
BIOGRAPHICAL SKETCH

NAME: Alessandro Tozzi

POSITION TITLE: Associate Professor of Physiology. University of Perugia, Italy.

Head of Neurophysiology Lab at the Department of Medicine and Surgery.

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University "La Sapienza" of Rome, Italy	B.Sc. & Master degree	1995	Biological Sciences
University "Tor Vergata" of Rome, Italy	Fellowship	1997	Neuroscience
RIKEN, BSI, Wako-shi, Japan	Fellowship	1998	Neuroscience
University "Tor Vergata" of Rome, Italy	Ph.D.	2004	Neuroscience
Fondazione Santa Lucia IRCCS, Rome, Italy	Postdoctoral	2004-08	Neuroscience
University of Perugia, Italy	Postdoctoral	2009-13	Neuroscience
University of Perugia, Italy	Assistant Professor	2013-19	Neurophysiology
University of Perugia, Italy	Associate Professor	2019-present	Neurophysiology

A. Personal Statement

In my career, I decided to focus on the study of mechanisms underlying neuronal communication and biological phenomena at the basis of neuronal memory systems such as synaptic plasticity. These neurophysiological investigations, involving aspects of biochemistry, molecular and cellular biology, gain great significance and value when conducted with a view to understanding diseases still without etiological cure, such as Multiple sclerosis or Parkinson's disease. For this reason, over the years I have been involved in investigating - mainly with electrophysiological approaches in animal models - how and by what mechanisms synaptic memory deficits are linked to the development of major neurological diseases. In particular, my field of research has led me to focus on the early stages of the diseases.

B. Positions, Scientific Appointments, and Honors

Teaching positions

Since 2013, Dr Tozzi is Associate Professor of human physiology in various graduate courses at the University of Perugia.

He is a member of the Board of Lecturers of the PhD course in Clinical and Molecular Medicine and the School of Specialization in Neurology at the University of Perugia.

Research positions

Study of synaptic transmission in the central nervous system under physiological and pathological conditions. Molecular pathways that modulate the processes underlying learning and memory, under physiological and pathological conditions.

Particular focus on:

- Electrophysiology of basal ganglia circuits.
- Modulation of synaptic plasticity and transmission under physiological conditions and in experimental animal models of neurological/neurodegenerative disorders (Parkinson's and Alzheimer's disease, autism and multiple sclerosis)
- Role of estrogenic steroids and neuroactive androgens in synaptic plasticity

Research grants

P.I., Perugia Unit, Ministry for Universities and Research Grant (P2022374Y9) "Neuronal and synaptic dysfunctions caused by TCF20 intellectual disability gene".

P.I., Perugia Unit, Ministry of Universities and Research Grant (2022CAKAHL) "Mechanisms underlying therapeutic approaches in an alphasynuclein-based model of Parkinson's disease: from pharmacological to non-pharmacological strategies".

P.I., Perugia Unit, Grant Telethon 2016 (GGP16131) "Neuronal dysfunctions underlying Phelan-McDermid syndrome and their rescue by genetic and pharmacological modulation of mGlu5 signaling".

P.I., Ministry of Health (RF-2011-02349806) "Mitochondrial targeting in LRRK2-associated parkinsonism (PARK8)".

Substitute P.I., Ministry of Health Grant (RF-2013-02357386) "Role of serotonin in modulating L-DOPA-induced dyskinesia".

