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Carola Torazza

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Gender: Female **Date of birth:** 06/09/1992 **Place of birth:** Genoa, Italy **Nationality:** Italian

WORK EXPERIENCE

Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa

City: Genoa | **Country:** Italy

[01/04/2024 – Current] **Assistant Professor**

Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa

City: Genoa | **Country:** Italy

[14/10/2024 – Current] **Laboratory assistant**

Module of Toxicology and laboratory, course of Pharmacology and Toxicology, Master's degree in Medical-Pharmaceutical Biotechnology, University of Genoa (Italy).

Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa

City: Genoa | **Country:** Italy

[04/01/2021 – 31/03/2024] **Post-doctoral fellow**

Title of the project: "Effects of extracellular vesicles produced by astrocytes and the microRNAs conveyed by them in amyotrophic lateral sclerosis"

University of Genoa (Italy) and Maastricht University (Netherlands)

City: Genoa | **Country:** Italy

[01/11/2017 – 31/10/2020] **PhD student**

Biomedical Research Institute (BIOMED), Hasselt University

City: Hasselt | **Country:** Belgium

Visiting PhD student

Title of the project: "Biomolecular effects of mGluR5 down-regulation on the phenotype of microglia isolated from spinal cord of a mouse model of amyotrophic lateral sclerosis"

Protein Transport and Secretion Laboratory, University Vita-Salute San Raffaele

City: Milan | **Country:** Italy

[09/01/2017 – 30/09/2017] **Postgraduate fellow**

Title of the project: "Study of the secretion mechanisms of Interleukin-1β in the THP-1 cell line and in human primary monocytes"

EDUCATION AND TRAINING

[23/04/2021] **PhD in Experimental Medicine**

University of Genoa (Italy) and Maastricht University (Netherlands).

City: Genoa | **Country:** Italy | **Field(s) of study:** Pharmacology and Toxicology | **Final grade:** Cum Laude | **Thesis:** Metabotropic glutamate receptor 5 as a target for the modulation of the reactive astrocyte phenotype in the SOD1G93A mouse model of amyotrophic lateral sclerosis

[28/10/2016] **Master's degree in Medical-Pharmaceutical Biotechnology**

University of Genoa (Italy)

City: Genoa | **Country:** Italy | | **Final grade:** 110/110 Cum Laude | **Thesis:** Experimental path for the characterization of transcriptional modulators of the ACVR1 gene with inhibitory action on the Bone Morphogenetic Protein signalling pathway. Implications for the development of new therapies for Fibrodysplasia Ossificans Progressiva

[29/09/2014] **Bachelor's degree in biotechnology**

University of Genoa (Italy)

City: Genoa | **Country:** Italy | | **Final grade:** 110/110 Cum Laude | **Thesis:** Methodological approach for the identification of therapies aimed at the treatment of Fibrodysplasia Ossificans Progressiva

[04/07/2011] **High school scientific diploma**

Giandomenico Cassini High School

City: Genoa | **Country:** Italy | | **Final grade:** 92/100

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING B1 **READING** B2 **WRITING** B1

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

German

LISTENING A1 **READING** A2 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

French

LISTENING A1 **READING** A2 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Microsoft Office | Microsoft Word | Microsoft Excel | Microsoft Powerpoint | Google Drive | Outlook | Zoom | LinkedIn | GraphPad Prism | Photoshop | Organizational and planning skills | Team-work oriented

NETWORKS AND MEMBERSHIPS

[2025 – Current] **"Group of Work-New Generation"** Centro 3R, Genoa (Italy)

The "Working Group – New Generation" is formed by young representatives reseachers (<40 years) and is aimed to discuss, develop and propose initiatives in various areas.

One of the objectives of the Group is to share the main opportunities for students, PhD students, and young researchers, such as: scientific opportunities (thesis proposals,

mobility initiatives for PhD students, etc.), calls for PhD positions and research contracts, calls for projects, awards for young people in the 3Rs Centre.

The Working Group – New Generation also develops initiatives to promote the careers of young people in the 3Rs Centre, such as the organization of conferences, symposiums, scientific collaborations, joint publications and the submission of collaborative projects.

