):7162–7170, 2021 doi:10.1523/JNEUROSCI.3129-20.2021.

6. Yi JH, Whitcomb DJ, Park SJ, Martinez-Perez C, **Barbati SA**, Mitchell SJ, Cho K. (2020) M1 muscarinic acetylcholine receptor dysfunction in moderate Alzheimer's disease pathology. Brain Commun. 2(2):fcaa058. doi: 10.1093/braincomms/fcaa058.

7. **Barbati SA**, Cocco S, Longo V, Spinelli M, Gironi K, Mattera A, Paciello F, Colussi C, Podda MV, Grassi C. (2020) Enhancing Plasticity Mechanisms in the Mouse Motor Cortex by Anodal Transcranial Direct-Current Stimulation: The Contribution of Nitric Oxide Signaling. Cereb Cortex 30(5):2972-2985. doi: 10.1093/cercor/bhz288.

8. Bacci L, **Barbati SA**, Colussi C, Aiello A , Isidori MA , Grassi C , Pontecorvi A, Farsetti A , Gaetano C, Nanni S. (2018) Sildenafil normalizes MALAT1 level in diabetic cardiomyopathy. Endocrine 62(1):259-262. doi: 10.1007/s12020-018-1599-z.

9. Aceto G, Re A, Mattera A, Leone L, Colussi C, Rinaudo M, Scala F, Gironi F, **Barbati SA**, Fusco S, Green T, Laezza F, D'Ascenzo M and Grassi C. (2018) GSK3β Modulates Timing-Dependent Long-Term Depression Through Direct Phosphorylation of Kv4.2 Channels. Cerebral Cortex 29(5):1851-1865. doi: 10.1093/cercor/bhy042

10. Mastrodonato A, **Barbati SA**, Leone L, Colussi C, Gironi K, Rinaudo M, Piacentini R, Denny CA, Grassi C. (2018) Olfactory memory is enhanced in mice exposed to extremely low-frequency electromagnetic fields via Wnt/β-catenin dependent modulation of subventricular zone neurogenesis. Sci Rep. 8(1):262. doi: 10.1038/s41598-017-18676-1.

11. **Barbati SA**, Colussi C, Bacci L, Aiello A, Re A, Stigliano E, Isidori A, Grassi C, Pontecorvi A, Farsetti A, Gaetano C, Nanni S. (2017) Transcription factor CREM mediates high glucose response in cardiomyocytes and in a mouse model of prolonged hyperglycemia. Endocrinology 158(7):2391-2405. doi: 10.1210/en.2016-1960.

12. Manni I, Di Rocco G, Fusco S, Leone L, **Barbati SA**, Carapella CM, Grassi C, Piaggio G, Toietta G (2016) Monitoring the Response of Hyperbilirubinemia in the Mouse Brain by In Vivo Bioluminescence Imaging. Int J Mol Sci. 18(1):50 doi: 10.3390/ijms18010050.

13. Podda MV, Cocco S, Mastrodonato A, Fusco S, Leone L, **Barbati SA**, Colussi C, Ripoli C, Grassi C. (2016) Anodal transcranial direct current stimulation boosts synaptic plasticity and memory in mice via epigenetic regulation of Bdnf expression. Sci Rep. 6:22180. doi: 10.1038/srep22180.

14. Fusco S, Leone L, **Barbati SA**, Samengo D, Piacentini R, Toletta G, Maulucci G, Spinelli M, McBurney M, Pani G & Grassi C. (2016) A Creb-Sirt1-Hes1 Circuitry Mediates Neural Stem Cell Response To Glucose Availability. Cell Rep. 9;14(5):1195-205. doi: 10.1016/j.celrep.2015.12.092.

15. Leone L, Fusco S, Mastrodonato A, Piacentini R, **Barbati SA**, Zaffina S, Pani G, Podda MV, Grassi C. (2014) Epigenetic modulation of adult hippocampal neurogenesis by extremely low-frequency electromagnetic fields. Mol Neurobiol. 49(3):1472-86. doi: 10.1007/s12035-014-8650-8.

16. Podda MV, Leone L, **Barbati SA,** Mastrodonato A, Li Puma DD, Piacentini R, Grassi C. Extremely low-frequency electromagnetic fields enhance the survival of newborn neurons in the mouse hippocampus. (2014) Eur J Neurosci.39(6):893-903. doi: 10.1111/ejn.12465.

17. Podda MV, Piacentini R, **Barbati SA**, Mastrodonato A, Puzzo D, D'Ascenzo M, Leone L, Grassi C. (2013) Role of cyclic nucleotide-gated channels in the modulation of mouse hippocampal neurogenesis, PLoS One. 22;8(8):e73246. doi: 10.1371/journal.pone.0073246.

## Other Pubblications

- **Saviana Antonella Barbati** (2015) Modulation of Adult Neurogenesis: From Epigenetics to Behavior. Tesi di Dottorato in Biofisica.
- D.Galimberti; **S.Barbati**; M.Gaparini; C.Belli; A. Toto; A.Poleggi; A.Crestini; E.Scarpini; G.Bruno and A.Gonfaloni. Alzheimer and Dementia, July 2011Volume 7, Issue 4, Supplement, Page S201