

Ermanna Turano

Dept. Neurosciences, Biomedicine and Movement Sciences

University of Verona

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Date of birth: 01/02/1982

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**Current position**

2023-current Associate researcher (RTDa) at the Department of Neurosciences, Biomedicine and Movement Sciences of the University of Verona. Laboratory of Anatomy and Histology.

Scientific Disciplinary Section: BIOS 13/A – Histology and Embryology (ex SSD BIO-17).

Project: MNESYS - A Multiscale integrated approach to the study of the nervous system in health and disease

National Scientific Qualification (ASN)

Qualification as Associate Professor (Abilitazione a Professore di II Fascia), Competitive Sector 05/H2, ISTOLOGIA (ora 05-BIOS/13). (10/03/2025 -10/03/2037) (art. 16, comma 1, Legge 240/10)

Work experiences

2022-2023 Fellowship at the Department of Neurosciences, Biomedicine and Movement Sciences of the University of Verona. Project: "Study of Extracellular vesicles as novel biomarkers in progressive Multiple Sclerosis (PI Massimiliano Calabrese).

2021-2019 Fellowship at the Department of Neurosciences, Biomedicine and Movement Sciences, University of Verona. Project: "Development of an innovative pharmaceutical formulation of nanovesicles from mesenchymal stem cells in neurological disease" Bando Cariverona R&S 2018. (PI Raffaella Mariotti).

2019-2017 Fellowship (AdR) at the Department of Neurological and Movement Sciences, University of Verona.

Project: "Homing and targets of exosomes from adipose mesenchymal stem cells in experimental autoimmune encephalomyelitis" (PI Bruno Bonetti).

2017-2015 Fellowship (AdR) at the Department of Neurological and Movement Sciences, lab of Neuropathology of the University of Verona.

Project: "Exosomes from mesenchymal adipose stem cells: an innovative therapeutic approach in neurological disease" (PI Bruno Bonetti).

2015-2013 Fellowship (AdR) at the Department of Neurological and Movement Sciences lab of Neuropathology, University of Verona.

Project: "MEF-gene (myeloid Elf-1 like factor, also known ELF4) promotes stemness in the pathogenesis of gliomas". (PI-Elena Bazzoli).

2012 Fellowship (AdR) at the Department of Neurological and Movement Sciences, lab of Neuropathology, University of Verona.

Project: "Characterization of stem cells from leptomeninges (LeSC) compared to stem cells from bone marrow"

2012-2009 PhD student in Neuroscience at the Department of Neurological and Movement Sciences, lab of Neuropathology, University of Verona (Supervisor Bruno Bonetti).

Project: "Role of chitin in Alzheimer's disease".

PhD awarded in May 2012.

2008 Fellowship at the Department of Neurological and Movement Sciences, lab of Neuropathology, University of Verona.

2008-2007 Associate Scientist at the Department of Screening and Compound Profiling at Glaxo SmithKline Verona- Centre of excellence for Neuroscience drug discovery.

2007 Trainee at the Department of Screening and Compound Profiling at Glaxo SmithKline Verona- Centre of excellence for Neuroscience drug discovery.

Education and training

2012 PhD in Neuroscience (XXIV cycle) at Doctoral School of Science, Engineering and Medicine, University of Verona
Project: "Role of chitin in Alzheimer's disease" (Supervisor Bruno Bonetti).

2007 Master Degree in Chemistry and Pharmaceutical Technology at Farmaco-Biologico department, Pathology Lab University of Calabria -Thesis: "Molecular mechanisms involved in the proliferation of prostate cancer cell line LNCaP induced by the Epidermal Growth Factor (EGF)." (Supervisor Marcello Maggiolini).

2005 Fellowship at Facultad de Medicina, Universidad de Cantabria, Santander (Spain) (Socrates/Erasmus project with grant).

Maternity leave

Carrier breaks for maternity leaves between 18/03/2018-1/10/2018 and 23/10/2015 and 26/06/2016

Lines of research

I focused my studies on the immunomodulatory, neuroprotective effects and regenerative potential of adipose-derived stem cells (ASCs) in models of neurodegenerative and inflammatory disease such as experimental autoimmune encephalomyelitis (EAE) and SOD1(G93A) mice with familial amyotrophic lateral sclerosis (ALS). In particular, in recent years I have been focused to the soluble factors released by stem cells in small vesicles (microvesicles and nanovesicles or exosomes) and their therapeutic potential in different experimental contexts in vitro and in vivo.

I am also focusing my research on the development and study of intranasal mechanisms to deliver extracellular vesicles from ASCs in an effective and minimally invasive way as a potential therapy for neurological disorders.

I actively collaborate with clinicians, particularly with the Neurology Clinic of Verona in several research project to identify biomarkers of disease progression in patients with multiple sclerosis.

