

## BIOGRAPHICAL SKETCH

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NAME Nicola Simola		POSITION TITLE Associate Professor of Pharmacology, Department of Biomedical Sciences, University of Cagliari, Italy		
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 Cagliari, Italy		M.Sc.	1996-2003	Pharmaceutical Chemistry
University of Cagliari, Italy		Ph. D.	2003-2007	Pharmacology of Drug Addiction
The University of Texas at Austin, U.S.A.		Post-Doctoral	2007-2009	Behavioral Neuroscience

### A. Personal Statement

During my undergraduate and graduate training at the University of Cagliari (2002-2007, Micaela Morelli's Lab) I gained experience in the use of experimental rodent models of behavioral pharmacology in the study of neurodegenerative diseases (i.e. Parkinson's disease), drug dependence, and neurotoxic/neuroinflammatory effects of synthetic psychostimulants. After my Ph.D. (University of Cagliari), I spent two years as post-doctoral fellow at the Department of Psychology and Institute of Neuroscience of the University of Texas at Austin, U.S.A. (2007-2009, Timothy Schallert's Lab). During my post-doctoral training I gained experience in the recording and analysis of ultrasonic vocalizations emitted by rodents, which are markers of affect and emotional state. Since then, my research has been devoted to the characterization of ultrasonic vocalizations in rodent models of social behavior and brain disease, and after moving back to the University of Cagliari as post-doctoral fellow (2010), I founded a laboratory of bioacoustics which has contributed important findings to the pharmacological characterization of rodent vocal communication. Starting from 2010, I continued my academic career at the University of Cagliari, where I was appointed Assistant Professor of Pharmacology (2012-2018) and then Associate Professor of Pharmacology (2018-present). During these years, I have also established collaborations with national and international research groups working in the field of neurological and psychiatric disorders (i.e., University of Chile, William Paterson University, U.S.A., University of Kwa-Zulu Natal, South Africa). The major aim of my research is currently to investigate the brain mechanisms that underlie the presence of affective and cognitive dysfunctions in experimental rodent models of Parkinson's disease, and to devise possible therapeutic interventions to treat these dysfunctions. In this regard, a recent study of our group has characterized the modifications in ultrasonic vocalization in hemiparkinsonian rats repeatedly treated with dopaminomimetic drugs, which could be a potential new preclinical model for studying the affective properties of dopamine replacement therapy in Parkinson's disease. Finally, besides being engaged in experimental research, I am involved in campaigns aimed at disseminating the importance of the use of animal models in biomedical research: in doing so, I constantly collaborate with platforms as Research4life and European Animal Research Association (EARA).

### B. Positions and Honors

<b>2003-2007</b>	Ph. D. Student, University of Cagliari, Italy
<b>2007-2009</b>	Post-Doctoral Fellow, The University of Texas at Austin, U.S.A.
<b>2010-2012</b>	Post-Doctoral Fellow, University of Cagliari, Italy
<b>2012-2015</b>	Assistant Professor of Pharmacology (RTD/A), University of Cagliari, Italy
<b>2015-2018</b>	Assistant Professor of Pharmacology (RTD/B), University of Cagliari, Italy

**2018-present** Associate Professor of Pharmacology, University of Cagliari, Italy  
**2020** National Qualification (ASN) as Professor of Pharmacology

#### Other Experience and Professional Memberships

**09-10/2011; 11-12/2013; 11-12/2019** Visiting Scientist at the Programme of Molecular and Clinical Pharmacology, University of Chile, Santiago, Chile.

**11/2014** Visiting Scientist at the College of Health Sciences, University of Kwa-Zulu Natal, Durban, South Africa.

**09/2015** Visiting Scientist at the Institute of Pharmacology, Polish Academy of Sciences, Krakow, Poland

**5-6/2019** Visiting Scientist at the Department of Biology, William Paterson University of New Jersey, U.S.A.

**2018- present** Member of the Advisory Board of the PhD School in Neuroscience, University of Cagliari, Italy

**2018- present** Member of the Organism for Animal Welfare (OPBA) University of Cagliari, Italy

Member of the Italian Society for Neuroscience (SINS), Italian Society of Pharmacology (SIF), Italian Society for the Study of Addiction (SITD), Mediterranean Neuroscience Society (MNS).