[2024 – Current] **Brainstorming Research Assembly for Young Neuroscientists (BraYn) Association**

[2022 – Current] **Federation of European Neurosciences (FENS)**

[2019 – Current] **Italian Society of Neuroscience (SINS)**

[2017 – Current] **Italian Society of Pharmacology (SIF),**

[2017 – Current] **Association of Cellular Biology and Differentiation (ABCD)**

CONFERENCES AND SEMINARS

Author of the following 11 oral communications (three on invitation) selected by scientific committees (7 at international congresses and 4 at national congresses):

1. "Sex- and Age-dependent Features of Spinal Cord Astrocytes derived from SOD1^{G93A} Mouse Model of Amyotrophic Lateral Sclerosis: an Attempt to Develop a Pharmacological Personalized Therapy to counteract the Pathology", 2nd World Summit on Toxicology and Applied Pharmacology (WSTAP 2025), Amsterdam (Netherlands), June 26-28, **2025**, online (by invitation).
2. "ER-PPP as a Potential Pharmacological Target to Improve the Antioxidant Response of Cortical Astrocytes from the Newborn SOD1^{G93A} Mouse Model of Amyotrophic Lateral Sclerosis", 21th Annual Congress of International Drug Discovery Science & Technology-2025 (IDDST-2025), June 18-20, **2025**, Stockholm (Sweden), online (by invitation).
3. "The age and sex of isolated cells: complex and heterogeneous reactive state of astrocytes in amyotrophic lateral sclerosis" Torazza C. et al., Astrocytes Cafè, Trieste (Italy) 10-12 July **2024**.
4. "The age and sex of isolated cells: complex and heterogeneous reactive state of astrocytes in amyotrophic lateral sclerosis" Torazza C. et al., Motor Neuron Diseases III Edition, Turin (Italy) 8-9 November **2024**.
5. "Differential responses to redox stress in brain cortex and spinal cord astrocytes from the SOD1G93A mouse model of amyotrophic lateral sclerosis" Torazza C., et al., More than neuron III edition, Turin (Italy) 15-17 December **2022**.
6. "Differential responses to redox stress in brain cortex and spinal cord astrocytes from the SOD1G93A mouse model of amyotrophic lateral sclerosis", Torazza C., et al., 41thNational congress SIF, Rome (Italy), 15-19 November **2022**.
7. "Reducing the expression of mGlu5 receptor modulates the reactive phenotype and neurotoxicity of astrocytes cultured from the SOD1G93A mouse model of amyotrophic lateral sclerosis", Torazza C., et al., Women in Neuroscience Symposium 2022, August 13, **2022** (online).
8. "Modulating glutamate transmission reduces the reactive astrocyte phenotype in amyotrophic lateral sclerosis", Torazza C., et al., 19th National Congress of the Italian Society for Neuroscience, September 9-11, **2021** (online).
9. "mGluR5 as a target to modulate the reactive phenotype of astrocytes in the SOD1G93A mouse model of amyotrophic lateral sclerosis", Torazza C., et al., 40th National Congress SIF, March 10-13, **2021** (online).
10. "mGluR5 as a target to modulate the reactive phenotype of astrocytes in the SOD1G93A mouse model of amyotrophic lateral sclerosis", Torazza C., et al.,

Workshop Glial cells-neuron crosstalk in CNS health and disease, October 1-3, **2020** (online).

11. "mGluR5 down-regulation attenuates the reactive phenotype of astrocytes prepared from the spinal cord of late symptomatic SOD1G93A mice", SINS Giovani, Naples (Italy), March 1, **2019**.

