

PART I: GENERAL INFORMATION

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Place of Birth: Genoa, Italy

Education:

1996 Degree, Biology University of Genoa, Italy

2002 Ph.D., Biophysics International School for Advanced Studies,
Trieste, Italy

Postdoctoral Training:

2002 - 2003 Postdoctoral Fellow Dept. of Pharmacology and Toxicology, Univ. of
Zurich, Switzerland, Hanns Mohler, advisor

2003 - 2005 Postdoctoral Fellow Dept. of Biophysics, Georgetown University,
Washington DC, USA, Stefano Vicini, advisor

2005 - 2007 Postdoctoral Fellow CNRS UMR5091, Institute de Neuroscience F.
Magendie, Bordeaux, France, Christophe Mulle,
advisor

Academic Appointments:

2007 - present Team Leader Dept. of Neuroscience and Brain Technologies,
Italian Institute of Technology (IIT), Genoa, Italy

Scientific Service:

Departmental and IIT-wide

- 2013 - present PhD selection advisory panel at IIT / University of Genoa
2008 - present Annual IIT PhD Course: “An integrated view of the synapse: roles of neurons and glia in the regulation of synaptic transmission and plasticity”

National / International

- 2012 - present Member of the *ISRN Neuroscience* Editorial Board
2013 - present Associate Editor of *Frontiers of Cellular Neuroscience*

Professional Societies:

- 1995 - present Society for Neuroscience
2010 - present SINS

Regular Reviewer for the Journals:

The Journal of Neuroscience, Journal of Physiology, European Journal of Neuroscience, Molecular Pharmacology, PLoS One.

Funding for Research

2016-2018	Telethon, GGP16083	Impairment of GABAergic signaling and synaptic plasticity as key determinants for neurodevelopmental disorders: a study from NL3R451C knock-in mice, an animal model of autism	PI	147.400 euros
2015-2017	Compagnia di san Paolo SIME 2015-0682	Ultra-high-speed 3D tracker of nanometric objects	Collab	50.000 euros
2013-2015	Compagnia di san Paolo ROL-4318	Alterazioni della plasticità sinaptica in due modelli animali per l'autismo: ruolo della proteina	Coord	80.000 euros

sinaptica neurologina

2012-2014	Telethon, GGP11043	Mechanisms underlying altered GABA signalling in the hippocampus of transgenic mice carrying the human R451C mutation of the NLG3 gene: an animal model of Autism	PI	150.000 euros
2011-2013	FET Proactive7	FOCUS	Collab	100.000 euros
2010-2013	Telethon, GGP10135	The role of GABA _A receptor mutations in idiopathic generalized epilepsy: a developmental study	Collab	30.000 euros

Publications

de Luca E, Ravasenga T, Petrini EM, Polenghi A, Nieuws T, Guazzi S, Barberis A. Inter-Synaptic Lateral Diffusion of GABA_A Receptors Shapes Inhibitory Synaptic Currents. **Neuron**. 2017 Jul 5;95(1):63-69.e5. doi: 10.1016/j.neuron.2017.06.022.

Dante S, Petrelli A, Petrini EM, Marotta R, Maccione A, Alabastri A, Quarta A, De Donato F, Ravasenga T, Sathya A, Cingolani R, Proietti Zaccaria R, Berdondini L, Barberis A, Pellegrino T. Selective Targeting of Neurons with Inorganic Nanoparticles: Revealing the Crucial Role of Nanoparticle Surface Charge. **ACS Nano**. 2017 Jul 25;11(7):6630-6640. doi: 10.1021/acsnano.7b00397. Epub 2017 Jun 23.

Sancataldo G., Scipioni L., Ravasenga T., Lanzano L., Diaspro A., Barberis A., Duocastella M. Three-dimensional multiple-particle tracking with nanometric precision over tunable axial ranges. 2017; **Optica**, vol. 4, (no. 3), pp. 367-373, 2334-2536 DOI; <https://doi.org/10.1364/OPTICA.4.000367>;

Pennacchietti F., Vascon S., Nieuws T., Rosillo C., Sabyasachi D., Tyagarjan S., Diaspro A., Del Bue A., Petrini E. M., Barberis A., Cella Zanacchi F. Nanoscale molecular reorganization of the inhibitory postsynaptic density is a determinant of GABAergic synaptic potentiation. 2017; **The Journal of Neuroscience**, pp. 0514-0516 DOI 10.1523/JNEUROSCI.0514-16.

Antonelli R., De Filippo R., Middei S., Stancheva S. H., Pastore B., Ammassari-Teule M., Barberis A., Cherubini E., Zacchi P. Pin1 Modulates the Synaptic Content of NMDA Receptors via Prolyl-Isomerization of PSD-95, 2016; **The Journal of Neuroscience**, 1529-2401 DOI 10.1523/JNEUROSCI.3124-15.2016

Barberis A., Bacci A. Editorial: Plasticity of GABAergic synapses. 2015; **Frontiers in Cellular Neuroscience**, vol. 9, (no. 262), 1662-5102; DOI 10.3389/fncel.2015.00262

Tsushima H., Emanuele M., Polenghi A., Esposito A., Vassalli M., Barberis A., Difato F., Chieriegatti E. HDAC6 and RhoA are novel players in Abeta-driven disruption of neuronal polarity; 2014; **Nature Communications**, vol. 6, pp. 7781, 2041-1723 DOI 10.1038/ncomms8781

Petrini E. M., Ravasenga T., Hausrat T.J., Iurilli G., Olcese U., Racine V., Sibarita J.B., Jacob T. C., Moss S. J., Benfenati F., Medini P., Kneussel M., Barberis A. Synaptic recruitment of gephyrin regulates surface GABAA receptor dynamics for the expression of inhibitory LTP. 2014; **Nature Communications**, vol. 5, pp. 3921, 2041-1723; DOI 10.1038/ncomms4921

Frola E, Patrizi A, Goetz T, Medrihan L, Petrini EM, Barberis A, Wulff P, Wisden W, Sassoè-Pognetto M. Synaptic competition sculpts the development of GABAergic axo-dendritic but not perisomatic synapses. **PLoS One**. 2013;8(2):e56311.