#### Editorial Activity

**2007-present** *ad hoc* reviewer for several International Journals with Impact Factor in the fields of Neuropharmacology and Neuroscience

**2015** Guest Editor for the Journal *Current Neuropharmacology* (SI, *Ultrasonic vocalizations in rats: a tool for the investigation of psychoactive drugs and neuropsychiatric conditions*)

**2015** Editor of a book (*The Adenosinergic system - a non-dopaminergic target in Parkinson's disease*) published by Springer in 2015 in the series "*Current Topics in Neurotoxicity*"

**2013** – present Academic Editor, *Biomed Research International*, Section Neuroscience

**2019** Guest Editor, *Frontiers in Aging Neuroscience* (SI, *Progress in Risk Factors and Development of Parkinson's Disease*)

**2020** – present Associate Editor, *Frontiers in Behavioral Neuroscience*, Section Motivation and Reward

**2020-present** Guest Editor, *Experimental Neurology* (SI, *Synthetic psychoactive substances and neurological diseases*)

**2020-present** Guest Editor, *International Journal of Molecular Sciences* (SI, *Exposure to Phytocannabinoids: Exploring Central Effects and Toxicity*)

**2021-present** Associate Editor, *Frontiers in Pharmacology*, Section Ethnopharmacology

#### **C. Selected Peer-reviewed Publications (15 best peer-reviewed publications)**

Total number of publications: 85, h-index: 27 (ISI), 28 (Scopus), 31 (Google Scholar)

**1) Simola N**, Serra M, Marongiu J, Costa G, Morelli M. Increased emissions of 50-kHz ultrasonic vocalizations in hemiparkinsonian rats repeatedly treated with dopaminomimetic drugs: A potential preclinical model for studying the affective properties of dopamine replacement therapy in Parkinson's disease. *Progress in Neuropsychopharmacology & Biological Psychiatry*. 2021;108:110184. doi: 10.1016/j.pnpbp.2020.110184

**2) Costa G**, Serra M, Marongiu J, Morelli M, **Simola N**. Influence of dopamine transmission in the medial prefrontal cortex and dorsal striatum on the emission of 50-kHz ultrasonic vocalizations in rats treated with amphetamine: Effects on drug-stimulated and conditioned calls. *Progress in Neuropsychopharmacology & Biological Psychiatry*. 2020; 97:109797. doi: 10.1016/j.pnpbp.2019.109797.

**3) Simola N**, Granon S. Ultrasonic vocalizations as a tool in studying emotional states in rodent models of social behavior and brain disease. *Neuropharmacology*. 2019;159:107420. doi: 10.1016/j.neuropharm.2018.11.008.