First-name author of the following 10 posters (2 at national congresses and 8 at international congresses):

1. Torazza C., et al., "Downregulation of the Metabotropic Glutamate Receptor Type 5 modulates the Reactive and Neurotoxic Phenotype of Adult Astrocytes in ALS", National Congress, SIF, Sorrento (Italy), November 13-16, **2024**.
2. Torazza C., et al., "Blocking mGluR5 with the negative allosteric modulator CTEP ameliorates the reactive phenotype of i-astrocytes from patients affected by Amyotrophic Lateral Sclerosis", International congress, FENS Forum 2022, Paris (France), July 9-13, **2022**.
3. Torazza C., et al., "Pharmacological blockade of metabotrobic glutamate receptor 5 by the negative allosteric modulator CTEP improves the disease course of ALS in SOD1 G93A mice", International congress, 31st International symposium on ALS/ MND, December 9-11, **2020** (online).
4. Torazza C., et al., "mGluR5 as a target to modulate the reactive phenotype of astrocytes in the SOD1G93A mouse model of amyotrophic lateral sclerosis ", International congress, Motor neuron diseases: understanding the pathogenic mechanisms to develop therapies, November 6-7, **2020** (online).
5. Torazza C., et al., "In-vivo genetic ablation of metabotropic glutamate receptor type 5 slows down disease progression in the SOD1G93A mouse model of amyotrophic lateral sclerosis", National congress, SIF, Florence (Italy), November 20-23, **2019**.
6. Torazza C., et al., "The mGluR5 knock out in SOD1G93A mice leads to a striking amelioration of amyotrophic lateral sclerosis disease progression", International congress, BraYn, Milan (Italy), November 14-16, 2019.
7. Torazza C., et al., "Astrocytes from spinal cord of late symptomatic mice expressing the SOD1G93Apoint mutation show a less reactive phenotype after knocking down mGluR5", International congress, Dutch Neuroscience Meeting, Luntheren (Netherlands), June 20-21, **2019**.
8. Torazza C., et al., "mGluR5 down-regulation attenuates the reactive phenotype of astrocytes prepared from the spinal cord of late symptomatic mice expressing the SOD1G93A point mutation", International congress, More than neurons, Turin (Italy), November 29 – December 1, **2018**.
9. Torazza C., et al., "Knocking down of mGluR5 attenuates the reactive phenotype of astrocytes prepared from the spinal cord of late symptomatic mice expressing the SOD1G93A point mutation", International congress, FOCUS ALS: Motor neuron diseases: molecular and cellular basis of selective vulnerability. Genoa (Italy), September 27-29, **2018**.
10. Torazza C., et al., "Exosome-shuttled miRNAs derived from mesenchymal stem cells affect the phenotype of spinal cord astrocytes isolated from late disease phase SOD1G93A mice", International congress, BraYn, Genoa (Italy), June 29-30, **20 18**.

PROJECTS

[01/10/2024 – Current] **Project "Fondi per la Ricerca di Ateneo (FRA)"**

Title of the project: Characterization of the SOD1G93A mouse model of amyotrophic lateral sclerosis, by behavioural monitoring, for correct stratification of results in preclinical studies.

Principal Investigator of the project: Dr. Carola Torazza

[30/04/2023 – Current] **Project Project RF-2021-12372711, "Molecular Imaging Study of the Immune Response in Muscle Denervation: a high-tech study in murine models and human patients" (duration of 36 months)**

Research Unit Partecipant.

Principal Investigator of the project: Prof. Carlo Martinoli, IRCCS Polyclinic Hospital San Martino, Genoa (Italy)

[27/04/2020 – 27/04/2023] **ARISLA Project: FG_12/2019**

Title of the Project: New strategies to enhance the trophic functions and remyelinating abilities of adult NG2-glia in amyotrophic lateral sclerosis via the GPR17 receptor.

Research Unit participant.

Principal Investigator of the project: Professor Tiziana Bonifacino, Department of Pharmacy, University of Genoa (Italy).

[2018 – 2021] **Testing Metys compounds in in-vitro assays on neurotransmitter release**

Research Unit Partecipant.

Pricipal Investigator of the project: Prof. Giambattista Bonanno, School of Medical and Pharmaceutical Sciences, Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa (Italy).

Collaboration with *Metys Pharmaceuticals AG* (Basel, Svitzerland).