Research support

I have actively collaborated as operational unit personnel in several financed research projects:

-Fondazione Arisla 2024 “DEFINEALS-Detection of TDP-43 aggregates and misfolding in the olfactory neuroepithelium of ALS patients”. PI: Gianluigi Zanusso

-Ricerca Finalizzata 2022 (Ministero della salute) “Identification of diagnostic and prognostic markers of silent disease progression independent of relapse (PIRA) in Multiple Sclerosis.” PI: Massimiliano Calabrese

-Ricerca Finalizzata 2022 (Ministero della salute) “Exploring the effect of a novel therapy on chronic intrathecal inflammation in patients with active progressive multiple sclerosis.” PI: Damiano Marastoni

-Progetto di ricerca PNR 2022 partenariato pubblico-privato a carattere “problem-driven” (Next Generation-EU) “Fluorinated pharmacological chaperones for parkinson disease in drug-delivery studies” (FluoPCPark). PI: Francesca Cardona

-Joint Research, Bando Ricerca UNIVR 2021 “Encapsulated extracellular vesicles from adipose stem cells: an innovative intranasal treatment for neurodegenerative disease.” PI: Raffaella Mariotti

-Fondazione Cariverona, Bando Ricerca e Sviluppo 2018. “Sviluppo di un’innovativa formulazione farmaceutica per la somministrazione di nanovesicicole da cellule staminali mesenchimali in malattie neurologiche” PI: Raffaella Mariotti

-FISM Fondazione italiana Sclerosi multipla Bando 2016. “Homing e target di esosomi da cellule staminali mesenchimali adipose nell’encefalomielite autoimmune sperimentale” PI: Bruno Bonetti

-FISM Fondazione italiana Sclerosi multipla Bando 2012 “Esosomi isolati da cellule staminali mesenchimali adipose come nuovo approccio terapeutico nell’encefalomielite autoimmune sperimentale” PI: Bruno Bonetti

-PRIN Bando 2009 “Cellule staminali/progenitrici leptomeningeali: nuova sorgente cellulare per il trattamento della encefalite autoimmune sperimentale” PI: Bruno Bonetti.

Academic participation

Teaching activity:

2022-current: teaching activity (in co-docenza) with Prof Raffaella Mariotti in the Degree Course in Physiotherapy, Obstetrics, medical radiology technicians and biomedical laboratory technicians for the scientific disciplinary sector SSD BIO-17 histology and embryology

2023-current: teaching activity in PhD Program in "Neurosciences, Psychological and Psychiatric Sciences, and Movement Sciences," University of Verona

Title: "Mesenchymal Stem Cells as a Therapeutic Strategy for Neurodegenerative Diseases" (2024/2025)

Title: "In Vitro and In Vivo Models of Neurodegenerative Diseases" (2023/2024)

2023-2022 “Cultore della materia” (SSD/Bio-17 Histology) for the master degree in Medicine and Surgery of University of Verona.

2020-2019 -Invited lesson in PhD Neuroscience, Biomedicine and Movement Sciences. Neuron-Glial Interactions in Health and Diseases. “Animal models in MS” - University of Verona (26/02/2020)

-Corso di laurea in Tecniche di laboratorio biomedico (Verona) D.M. 270/04

Insegnamento: Scienze di medicina di laboratorio – Mod: metodi e tecniche di biochimica clinica (in co-docenza)

Positions in Collegial Bodies:

2023-current Representative of Researchers for the Department of Neurosciences, Biomedicine and movement Sciences in Consiglio di Facoltà di Medicina e Chirurgia, Univeristy of Verona.

2023-2024 Substitute teacher in “Commissione esami di profitto” for Histology and Embryology, Master's Degree in Medicine and Surgery and in Dentistry and Dental Prosthetics, University of Verona

2018 Member of Evaluation Commission for “Invite” PhD Programme in Inflammation, Immunity and Cancer (substituting Dr. Bonetti Bruno) - University of Verona

Tutoring:

2022-current: Tutoring for PCTO students at the Department of Neurological and Movement Sciences, section of Anatomy and Histology, University of Verona (Reference Raffaella Mariotti, Andrea Sbarbati)

2023-current: PhD Student Supervision (Co-supervision with Prof. Raffaella Mariotti)

PhD Program in "Neurosciences, Psychological and Psychiatric Sciences, and Movement Sciences" – University of Verona 39th Cycle – Student ID: VR501034

Project Title: "Innovative Therapeutic Approaches for Neurodegenerative Diseases Using Extracellular Vesicles Derived from Adipose Mesenchymal Stem Cells"

35th Cycle – Student ID: VR444287 Project Title: "Extracellular Vesicles from Adipose Mesenchymal Stem Cells: A Therapeutic Strategy for Neurodegenerative Diseases"