Participation to scientific forum

- Attender and part of the local organizing committee at the National Congress of the Italian Neuroscience Society (SINS), September 26-29, 2019 Perugia, Italy
- Speaker: 69th Congress of The Physiological Society of Italy (SIF 2018), 19-21 September 2018, Florence, Italy
- Speaker: National Congress of the Italian Neuroscience Society, October 1-4, 2017 Lacco Ameno, Ischia Island - Naples, Italy
- Chairman: Memoria: dai sistemi neuronali alle disfunzioni cliniche. Perugia 27 Maggio 2017.
- 6th Biennial workshop on dystonia: "Dystonia: the link between hypo- and hyperkinetic movement disorders?" 12 & 13 Maggio 2017 by the Nobile Collegio Farmaceutico, Roma
- The Fresco Conference 4th International Workshop on Synaptic Plasticity: "from bench to bedside" — 12-14 September 2016 Lucca, Italy
- International conference — Motor Complications in Parkinson's Disease Current Status and Future Prospects — April 21-22, 2016 Casina Pio IV — Vatican City
- 9th FENS Forum of Neuroscience - Milan, July 5-9, 2014
- Gordon Research Conference, Basal Ganglia Cells and Circuits in Health and Disease 2-7 February 2014, Ventura, CA, USA
- Society for Neuroscience 43th Annual Meeting - November 9-13, 2013 San Diego, CA
- Speaker: Congresso "Diamo una risposta alle persone con sclerosi multipla" — FISM -Roma 29-30/5, 2013
- 8th FENS Forum of Neuroscience - Barcelona, July 14-18, 2012
- Speaker: 35° Congresso nazionale della Società italiana di farmacologia (SIF), Bologna 14-17 September, 2011
- 7th Forum of European Neuroscience - Amsterdam July 3-7, 2010
- 1st International Workshop on Synaptic Plasticity: From Bench to Bed Side, Giardini-Naxos (ME) 2010
- Society for Neuroscience 38th Annual Meeting - November 15-19, 2008 Washington, DC
- Parkinson's Disease: beyond motor dysfunction - Perugia, November 30, December 1, 2006
- 4th Forum of European Neuroscience FENS FORUM - Lisbon, July 10-14, 2004
- National Congress of the Italian Neuroscience Society (SINS), Brescia 1997

Other activities (selection)

Member of the Italian Society of Neuroscience (SINS) since year 2015 and of Italian Society of Physiology (SIF) since year 2021.

Associate Editor for *Frontiers in Cellular Neuroscience*
Guest Editor for *Cells*

C. Contributions to Science

Over the years, prof. Tozzi has been involved over in the study of neuronal functions in health and disease, focusing on basal ganglia- and hippocampal-dependent learning, by means of -but not limited to- electrophysiological techniques in rodent brain slice models. Regarding these research topics, he has been co-authoring many scientific publications on peer-reviewed international indexed journals, where in some he was first or last in the author's list.

General quality indicators of scientific production

According to Google Scholar: Total citations: 6307. H index: 38. Index i10 = 82.

According to Scopus: Total citations: 4410. H index: 34.