[01/09/2019 – 31/08/2022] **Project MIUR PRIN**

Title of the project: "The interplay between the "RNA/protein quality control system and "exosomes" as a spreading mechanism in amyotrophic lateral sclerosis [ex_als]" (Prot. 2017F2A2C5).

Research Unit Member.

Principal Investigator of the project: Prof. Giambattista Bonanno, School of Medical and Pharmaceutical Sciences, Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa (Italy).

HONOURS AND AWARDS

FELLOWSHIPS, GRANTS, PRIZES and QUALIFICATIONS

- **January 2024**: Winner of 3-years contract as Associate Researcher (RTDA) at the Department of Pharmacy (DIFAR) for the scientific-disciplinary sector BIO/14 - Pharmacology, competition sector 05/G1 – Pharmacology, Clinical Pharmacology and Pharmacognosy.
- **November 2022**: State exam for the qualification to the profession of Biologist, score 46/50.

- **July 2020**: Winner of 1-year post-doc fellowship in Pharmacology (programme n° 10, BIO/14 PHARMACOLOGY).
- **July 2020**: acquisition of 24 university credits (CFU) to teach (provided for by the Italian Legislative Decree 59 of 13 April 2017 and the requirements of Article 5, paragraph 1, letter b and Article 5, paragraph 2, letter b).
- **February 2019**: Erasmus+ scholarship for traineeship purposes, advertised by the University of Genoa (Italy) (2100 euros), to carry out a six-month research period, as part of the project with the title: "Effects of dampening mGluR5 on the phenotype of microglia purified from spinal cord of ALS mouse model", School for Mental Health and Neuroscience, Maastricht University (Netherlands).
- **August 2017**: winner of 3-years PhD fellowship in Experimental Medicine, International Curriculum in Pharmacology and Toxicology, at the Department of Pharmacy, Pharmacology and Toxicology Section, University of Genoa (Italy).
- **January 2016**: 9-months fellowship at the Protein Transport and Secretion Laboratory, University Vita-Salute San Raffaele (Milan, Italy) with the project: "Study of the mechanisms of IL-1β secretion from THP-1 cells and human primary monocytes".
- **October 2016**: Right to publication and medal for the thesis of the Master's degree in Medical-Pharmaceutical Biotechnology.

RESEACH ACTIVITY

Publications

1. Alfei S, **Torazza C**, et al., **2025**, B.Int J Mol Sci. 26(11):4991; doi: 10.3390/ijms26114991.
2. Monaco M, **Torazza C.,** et al., **2025**, Int J Mol Sci. 26;26(7):3015; doi: 10.3390/ijms26073015.
3. Alfei S, **Torazza C**., et al., **2025**, Int J Mol Sci. 26(7):3227; doi: 10.3390/ijms26073227.
4. Valenza M, Facchinetti R, **Torazza C.,** et al., **2024**, Transl Psychiatry. 25;14(1):209; doi: 10.1038/s41398-024-02928-6.
5. Alfei S, Giannoni P, Signorello MG, **Torazza C.,** et al., **2024**, Nanomaterials (Basel) 14(18):1505; doi: 10.3390/nano14181505.
6. Alfei S, Zuccari G, Bacchetti F, **Torazza C.,** et al., **2024,** Nanomaterials (Basel);14(16): 1351;doi: 10.3390/nano14161351.
7. Provenzano F, **Torazza C**, et al., **2023**, M.Int J Mol Sci. 24(20):15430; doi: 10.3390/ijms242015430
8. **Torazza C**., et al., **2023**, Cells 12(15):1952; doi: 10.3390/cells12151952
9. Mingardi J., Ndoj E., Bonifacino T., Misztak P., Bertoli M., La Via L., **Torazza C.,** et al., **2023**, International Journal of Molecular Sciences 24(13):10814; doi: 10.3390/ijms241310814.
10. Bonifacino T., Mingardi J., Facchinetti R., Sala N., Frumento G., Ndoj E., Valenza M., Paoli C., Ieraci A., **Torazza C.,** et al., **2023**, Translational Psychiatry 13(1):62; doi: 10.1038/s41398-023-02366-w.
11. Bonifacino T., Micheli L., **Torazza C.**, et al., **2022**, Cells. 11(24):4027; doi: 10.3390/cells11244027.
12. Provenzano F., Nyberg S., Giunti D., **Torazza C.,** et al., **2022**, Cells. 11(23):3923; doi: 10.3390/cells11233923.
13. Milanese M., Bonifacino T., **Torazza C.**, et al., **2021**, British Journal of Pharmacology 178(18):3747-3764; doi: 10.1111/bph.15515.
14. Bonifacino T, Zerbo RA, Balbi M, **Torazza C,** et al., **2021**, Int J Mol Sci. 22(22):12236. doi: 10.3390/ijms222212236.
15. Marini C., Cossu V., Kumar M., Milanese M., Cortese K., Bruno S., Bellese G., Carta S., Zerbo R.A. **Torazza C.**, et al., **2021**, Antioxidants (Basel). 10(9):1392; doi: 10.3390/antiox10091392.

