# CURRICULUM VITAE MATILDE BALBI

## *EDUCATION*

- 2020 February: **PhD in Experimental Medicine**, curriculum of Pharmacology and Toxicology at University of Genoa. Thesis title: "Group I metabotropic glutamatergic receptors regulating glutamate release and microglia phenotype in a murine model of amyotrophic lateral sclerosis".
- 2016 November: **Pharmacist profession license**. Score: 272/300.
  2017 April: Membership to Ordine dei Farmacisti of Genoa.
- 2016 July: **Master Degree in Pharmacy** at University of Genoa. Thesis title: "Il Peptide 1 Glucagone-Simile (GLP-1) modula il rilascio di Acido Glutammico e GABA da sinaptosomi di corteccia cerebrale e ippocampo di topo attraverso l'attivazione di specifici recettori presinaptici". Score: 110/110 cum laude.
- 2010 July: **High School diploma** at Liceo Scientifico Martin Luther King, Genoa. Score: 91/100.

## *PERSONAL SKILLS*

- Mother tongue: Italian
- Other languages: English (on August 2015 I attended an English course level C1 at UIC School of Greenwich, London)

## *DIGITAL SKILLS*

- MS office, Internet browsers, Sigma Plot 10.0, Kyplot 2.0 beta 15, Sigma Stat, GraphPad Prism

## *WORK EXPERIENCE*

- June 2023-ongoing: **Post Doc** at University of Genoa, Department of experimental medicine in Prof. Gentili research group. European project AUTOCRAT H2020 cod. n. 874671.
- November 2019-June 2023: **Post Doc** at University of Genoa, Pharmacology and Toxicology section in Prof. Bonanno and Prof. Milanese research group. During this period

I focus my research on the investigation of the effect of the in-vivo genetic partial deletion of mGluR5 in $SOD1^{G93A}$ mice on microglia cells evaluating disease specific inflammatory phenotype and bioenergetic aspects. Moreover I am developing in vivo pharmacological treatment, following by behavioral tests to monitor the progression of the pathology in $SOD1^{G93A}$ mice.

- November 2020-June 2023: secondary schoolteacher A031 - SCIENZE DEGLI ALIMENTI at Istituto Professionale Statale per l'Enogastronomia e l'Ospitalità Alberghiera "Marco Polo" - IDA
- October 2019- June 2020: secondary schoolteacher A050 - SCIENZE NATURALI, CHIMICHE E BIOLOGICHE presso L.A.S. - P. KLEE - N. BARABINO - IDA
- 2019 March-June: **Research period at the University of Lausanne**, in Prof. Rosa Chiara Paolicelli group for a pilot project on "The role of astrocytes-derived extracellular vesicles in microglial activation".
- 2016-2019: **PhD student** in Experimental Medicine, curriculum Pharmacology and Toxicology, University of Genoa. Thesis title: "Group I metabotropic glutamatergic receptors regulating glutamate release and microglia phenotype in a murine model of amyotrophic lateral sclerosis".
- 2016 July-October: **Work experience** at Canevari Pharmacy, Genoa.
- 2016 December-June: training at Canevari Pharmacy, Genoa.
- 2015 May-2016 June: **Internship for experimental thesis** at Pharmacology and Toxicology Section, University of Genoa. Tutor: Prof. Ernesto Fedele.
- 2015-2016**:** Part-time collaboration with University of Genoa– DIFAR .

***TECHNICAL SKILLS***

- Synaptosomes and gliosomes purification from different CNS tissues
- Neurotransmitter release experiment with superfusion tecnique
- Confocal Microscopy and IHC
- Western blot
- Immunohistochemistry
- HPLC
- Bradford analysis
- Microdialysis in vivo experiment
- DNA extraction from transgenic mice and genotyping
- Isolation of acute microglia from $SOD1^{G93A}$ mice brain, motor cortex and spinal cord
- Microglia and astrocytes neonatal primary cultures
- Mesenchymal stromal cells culture
- Flow cytometric analysis
- Extracellular vesicles isolation
- RT-PCR
- In vivo pharmacological treatment (gavage, IP, SC and IN injections), behavioral tests to monitor the progress of the pathology in $SOD1^{G93A}$ mice: Rotarod, Balance beam, Paw grip endurance, Grip strength meter, gait and hindlimb extension reflex.