-Co-tutoring of Master degree thesis "Neuroprotective effect of extracellular vesicles derived from adipose stem cells diffused through nasal epithelium on neuronal cells" (Supervisor Raffaella Mariotti)

-Co-tutoring of Master degree thesis "In vitro evaluation of mucolytic enzyme to improve intranasal delivery of extracellular vesicles (Supervisor Raffaella Mariotti)

2021 Co-relator of Master degree thesis "Effetto di esosomi derivati da cellule mesenchimali adipose (exo-asc) su cellule gliali in modello murino di SLA: studio istologico" matr. VR 404418

2020 -Discussant in PhD annual report at PhD School: Life and Health Sciences PhD Course in Neuroscience, Psychological and Psychiatric Sciences, and Movement Sciences- University of Verona (08/09/2020)

-Invited lesson in PhD Neuroscience, Biomedicine and Movement Sciences. Neuron-Glial Interactions in Health and Diseases. "Animal models in MS" - University of Verona (26/02/2020)

2012-current Supervisor of students (undergraduate, graduate and PhD).

Collaboration and no-academic Networks

-Aptuit s.r.l. an Evotec company- Verona, Italy

Project: "Development of an innovative pharmaceutical formulation for the administration of nanovesicles from mesenchymal stem cells in neurological disease"

-Nanomnia s.r.l

Project: "Encapsulated extracellular vesicles from adipose stem cells: an innovative intranasal treatment for neurodegenerative disease."

-MRC Brain Bank for Neurodegenerative Disease- London,

Project: "Assessment of pathogenetic role of chitin in genetic amyloidotic conditions and tauopathies"

-Memorial Sloan Kettering Institute-NY

Project: "Role of macrophages-derived vesicles in malignant gliomas"

Affiliation to scientific society

Member of AINI (Associazione Italiana Neuroimmunologia)

Member of GISN (Gruppo italiano per lo studio della Neuromorfologia)

Member of Collegio dei docenti di Istologia ed Embriologia

Member of Associazione Giuseppe Moruzzi per le Neuroscienze

Honours

Winner of the poster prize at the 10th European Chitin Conference- St. Petersburg, Russia (2010) for best scientific contribution.

Multimedia

Homing e target cellulari di esosomi derivati da cellule staminali mesenchimali adipose-La ricerca di AISM

(Associazione Italiana Sclerosi Multipla) e FISM (Fondazione Italiana Sclerosi Multipla). **2021**

<https://www.youtube.com/watch?v=eua8eYfzsFU>

Publications

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Marastoni D., Colato E., Foschi M., Tamanti A., Ziccardi S., Eccher C., Crescenzo F., Bajrami A., Schiavi G.M., Camera V., Anni D., Virla F., Guandalini M., **Turano E.**, Pizzini F.B., Montemezzi S., Bonetti B., Howell O., Magliozzi R., Nicholas R.S., Scalfari A., Granziera C., Kappos L., Calabrese M. Intrathecal Inflammatory Profile and Gray Matter Damage Predict Progression Independent of Relapse Activity in Early Multiple Sclerosis. *Neurology(R) neuroimmunology & neuroinflammation*. 2025 jul; 12(4):e200399. DOI: 10.1212/NXI.0000000000200399. PMID: 40311103; PMCID: PMC12056761

Marastoni D., Sicchieri M., Pizzini F.B., Scartezzini A., Virla F., **Turano E.**, Anni D., Bertolazzo M., Ziccardi S., Camera V., Tamanti A., Marini M., Lippi G., Bonetti B., Solomon A.J., Calabrese M. Multiple sclerosis diagnosis and its differential diagnosis in patients presenting with type four 'mirror pattern' CSF oligoclonal bands. *Journal of Neurology*. 2025 feb 15; 272(3):207. doi: 10.1007/s00415-025-12947-y. PMID: 39954124; PMCID: PMC11829897

Mazziotti V., Crescenzo F., **Turano E.**, Guandalini M., Bertolazzo M., Ziccardi S., Virla F., Camera V., Marastoni D., Tamanti A., Calabrese M. The contribution of tumor necrosis factor to multiple sclerosis: a possible role in progression independent of relapse?. *Journal of Neuroinflammation*. 2024 aug 21; 21(1):209. doi: 10.1186/s12974-024-03193-6. PMID: 39169320; PMCID: PMC11340196

Virla F., **Turano E.**, Scambi I., Schiaffino L., Boido M., Mariotti R. Correction to: Administration of adipose-derived stem cells extracellular vesicles in a murine model of spinal muscular atrophy: effects of a new potential therapeutic strategy. *Stem Cell Research and Therapy*. 2024apr 29; 15(1):126. doi: 10.1186/s13287-024-03744-x. PMID: 38685128; PMCID: PMC11059648.