16. Marini C., Cossu V., Bonifacino T., Bauckneht M., **Torazza C.,** et al., **2020**, EJNMMI Res. 10(1):76; doi: 10.1186/s13550-020-00666-6.
17. Ravera S., **Torazza C.**, et al., 2019, Journal of Neurochemistry. 151(3):336-350; doi: 10.1111/jnc.14819.
18. Bonifacino T., Rebosio C., Provenzano F., **Torazza C.,** et al., **2019**, International Journal of Molecular Sciences 20(18):4552; doi: 10.3390/ijms20184552.
19. Bonifacino T., Provenzano F., Gallia E., Ravera S., **Torazza C.**, et al., **2019**, Neurobio logy of Disease 129:79-92; doi: 10.1016/j.nbd.2019.05.007.

IRIS: https://iris.unige.it/cris/rp/rp40182;type=all

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TUTORIAL EXPERIENCE

[2017 – Current]

Tutorial and assistance activities to students for experimental theses, Master's Degrees in Pharmaceutical Chemistry and Technology and in Pharmacy, School of Medical and Pharmaceutical Sciences, Department of Pharmacy, University of Genoa (Italy). This activity supported the following theses:

- "Preclinical study of the protective antioxidant effects of an in-vivo treatment with platinum nanozymes in a mouse model of amyotrophic lateral sclerosis".
- "Study of the glutamate and dopamine in pre-frontal cortex in an animal model of resilience and/or vulnerability to the acute stress".
- "Sox2 mutations and possible implications in ataxia".
- "Aerobic and anaerobic metabolism at the pre- and peri-synaptic level in the SOD1G93A experimental model of amyotrophic lateral sclerosis: study in a symptomatic phase of the disease".
- "In-vivo gene ablation of the metabotropic glutamate receptor type 5 slows the progression of amyotrophic lateral sclerosis in the SOD1G93A mouse model".
- "Pre-clinical study on the effects of an experimental pharmacological treatment with CTEP, a negative allosteric modulator of the mGlu5 glutamatergic receptor, in the SOD1G93A mouse model of amyotrophic lateral sclerosis".
- "Effects of an in-vitro treatment with extracellular vesicles from mesenchymal stem cells on astrocytes isolated from the spinal cord of SOD1G93A mice model of amyotrophic lateral sclerosis".
- "Acute administration of ketamine blocks excessive glutamate release in the prefrontal cortex in an animal model of post-traumatic stress."

[2020 – Current]

Tutorial and assistance activities to students of the PhD Programme in Experimental Medicine, Curriculum of Pharmacology and Toxicology, University of Genoa

This activity supported the following PhD theses:

- "Characterization of mouse and human astrocytes in amyotrophic lateral sclerosis: effects of oxidative stress and blockade of the metabotropic glutamate receptor 5".
- "Characterization of the extracellular vesicles released by astrocytes cultured from the spinal cord of late symptomatic SOD1G93A mice, a model of amyotrophic lateral sclerosis".

[03/2017 – 03/2017]

Scientific divulgation to students attending the secondary school

Theoretical explanations and practical activities relating to cellular biology and the function of DNA, secondary schools, Milan (Italy).