Selected publications of original research articles

1. Bellingacci L, Tallarico M, Mancini A, Megaro A, De Caro C, Citraro R, De Sarro G, Tozzi A, Di Filippo M, Sciacaluga M, Russo E, Leo A, Costa C. Non-competitive AMPA glutamate receptors antagonism by perampanel as a strategy to counteract hippocampal hyper-excitability and cognitive deficits in cerebral amyloidosis. *Neuropharmacology*. (2023) Mar 1;225:109373.
2. Di Filippo M, Mancini A, Bellingacci L, Gaetani L, Mazzocchetti P, Zelante T, La Barbera L, De Luca A, Tantucci M, Tozzi A, Durante V, Sciacaluga M, Megaro A, Chiasserini D, Salvadori N, Lisetti V, Portaccio E, Costa C, Sarchielli P, Amato MP, Parnetti L, Viscomi MT, Romani L, Calabresi P. Interleukin-17 affects synaptic plasticity and cognition in an experimental model of multiple sclerosis. *Cell Rep*. (2021) Dec 7;37(10):110094.
3. Bellingacci L, Mancini A, Gaetani L, Tozzi A, Parnetti L, Di Filippo M. Synaptic Dysfunction in Multiple Sclerosis: A Red Thread from Inflammation to Network Disconnection. *Int J Mol Sci*. (2021) Sep 9;22(18):9753.
4. Tozzi A*, Sciacaluga M.*, Loffredo V, Megaro A, Ledonne A, Cardinale A, Federici M, Bellingacci L, Paciotti S, Ferrari E, La Rocca A, Martini A, Mercuri NB, Gardoni F, Picconi B, Ghiglieri V, De Leonibus E, Calabresi P. Dopamine-dependent early synaptic and motor dysfunctions induced by alpha-synuclein in the nigrostriatal circuit. (2021) *Brain*, 144(11), pp. 3477-3491.
5. Mossa, A., Pagano, J., Ponzoni, L., Tozzi, A., Vezzoli, E., Sciacaluga, M., Costa, C., Beretta, S., Francolini, M., Sala, M., Calabresi, P., Boeckers, T.M., Sala, C., Verpelli, C. Developmental impaired Akt signaling in the Shank1 and Shank3 double knock-out mice (2021) *Molecular Psychiatry*, 26 (6), pp. 1928-1944.
6. Sciacaluga, M., Mazzocchetti, P., Bastioli, G., Ghiglieri, V., Cardinale, A., Mosci, P., Caccia, C., Keywood, C., Melloni, E., Padoani, G., Vailati, S., Picconi, B., Calabresi, P., Tozzi, A. Effects of safinamide on the glutamatergic striatal network in experimental Parkinson's disease (2020) *Neuropharmacology*, 170, p.108024.
7. Tozzi, A., Durante, V., Manca, P., Di Mauro, M., Blasi, J., Grassi, S., Calabresi, P., Kawato, S., Pettorossi, V.E. Bidirectional Synaptic Plasticity Is Driven by Sex Neurosteroids Targeting Estrogen and Androgen Receptors in Hippocampal CA1 Pyramidal Neurons (2019) *Frontiers in Cellular Neuroscience*, 13, p. 534.
8. Durante, V., De Iure, A., Loffredo, V., Vaikath, N., De Risi, M., Paciotti, S., Quiroga-Varela, A., Chiasserini, D., Mellone, M., Mazzocchetti, P., Calabrese, V., Campanelli, F., Mechelli, A., Di Filippo, M., Ghiglieri, V., Picconi, B., El-Agnaf, O.M., De Leonibus, E., Gardoni, F., Tozzi, A., Calabresi, P. Alpha-synuclein targets GluN2A NMDA receptor subunit causing striatal synaptic dysfunction and visuospatial memory alteration (2019) *Brain*, 142 (5), pp. 1365-1385.