- 4) Costa G, Serra M, Pintori N, Casu MA, Zanda MT, Murtas D, De Luca MA, **Simola N\***, Fattore L. The novel psychoactive substance methoxetamine induces persistent behavioral abnormalities and neurotoxicity in rats. *Neuropharmacology*. 2019 Jan;144:219-232. doi: 10.1016/j.neuropharm.2018.10.031. \*corresponding author
- 5) **Simola N**, Paci E, Serra M, Costa G, Morelli M. Modulation of rat 50-kHz ultrasonic vocalizations by glucocorticoid signaling: Possible relevance to reward and motivation. *International Journal of Neuropsychopharmacology*. 2018; 21:73-83. doi: 10.1093/ijnp/pyx106.
- 6) **Simola N**, Costa G, Morelli M. Activation of adenosine A<sub>2</sub>A receptors suppresses the emission of pro-social and drug-stimulated 50-kHz ultrasonic vocalizations in rats: possible relevance to reward and motivation. *Psychopharmacology*. 2016; 233:507-19. doi: 10.1007/s00213-015-4130-8.
- 7) **Simola N**. Rat ultrasonic vocalizations and behavioral neuropharmacology: From the screening of drugs to the study of disease. *Current Neuropharmacology*. 2015;13:164-79. doi: 10.2174/1570159x13999150318113800.
- 8) Moratalla R, Khairnar A, **Simola N**, Granado N, García-Montes JR, Porceddu PF, Tizabi Y, Costa G, Morelli M. Amphetamine-related drugs neurotoxicity in humans and in experimental animals: Main mechanisms. *Progress in Neurobiology*. 2017;155:149-170. doi: 10.1016/j.pneurobio.2015.09.011.
- 9) Costa G, Morelli M, **Simola N**. Involvement of glutamate NMDA receptors in the acute, long-term, and conditioned effects of amphetamine on rat 50 kHz ultrasonic vocalizations. *International Journal of Neuropsychopharmacology*. 2015;18:pyv057. doi: 10.1093/ijnp/pyv057.
- 10) **Simola N**, Morelli M. Repeated amphetamine administration and long-term effects on 50-kHz ultrasonic vocalizations: possible relevance to the motivational and dopamine-stimulating properties of the drug. *European Neuropsychopharmacology*. 2015 Mar;25(3):343-55. doi:10.1016/j.euroneuro.2015.01.010.
- 11) **Simola N**, Frau L, Plumitallo A, Morelli M. Direct and long-lasting effects elicited by repeated drug administration on 50-kHz ultrasonic vocalizations are regulated differently: implications for the study of the affective properties of drugs of abuse. *International Journal of Neuropsychopharmacology*. 2014;17:429-41. doi:10.1017/S1461145713001235.
- 12) Frau L, Morelli M, **Simola N**. Performance of movement in hemiparkinsonian rats influences the modifications induced by dopamine agonists in striatal efferent dynorphinergic neurons. *Experimental Neurology*. 2013; 247:663-72. doi:10.1016/j.expneurol.2013.03.002.
- 13) **Simola N**, Fenu S, Costa G, Pinna A, Plumitallo A, Morelli M. Pharmacological characterization of 50-kHz ultrasonic vocalizations in rats: comparison of the effects of different psychoactive drugs and relevance in drug-induced reward. *Neuropharmacology*. 2012; 63:224-34. doi:10.1016/j.neuropharm.2012.03.013.
- 14) **Simola N**, Ma ST, Schallert T. Influence of acute caffeine on 50-kHz ultrasonic vocalizations in male adult rats and relevance to caffeine-mediated psychopharmacological effects. *International Journal of Neuropsychopharmacology*. 2010;13:123-32. doi: 10.1017/S1461145709990113.
- 15) **Simola N**, Fenu S, Baraldi PG, Tabrizi MA, Morelli M. Blockade of adenosine A<sub>2</sub>A receptors antagonizes parkinsonian tremor in the rat tacrine model by an action on specific striatal regions. *Experimental Neurology*. 2004;189:182-8. doi:10.1016/j.expneurol.2004.05.027.

## D. Research Support

### Ongoing Research Support

**2019** Participant in the PRIN project: "Molecular and imaging prodromal markers of dopamine neuron degeneration in animal models of Parkinson's disease: pathophysiology and clinical perspectives".

**2021 -present** Participant in the project: "Angiotensin system's role in SARS-COV2 infection in multiple sclerosis: from bed to the bench-side" – Funded by Fondazione di Sardegna

### Completed Research Support

**2013** PI of the project: "Adenosine A2A receptor antagonists as treatment for cognitive decline associated with aging" (*Farmaci antagonisti del recettore A2A dell'adenosina per il trattamento del declino cognitivo associato all'invecchiamento: studio preclinico*). Funded by Fondazione di Sardegna

**2014** PI of the project: "Preclinical and clinical study of the obsessive-compulsive traits associated with Parkinson's disease" (*Studio sperimentale e valutazione clinica dei comportamenti compulsivi associati alla malattia di Parkinson*). Funded by Fondazione di Sardegna

**2014-2018** Head of the Italian Unit of the International Research Project: "HIV associated neurotoxicity". Funded by National Research Foundation of South Africa and Italian Ministry for Foreign Affairs (Executive Program 2014-2016)

**2015-2018** Participant in the PRIN project: "Identification of molecular mechanisms linking neuroinflammation and mitochondrial dysfunction to the spreading of Parkinson's disease: perspectives for an innovative therapeutic approach".

**2017-2019** PI of the project: "Experimental study of the cerebral toxicity induced by hyperglycemia and of the link between diabetes and dopaminergic neurodegeneration" (*Studio sperimentale della tossicità cerebrale indotta dall'iperglicemia e valutazione possibile legame tra diabete mellito e neurodegenerazione dopaminergica*). Funded by Regione Autonoma della Sardegna

**2017-2019** PI of the project: "Targeting neuroinflammation in psychiatric diseases: a multidisciplinary approach". Funded by Fondazione di Sardegna