Limongi T, Cesca F, Gentile F, Marotta R, Ruffilli R, Barberis A, Dal Maschio M, Petrini EM, Santoriello S, Benfenati F, Di Fabrizio E. Nanostructured superhydrophobic substrates trigger the development of 3D neuronal networks. **Small**. 2013 Feb 11;9(3):402-12. doi: 10.1002/sml.201201377.

Succol F, Fiumelli H, Benfenati F, Cancedda L, Barberis A. (2011) Intracellular chloride concentration influences GABA(A) receptor subunit composition. **Nature Communications**. 2012 Mar 13;3:738.

Petrini EM, Nieuw T, Ravasenga T, Succol F, Guazzi S, Benfenati F, Barberis A, (2011). Influence of GABA(A)R monoligated states on GABAergic responses. **The Journal of Neuroscience**. 2;31(5):1752-61

Benke D, Barberis A, Kopp S, Altmann KH, Schubiger M, Vogt KE, Rudolph U, Möhler H. (2008) GABA(A) receptors as in vivo substrate for the anxiolytic action of valerenic acid, a major constituent of valerian root extracts. **Neuropharmacology**. 56(1):174-81

Barberis A, Sachidhanandam S and Mülle C. (2008) GluR6/KA2 kainate receptors mediate slow deactivating currents **The Journal of Neuroscience**. 28(25):6402-6.

Mozrzymas JW, Barberis A, Vicini S. (2007) GABAergic currents in RT and VB thalamic nuclei follow kinetic pattern of alpha3- and alpha1-subunit-containing GABA(A) receptors. **Eur J. Neurosci**. 26(3):657-65

Barberis A, Jerzy W. Mozrzymas, Pavel I. Ortinski and Vicini S. (2007) Desensitization and binding properties determine distinct alpha1 and alpha3 GABA(A) receptor-channel kinetic behavior **Eur J. Neurosci** 26(3):657-65

Ortinski PI, Turner JR, Barberis A, Motamedi G, Yasuda RP, Wolfe BB, Kellar KJ, Vicini S. (2006) Deletion of the GABA(A) receptor alpha1 subunit increases tonic GABA(A) receptor

current: a role for GABA uptake transporters. **The Journal of Neuroscience**. 6;26(36):9323-31.

Barberis A, Lu C, Vicini S, Mozrzymas JW. (2005) Developmental changes of GABA synaptic transient in cerebellar granule cells. **Mol Pharmacol**. 67(4):1221-8.

Fiszman ML, Barberis A, Lu C, Fu Z, Erdelyi F, Szabo G, Vicini S. (2005) NMDA receptors increase the size of GABAergic terminals and enhance GABA release. **The Journal of Neuroscience**. 23;25(8):2024-31.

Barberis A, Petrini EM, Cherubini E. (2004) Presynaptic source of quantal size variability at GABAergic synapses in rat hippocampal neurons in culture. **Eur J Neurosci**. 20 (7):1803-10

Mozrzymas JW, Barberis A. (2004) Changes of GABA(A)receptor activation kinetics in hippocampal neurons cultured for different periods of time. **Cell Mol Biol Lett**. 9(1):61-7.

Petrini E.M., Zacchi P., Barberis A., Mozrzymas JW., and Cherubini E. (2003). Declusterization of GABA(A) receptors affects the kinetic properties of GABAergic currents in cultured hippocampal neurons. **J. Biol. Chem**. 2;278(18):16271-9

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Usai C, Barberis A, Moccagatta L, Marchetti C (1999) Pathways of cadmium influx in mammalian neurons. **J Neurochem**. 72(5):2154-61

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Reviews and Book Chapters

Petrini E. M., Barberis A. Probing the Lateral Diffusion of Individual Neurotransmitter Receptors. 2014; **Novel Approaches for Single Molecule Activation and Detection**, pp. 203-19

Petrini E. M., Barberis A. Diffusion dynamics of synaptic molecules during inhibitory postsynaptic plasticity. 2014; **Frontiers in Cellular Neuroscience**, vol. 8, pp. 300, 1662-5102 DOI 10.3389/fncel.2014.00300

Petrini E. M., Barberis A. Methods for the study of synaptic receptor functional properties. 2014; **Methods in Molecular Biology**, vol. 1183, pp. 117-41; DOI 10.1007/978-1-4939-1096-0_7

Barberis A., Benfenati F. Complexity and Computation at the Synapse: Multilayer Architecture and Role of Diffusion in Shaping Synaptic Activity and Computation. 2013; **Bioinspired Approaches for Human-Centric Technologies**, 978-3-319-04924-3

Barberis A, Petrini EM, Mozrzymas JW. Impact of synaptic neurotransmitter concentration time course on the kinetics and pharmacological modulation of inhibitory synaptic currents. **Front Cell Neurosci.** (2011); 5:6. doi: 10.3389/fncel.2011.00006. Epub 2011 Jun 22.

Barberis A. Fast perfusion methods for the study of ligand-gated ion channels. In “Neuronal Network Analysis” edited by Fellin and Halassa; **Springer Protocols**, *Humana Press*, Volume 67, 2012, Pages 173-187