9. Tozzi, A., Durante, V., Bastioli, G., Mazzocchetti, P., Novello, S., Mechelli, A., Morari, M., Costa, C., Mancini, A., Di Filippo, M., Calabresi, P. Dopamine D2 receptor activation potently inhibits striatal glutamatergic transmission in a G2019S LRRK2 genetic model of Parkinson's disease (2018) *Neurobiology of Disease*, 118, pp. 1-8.
10. Tozzi, A., Tantucci, M., Marchi, S., Mazzocchetti, P., Morari, M., Pinton, P., Mancini, A., Calabresi, P. Dopamine D2 receptor-mediated neuroprotection in a G2019S Lrrk2 genetic model of Parkinson's disease (2018) *Cell Death and Disease*, 9 (2), p. 204.
11. Mancini A, Tantucci M, Mazzocchetti P, de Iure A, Durante V, Macchioni L, Giampà C, Alvino A, Gaetani L, Costa C, Tozzi A, Calabresi P, Di Filippo M. Microglial activation and the nitric oxide/cGMP/PKG pathway underlie enhanced neuronal vulnerability to mitochondrial dysfunction in experimental multiple sclerosis. *Neurobiol Dis.* (2018) May;113:97-108.
12. Vicidomini, C., Ponzoni, L., Lim, D., Schmeisser, M.J., Reim, D., Morello, N., Orellana, D., Tozzi, A., Durante, V., Scalmani, P., Mantegazza, M., Genazzani, A.A., Giustetto, M., Sala, M., Calabresi, P., Boeckers, T.M., Sala, C., Verpelli, C. Pharmacological enhancement of mGlu5 receptors rescues behavioral deficits in SHANK3 knock-out mice (2017) *Molecular Psychiatry*, 22 (5), pp. 689-702.
13. Tozzi, A., de Iure, A., Bagetta, V., Tantucci, M., Durante, V., Quiroga-Varela, A., Costa, C., Di Filippo, M., Ghiglieri, V., Latagliata, E.C., Wegrzynowicz, M., Decressac, M., Giampà, C., Dalley, J.W., Xia, J., Gardoni, F., Mellone, M., El-Agnaf, O.M., Ardah, M.T., Puglisi-Allegra, S., Björklund, A., Spillantini, M.G., Picconi, B., Calabresi, P. Alpha-Synuclein Produces Early Behavioral Alterations via Striatal Cholinergic Synaptic Dysfunction by Interacting With GluN2D N-Methyl-D-Aspartate Receptor Subunit (2016) *Biological Psychiatry*, 79 (5), pp. 402-414.
14. Di Filippo M, de Iure A, Giampà C, Chiasserini D, Tozzi A, Orvietani PL, Ghiglieri V, Tantucci M, Durante V, Quiroga-Varela A, Mancini A, Costa C, Sarchielli P, Fusco FR, Calabresi P. Persistent activation of microglia and NADPH oxidase [corrected] drive hippocampal dysfunction in experimental multiple sclerosis. *Sci Rep.* (2016) Feb 18;6:20926. doi: 10.1038/srep20926. Erratum in: *Sci Rep.* 2016;6:23855.
15. Tozzi, A., de Iure, A., Tantucci, M., Durante, V., Quiroga-Varela, A., Giampà, C., Di Mauro, M., Mazzocchetti, P., Costa, C., Di Filippo, M., Grassi, S., Pettorossi, V.E., Calabresi, P. Endogenous 17 β -estradiol is required for activity-dependent long-term potentiation in the striatum: Interaction with the dopaminergic system (2015) *Frontiers in Cellular Neuroscience*, 9, p.192.
16. Tozzi, A., Scip, A., Tantucci, M., de Iure, A., Ghiglieri, V., Costa, C., Di Filippo, M., Borsello, T., Calabresi, P. Region- and age-dependent reductions of hippocampal long-term potentiation and NMDA to AMPA ratio in a genetic model of Alzheimer's disease (2015) *Neurobiology of Aging*, 36 (1), pp. 123-133.
17. Scip, A., Tozzi, A., Abaza, A., Cardinetti, D., Colombo, I., Calabresi, P., Salmona, M., Welker, E., Borsello, T. c-Jun N-terminal kinase has a key role in Alzheimer disease synaptic dysfunction in vivo. (2014) *Cell Death Dis.* Jan 23;5(1):e1019.
18. Tozzi, A., De Iure, A., Di Filippo, M., Costa, C., Caproni, S., Pisani, A., Bonsi, P., Picconi, B., Cupini, L.M., Materazzi, S., Geppetti, P., Sarchielli, P., Calabresi, P. Critical role of calcitonin gene-related peptide receptors in cortical spreading depression (2012) *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 109 (46), pp. 18985-18990.
19. Tozzi, A., Costa, C., Siliquini, S., Tantucci, M., Picconi, B., Kurz, A., Gispert, S., Auburger, G., Calabresi, P. Mechanisms underlying altered striatal synaptic plasticity in old A53T- α synuclein overexpressing mice (2012) *Neurobiology of Aging*, 33 (8), pp. 1792-1799.
20. Tozzi, A., de Iure, A., Marsili, V., Romano, R., Tantucci, M., Di Filippo, M., Costa, C., Napolitano, F., Mercuri, N.B., Borsini, F., Giampà, C., Fusco, F.R., Picconi, B., Usiello, A., Calabresi, P. A2A adenosine receptor antagonism enhances synaptic and motor effects of cocaine via CB1 cannabinoid receptor activation (2012) *PLoS ONE*, 7 (6), art. no. e38312.
21. Costa, C., Sgobio, C., Siliquini, S., Tozzi, A., Tantucci, M., Ghiglieri, V., Di Filippo, M., Pendolino, V., De Iure, A., Marti, M., Morari, M., Spillantini, M.G., Latagliata, E.C., Pascucci, T., Puglisi-Allegra, S., Gardoni, F., Di Luca, M., Picconi, B., Calabresi, P. Mechanisms underlying the impairment of hippocampal long-term potentiation and memory in experimental Parkinson's disease (2012) *Brain*, 135 (6), pp. 1884-1899.