## *BIBLIOMETRIC INDEXES*

Citations: 110

H index: 5

Number of pubblications: 8

IF tot: 42.154

IF mean: 6.022

## *ARTICLES*

- Torazza C, Provenzano F, Gallia E, Cerminara M, **Balbi M**, Bonifacino T, Tessitore S, Ravera S, Usai C, Musante I, Puliti A, Van Den Bosch L, Jafar-Nejad P, Rigo F, Milanese M, Bonanno G. *"Genetic Downregulation of the Metabotropic Glutamate Receptor Type 5 Dampens the Reactive and Neurotoxic Phenotype of Adult ALS Astrocytes"*. Cells. 2023 Jul 27;12(15):1952. doi: 10.3390/cells12151952. PMID: 37566031; PMCID: PMC10416852. IF (2022) 6.0.
- **Balbi M**, Bonanno G, Bonifacino T, Milanese M. *"The Physio-Pathological Role of Group I Metabotropic Glutamate Receptors Expressed by Microglia in Health and Disease with a Focus on Amyotrophic Lateral Sclerosis".* Int J Mol Sci. 2023 Mar 9;24(6):5240. doi: 10.3390/ijms24065240. PMID: 36982315. IF (2022) 6.208.
- Bonifacino T, Mingardi J, Facchinetti R, Sala N, Frumento G, Ndoj E, Valenza M, Paoli C, Ieraci A, Torazza C, **Balbi M**, Guerinoni M, Muhammad N, Russo I, Milanese M, Scuderi C, Barbon A, Steardo L, Bonanno G, Popoli M, Musazzi L. *"Changes at glutamate tripartite synapses in the prefrontal cortex of a new animal model of resilience/vulnerability to acute stress."* Transl Psychiatry. 2023 Feb 18;13(1):62. doi: 10.1038/s41398-023-02366-w. PMID: 36806044; PMCID: PMC9938874. IF (2022) 7.989.
- Bonifacino T, Zerbo RA, **Balbi M**, Torazza C, Frumento G, Fedele E, Bonanno G, Milanese M. *"Nearly 30 Years of Animal Models to Study Amyotrophic Lateral Sclerosis: A Historical Overview and Future Perspectives"* Int J Mol Sci. 2021 Nov 12;22(22):12236. doi: 10.3390/ijms222212236. IF (2022) 6.208/ IF (2021) 6.208.
- Milanese M, Bonifacino T, Torazza C, Provenzano F, Kumar M, Ravera S, Zerbo AR, Frumento G, **Balbi M**, Nguyen TPN, Bertola N, Ferrando S, Viale M, Profumo A, Bonanno G. *"Blocking glutamate mGlu5 receptors with the negative allosteric modulator CTEP improves disease course in SOD1G93A mouse model of amyotrophic lateral sclerosis"* Br J Pharmacol. 2021 Sep;178(18):3747-3764. doi: 10.1111/bph.15515. IF (2022) 9.473/ IF (2021) 9.473.
- Bonifacino T, Rebosio C, Provenzano F, Torazza C, **Balbi M**, Milanese M, Raiteri L, Usai C, Fedele E, Bonanno G. "*Enhanced Function and Overexpression of Metabotropic Glutamate Receptors 1 and 5 in the Spinal Cord of the SOD1$^{G93A}$ Mouse Model of Amyotrophic Lateral Sclerosis during Disease Progression*" Int J Mol Sci. 2019 Sep; 20(18). doi: 10.3390/ijms20184552. IF (2022) 6.208/ IF (2019) 4.556.
- Rebosio C*, **Balbi M***, Passalacqua M, Ricciarelli R, Fedele E. "*Presynaptic GLP-1 receptors enhance the depolarization-evoked release of glutamate and GABA in the mouse*

*cortex and hippocampus"* *Equally contributed. Biofactors. 2018 Mar; 44(2):148-157. doi: 10.1002/biof.1406. IF (2022) 6.438/ IF (2018) 3.598.