TRAINING COURSES

[10/03/2025 – 11/03/2025] **Modulo 3.2 - Biologia di base, 6.2 - Metodi umanitari di soppressione e 8 - Procedure minimamente invasive senza anestesia - pratica (topo e ratto)**

Course in presence, Calco (Italy)

Courses organized by the Experimental Zooprofilactic Institute of Lombardia and Emilia-Romagna (Italy), "Bruno Umbertini" public health institution:

- 2024- "Advanced breeding practices, module 23, ministerial decree 5 August 2021" (online).
- 2024- "OPBA: Task training, modules 25, 50, 51 (online).
- 2022- "Basic elements for researchers' approach to the use of animals for scientific purposes - unique edition" (online).
- 2022- "Biology and management of laboratory animals, modules 3.1, 4, 5, 6.1, 7. Ministerial Decree 5 August 2021 rodents and lagomorphs - single edition" (online).
- 2022- "National legislation and ethics level 1, modules 1 and 2, ministerial decree 5 August 2021 - single edition" (online).
- 2022- "Ethics and conception of projects, modules 9, 10, 11, ministerial decree 5 August 2021 - single edition" (online).

[01/10/2019 – 05/10/2019] **EURON advanced workshop: Drugs and the Brain", Crete University (Greece).**

[20/05/2019 – 21/05/2019] **RT-qPCR course", Hasselt University (Belgium).**

[04/2019 – 06/2019] **Online Academic Writing English for FHML PhD students", Language centre of Maastricht University, Maastricht University (Netherlands)**

[01/04/2019 – 04/04/2019] **Human neuroanatomy and its clinical application", School for mental health and Neuroscience, Maastricht University (Netherlands)**

[20/05/2017 – 27/05/2017] **Neuroscience School about "Neural Stem Cells Development and Brain Repair", Neuroscience school of advanced studies, NSAS, Cortona (Italy)**

[03/2017 – 09/2017] **English language course to prepare IELTS exam, Medical English Service Network, University Vita-Salute San Raffaele, Milan (Italy)**

[10/2011 – 05/2012] **German language course, Goethe-Zentrum Genua (Genoa, Italy)**

[07/2010 – 07/2010] **English language course, Languages International, Tunbridge Wells (UK).**

[07/2009 – 07/2009] **English language course, MLI International School, Limerick (Irland)**

SCIENTIFIC SKILLS

Technical Skills

- Western Blotting.
- Immunocytochemistry.
- RT-qPCR.
- PCR.
- Cell line cultures.
- Primary cell line cultures (neonatal/adult astrocytes and microglia, neonatal oligodendrocytes, human monocytes).
- Motor neurons and astrocytes co-cultures (from mouse embryos).
- Culture of human inducible neuronal pluripotent cells (iNPCs) isolated from human fibroblasts of healthy donors and patients affected by amyotrophic lateral sclerosis.
- Transient and stable cell transfections.

- Isolation of nucleic acids (DNA, RNA).
- Bacterial cloning for plasmids engineering.
- CRISPR-Cas9 molecular editing.
- Aminoacids dosage with HPLC.
- ELISA.
- Samples preparation for immunohistochemistry.
- Dosage of cytosolic calcium with spectrofluorimetric technique.
- Preparation and purification of subcellular synaptic particles (synaptosomes) and glial particles (gliosomes) isolated from Central Nervous System.
- Functional studies and characterization of neurotransmitters release with superfusion technique.
- Acute cell preparations of astrocytes, microglia and neurons isolated from different areas of Central Nervous System.
- Transgenic mouse colonies maintenance.
- Pharmacological in-vivo treatments (through gavage, intraperitoneal injection, oral and nasal subministrations, subcutaneous administration and Alzet mini-pumps) in mice.
- Behavioural tests to study motor skills in mice (Rotarod, Beam Balance, Gait, Extension Reflex, Grip Strenght Meter, Paw Grip Endurance) and scute stress in rats (footshock).

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Genoa, 25/06/2023