22. Sclip, A., Antoniou, X., Colombo, A., Camici, G.G., Pozzi, L., Cardinetti, D., Feligioni, M., Veglianese, P., Bahlmann, F.H., Cervo, L., Balducci, C., Costa, C., Tozzi, A., Calabresi, P., Forloni, G., Borsello, T. c-Jun N-terminal kinase regulates soluble A β oligomers and cognitive impairment in AD mouse model (2011) *Journal of Biological Chemistry*, 286 (51), pp. 43871-43880.
23. Tozzi, A., De Iure, A., Di Filippo, M., Tantucci, M., Costa, C., Borsini, F., Ghiglieri, V., Giampà, C., Fusco, F.R., Picconi, B., Calabresi, P. The distinct role of medium spiny neurons and cholinergic interneurons in the D2/A2A receptor interaction in the striatum: Implications for Parkinson's disease (2011) *Journal of Neuroscience*, 31 (5), pp. 1850-1862.
24. Kurz, A., Double, K.L., Lastres-Becker, I., Tozzi, A., Tantucci, M., Bockhart, V., Bonin, M., García-Arencibia, M., Nuber, S., Schlaudraff, F., Liss, B., Fernández-Ruiz, J., Gerlach, M., Wullner, U., Lüddens, H., Calabresi, P., Auburger, G., Gisbert, S. A53T-alpha-synuclein overexpression impairs dopamine signaling and striatal synaptic plasticity in old mice (2010) *PLoS ONE*, 5 (7), pp. 1-15.
25. Tozzi, A., Tschertter, A., Belcastro, V., Tantucci, M., Costa, C., Picconi, B., Centonze, D., Calabresi, P., Borsini, F. Interaction of A2A adenosine and D2 dopamine receptors modulates corticostriatal glutamatergic transmission (2007a) *Neuropharmacology*, 53 (6), pp. 783-789.
26. Tozzi, A., Costa, C., Di Filippo, M., Tantucci, M., Siliquini, S., Belcastro, V., Parnetti, L., Picconi, B., Calabresi, P. Memantine reduces neuronal dysfunctions triggered by in vitro ischemia and 3-nitropropionic acid (2007b) *Experimental Neurology*, 207 (2), pp. 218-226.
27. Bengtson, C.P., Tozzi, A., Bernardi, G., Mercuri, N.B. Transient receptor potential-like channels mediate metabotropic glutamate receptor EPSCs in rat dopamine neurons (2004) *Journal of Physiology*, 555 (2), pp. 323-330.
28. Tozzi, A., Bengtson, C.P., Longone, P., Carignani, C., Fusco, F.R., Bernardi, G., Mercuri, N.B. Involvement of transient receptor potential-like channels in responses to mGluR-I activation in midbrain dopamine neurons (2003) *European Journal of Neuroscience*, 18 (8), pp. 2133-2145.
29. Tozzi, A., Guatteo, E., Caputi, L., Bernardi, G., Mercuri, N.B. Group I mGluRs coupled to G proteins are regulated by tyrosine kinase in dopamine neurons of the rat midbrain (2001) *Journal of Neurophysiology*, 85 (6), pp. 2490-2497.