- Ricciarelli R, Brullo C, Prickaerts J, Arancio O, Villa C, Rebosio C, Calcagno E, **Balbi M**, Britt T. J. van Hagen, Argyrousi EK, Zhang H, Pronzato MA, Bruno O & Fedele E. "*Memory-enhancing effects of GEBR-32a, a new PDE4D inhibitor holding promise for the treatment of Alzheimer's disease"* Sci Rep. 2017 Apr; 7:46320. doi: 10.1038/srep46320. IF (2022) 4.996/ IF (2017) 4.122.

## *AWARDS AND RECOGNITIONS*

- November 2022: SIF best poster award at 41° SIF National Congress.

## *MEMBER OF SCIENTIFIC SOCIETIES*

- Pharmacology Italian Society (SIF), since 2017
- Neuroscience Italian Society (SINS), since 2017
- Cytometry Italian Society (GIC), since 2018

## *SPECIALISATION COURSE*

- November 2022: **"Biology and management of laboratory animals-National legislation and ethics-Ethics and project concept"** Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna "Bruno Ubertini"
- 24-25 November 2022: "**Bioimage processing and analysis with ImageJ**", Alta Formazione Insubria
- 2022 September-February: specialisation course in "**Diet and Disease**", University of Genoa
- 2018 September-December: specialisation course in "**Drugs, health and advanced technology economy**" APHEC, University of Genoa.
- 2018 June: Flow Cytometry course organized by Cytometry Italian Society (GIC), Frascati.
- 2017 May: specialisation course in "**Nutrition and longevity**", Dept. of Medicine (DIMI), University of Genoa.

## *MEETINGS*

- 2023 September: *20$^{th}$ National Congress of the Italian Society for Neuroscience (SINS), Turin, 14$^{th}$-17$^{th}$ 2023.*
  M. Balbi, D. Giunti, F. Provenzano, S. Nyberg, B. Parodi, C. Torazza, T. Bonifacino, c. Usai, N. Kerlero de Rosbo, A. Uccelli, J.P. Shaw, L. Ferraiuolo, G. Bonanno, M. Milanese
  **Oral communication symposium "Extracellular vesicles in ALS/MND: the two sides of the medal"**: MSC-derived extracellular vesicles for the treatment of ALS.
- 2023 September: *XXV Conference of Young SIF Pharmacologists 2023 Urbino (PU), 5$^{th}$-8$^{th}$ September 2023.*
  M. Balbi, D. Giunti, F. Provenzano, S. Nyberg, B. Parodi, C. Torazza, T. Bonifacino, c. Usai, N. Kerlero de Rosbo, A. Uccelli, J.P. Shaw, L. Ferraiuolo, G. Bonanno, M. Milanese

**Oral communication**: A novel potential therapeutic approach in the treatment of amyotrophic lateral sclerosis: in-vitro and in-vivo effect of extracellular vesicles derived from mesenchymal stem cells.

- 2023 July: *XVI European Meeting on Glial Cells in Health and Disease (GLIA 2023) Berlin, Germany, 8th-11th July 2023.*
  M. Balbi, T. Bonifacino, S. Ravera, D. Fenoglio, T. Altosole, R. Leardi, G. Bonanno, M. Milanese
  Poster: Inflammatory, bioenergetic, and red-ox changes of spinal cord microglia cells acutely purified from SOD1$^{G93A}$ ALS mice during disease progression: focus on the genetic down regulation of mGlu5 receptor.
- 2022 December: *Young Minds at Work: Blending Biology and Bioinformatics On-line workshop, 16th December 2022.*
  M. Balbi, T. Bonifacino, C. Torazza, S. Ravera, AR. Zerbo, S. Tessitore, S. Ferrando, G. Bonanno, M. Milanese.
  Poster: The pharmacological blockade of mGluR5 with CTEP improves disease course in SOD1$^{G93A}$ ALS animal model.
- 2022 November: *XXIV SIF Seminar on Pharmacology for PhD Students, Fellows, Post Doc and Specialist Trainees e 41°SIF National Congress "il valore scientifico e l'uso appropriato del farmaco", Rome, 15th-19th November 2022.*
  M. Balbi, T. Bonifacino, S. Ravera, D. Fenoglio, T. Altosole, R. Leardi, M. Milanese, G. Bonanno
  Poster: Inflammatory, bioenergetic, and red-ox state in microglia acutely purified from SOD1G93A mice during disease progression : effects of lowering mGluR5 expression.
- 2022 July: *FENS Forum 2022, Paris, France, 11th-13rd July 2022.*
  M. Balbi, T. Bonifacino, S. Ravera, D. Fenoglio, T. Altosole, G. Filaci, R. Leardi, M. Cerminara, A. Puliti, M. Milanese, G. Bonanno
  Poster: Partial deletion of mGluR5 affects microglia inflammatory phenotype, bioenergetic characteristics, and red-ox state during ALS progression in SOD1G93A mice.
- 2022 June: *SCR meeting, Genoa, 8th-10th June 2022.*
  M. Balbi, S.E.L. Nyberg, D. Giunti, F. Provenzano, C. Torazza, B. Parodi, C. Usai, N. Kerlero de Rosbo, A. Uccelli, P.J. Shaw, L. Ferraiuolo, G. Bonanno, M. Milanese
  **Oral communication**: microRNAs shuttled by extracellular vesicles derived from mesenchymal stem cells revert glial activation in in-vitro models of amyotrophic lateral sclerosis.
- 2021 September: *19th Virtual National Congress of the Italian society of Neuroscience, 9th-11th September.*
  Partial deletion of mGluR5 affects microglia inflammatory pathways and bioenergetic metabolism in SOD1$^{G93A}$ mice
  M. Balbi, T. Bonifacino, S. Ravera, M. Milanese, G. Bonanno
- 2021 July: *XV European Meeting on Glial Cells in Health and Disease, online meeting 7th-10th July 2021.*
  Poster: The partial deletion of mGluR5 affects the pro- and anti-inflammatory and bioenergetic characteristics of microglia during ALS progression in SOD1$^{G93A}$ mice
  M. Balbi, T. Bonifacino, S. Ravera, M. Milanese, G. Bonanno
- 2021 March: *40° SIF National Congress , Rome 10th-13th March 2021.*

M. Balbi, T. Bonifacino, S. Ravera, M. Milanese, G. Bonanno
Poster: Effects of the partial deletion of mGluR5 on pro- and anti-inflammatory features of microglia during ALS progression in SOD1G93A mice

- 2020 December: *Virtual 31st International Symposium on ALS/MND, 9th-11th December 2020.*
  M. Balbi, T. Bonifacino, S. Ravera, M. Milanese, G. Bonanno
  Poster: Deletion of mGluR5 affects the pro- and anti-inflammatory traits of microglia during ALS progression in SOD1G93A mice.
- 2020 October: *Online Workshop on glial cells-neuron crosstalk in cns health and disease 1st-3rd October 2020.*
  M. Balbi , T. Bonifacino, S. Ravera, M. Milanese, G. Bonanno
  Poster: Pro- and anti-inflammatory phenotypes of microglia acutely isolated from SOD1G93A mice during disease progression and effects of the partial deletion of mGluR5.
- 2020 September: *Online PhD National meeting SINS, 29th-30th September 2020.*
  M. Balbi, C. Rebosio, T. Bonifacino, M. Milanese, C. Usai, G. Bonanno
  **Oral communication**: Group-I metabotropic glutamate receptors regulate glutamate release in spinal cord synaptosomes from SOD1G93A mice at different stages of the disease.
- 2019 September: *39° SIF National Congress, Florence, 20th-23rd November 2019.*
  M. Balbi, T. Bonifacino, M. Milanese, G. Bonanno
  Poster: Pro- and anti-inflammatory state of microglia is affected by the partial deletion of metabotropic glutamate receptor type 5 in SOD1G93A mice during disease progression.
- 2019 September: *BraYn, 2nd Brainstorming Research Assembly for Young Neuroscientists, Milan, 14th-16th November 2019.*
  M. Balbi, T. Bonifacino, M. Milanese, G. Bonanno
  Poster: Pro- and anti-inflammatory phenotypes of acute microglia isolated from spinal cord of SOD1G93A mice during disease progression and effects of the partial deletion of mGluR5.
- 2019 July: *XIV European Meeting on Glial Cells in Health and Disease, Porto, Portugal, 10th-13th July 2019.*
  M. Balbi, T. Bonifacino, M. Milanese, G. Bonanno
  Poster: Partial deletion of mGluR5 affects M1 and M2 phenotypes in microglia acutely isolated from SOD1G93A mice during disease progression.
- 2018 December: *Meet the microglia: homeostatic role and harmful contribution to neurological disorders, Milano, 19th December 2018.*
- 2018 September: *Focus SLA, Genoa, 27th-29th September 2018.*
  M. Balbi, C. Rebosio, T. Bonifacino, M. Milanese, L. Raiteri, M. Nadeem, C. Usai, G. Bonanno
  Poster: The function of release-regulating presynaptic Group I metabotropic glutamate autoreceptors is enhanced in the spinal cord of $SOD1^{G93A}$ mice.
- 2018 September: *XXI SIF Seminar for PhD students, Fellows, Post Doc and Specialist Trainees, Bresso, 19th-22nd September 2018.*
  **Oral communication**: Treatment with exosome-shuttled miRNAs derived from mesenchymal stem cells shifts spinal cord astrocytes isolated from late disease state $SOD1^{G93A}$ mice from a neurotoxic to a neuroprotective phenotype.

- 2018 June**:** *First brainstorming research assembly for young neuroscientists, Genoa, 29nd-30nd June 2018.*
  M. Balbi, M. Milanese, T.Bonifacino, C. Rebosio, S. Ravera
  Poster: Pharmacological treatment with CTEP, an mGluR5 negative allosteric modulator, in SOD1G93A mice.
  S. Ravera, T. Bonifacino, M. Bartolucci, C. Torazza, F. Provenzano, M. Balbi, K. Cortese, I. Panfoli, G. Bonanno
  Poster: Characterization of the mitochondrial aerobic metabolism at the pre- and perisynaptic districts of the SOD1G93A mouse model of amyotrophic lateral sclerosis.
- 2018 June: *Glial cells and therapeutic perspectives: from maladaptive plasticity to neurorestoration, Florence, 29nd June 2018.*
- 2018 June: *XXXVI National Conference about Flow Cytometry, Cytometry Italian Society (GIC), Frascati, 6th-8th June 2018.*
- 2018 February: *National Meeting of PhD student in Neuroscience, Neuroscience Italian Society (SINS), Naples, 23rd February 2018.*
  M. Balbi
  Poster: Treatment with CTEP, a mGluR5 negative allosteric modulator, in the SOD1G93A ALS animal model.
- 2017 October: *38° National Congress of Pharmacology Italian Society (SIF) "Farmaci, salute e qualità della vita", Rimini, 25th-28th October 2017.*
  M. Balbi, C. Rebosio, C. Brullo, J. Prickaerts, O. Arancio, O. Bruno, E. Calcagno, R. Ricciarelli, E. Fedele.
  Poster: GEBR-32a, a new promising PDE4D inhibitor for the treatment of Alzheimer's disease.
  C. Rebosio, M.Balbi, M. Passalacqua, R. Ricciarelli, E. Fedele.
  Poster: Release-regulating GLP-1 receptors are present on cortical and hippocampal glutamatergic and GABAergic nerve terminals.
- 2017 October: *XVII National Meeting of Neuroscience Italian Society (SINS), Ischia, 1st-4th October 2017.*
  M. Balbi, C. Rebosio, M. Passalacqua, R. Ricciarelli, E. Fedele .
  Poster: Presynaptic GLP-1 receptors enhance glutamate and GABA release from purified mouse cortical and ippocampal synaptosomes.
- 2016 September: *XIX National Meeting of PhD student in Pharmacology, Pharmacology Italian Society (SIF) Rimini, 20th-22nd September 2016.*
  C. Rebosio, C. Garbarini, M. Balbi, M. Passalacqua, R. Ricciarelli, E. Fedele.
  Comunicazione orale: Presynaptic GLP-1 receptors modulate glutamate release in mouse cortical and ippocampal synaptosomes.
- 2016 July: *10th FENS, Forum of Neuroscience, Copenhagen, Denmark, 2nd-6th July 2016.*
  C. Rebosio, C. Garbarini, M. Balbi, M. Passalacqua, R. Ricciarelli, E. Fedele.
  Poster: Presynaptic GLP-1 receptors modulate glutamate release in mouse cortical and ippocampal synaptosomes.