Virla F., **Turano E.**, Scambi I., Schiaffino L., Boido M., Mariotti R. Administration of adipose-derived stem cells extracellular vesicles in a murine model of spinal muscular atrophy: effects of a new potential therapeutic strategy. *Stem Cell Research and Therapy*. 2024 apr 1; 15(1):94. doi: 10.1186/s13287-024-03693-5. PMID: 38561840; PMCID: PMC10986013.

Turano E., Virla F., Scambi I., Dabrowska S., Bankole O., Mariotti R. Adipose mesenchymal stem cells-derived extracellular vesicles exert their preferential action in damaged central sites of SOD1 mice rather than peripherally. *European Journal of Histochemistry*. 2024 jul 4; 68(3):4040. doi: 10.4081/ejh.2024.4040. PMID: 38963135; PMCID: PMC11256976.

Marastoni D., **Turano E.**, Tamanti A., Colato E., Pisani A.I., Scartezzini A., Carotenuto S., Mazziotti V., Camera V., Anni D., Ziccardi S., Guandalini M., Pizzini F.B., Virla F., Mariotti R., Magliozzi R., Bonetti B., Steinman L., Calabrese M. Association of Levels of CSF Osteopontin With Cortical Atrophy and Disability in Early Multiple Sclerosis. *Neurology: Neuroimmunology and NeuroInflammation*. 2024 sep 11; 11(5):e200265. doi: 10.1212/NXI.0000000000200265. PMID: 38917380; PMCID: PMC11203401.

Dabrowska S., **Turano E.**, Scambi I., Virla F., Nodari A., Pezzini F., Galiè M., Bonetti B., Mariotti R. A Cellular Model of Amyotrophic Lateral Sclerosis to Study the Therapeutic Effects of Extracellular Vesicles from Adipose Mesenchymal Stem Cells on Microglial Activation. *International Journal of Molecular Sciences*. 2024 may 24; 25(11):5707. doi: 10.3390/ijms25115707. PMID: 38891895; PMCID: PMC11171908.

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Turano E., Scambi I., Bonafede R., Dusi S., Angelini G., Lopez N., Marostica G., Rossi B., Furlan R., Constantin G., Mariotti R., Bonetti B. Extracellular vesicles from adipose mesenchymal stem cells target inflamed lymph nodes in experimental autoimmune encephalomyelitis. *Cytotherapy*. 2024 mar; 26(3):276-285. doi: 10.1016/j.jcyt.2023.12.007. PMID: 38231166.

Marastoni D., Foschi M., Eccher C., Crescenzo F., Mazziotti V., Tamanti A., Bajrami A., Camera V., Ziccardi S., Guandalini M., Bosello F., Anni D., Virla F., **Turano E.**, Romoli M., Mariotti R., Pizzini F.B., Bonetti B., Calabrese M. CSF levels of Chitinase3like1 correlate with early response to cladribine in multiple sclerosis. *Frontiers in Immunology*. 2024 feb 9; 15:1343892. doi: 10.3389/fimmu.2024.1343892. PMID: 38404586; PMCID: PMC10885800.

Turano E., Scambi I., Virla F., Bonetti B., Mariotti R. Extracellular Vesicles from mesenchymal stem cells: towards novel therapeutic strategies for neurodegenerative diseases. *Int J Mol Sci*. 2023 feb 2;24(3):2917. doi: 10.3390/ijms24032917. PMID: 36769247; PMCID: PMC9917806.

Mazziotti V., Crescenzo F., Tamanti A., Dapor C., Ziccardi S., Guandalini M., Colombi A., Camera V., Peloso A., Pezzini F., **Turano E.**, Marastoni D., Calabrese M. Immune Response after COVID-19 mRNA Vaccination in Multiple Sclerosis Patients Treated with DMTs. *Biomedicines*. 2022 Nov 24;10(12):3034. doi: 10.3390/biomedicines10123034. PMID: 36551795; PMCID: PMC9775192.

Bankole O., Scambi I., Parrella E., Muccilli M., Bonafede R., **Turano E.**, Pizzi M., Mariotti R. Beneficial and Sexually Dimorphic Response to Combined HDAC Inhibitor Valproate and AMPK/SIRT1 Pathway Activator Resveratrol in the Treatment of ALS Mice. *Int J Mol Sci*. 2022 Jan 19;23(3):1047. doi: 10.3390/ijms23031047. PMID: 35162978; PMCID: PMC8835218.

Bonafede R., **Turano E.**, Scambi I., Busato A., Bontempi P., Virla F., Schiaffino L., Marzola P., Bonetti B., Mariotti R. ASC-Exosomes Ameliorate the Disease Progression in SOD1(G93A) Murine Model Underlining Their Potential Therapeutic Use in Human ALS. *Int J Mol Sci*. 2020 May 21;21(10):3651. doi: 10.3390/ijms21103651. PMID: 32455791; PMCID: PMC7279464.

Bonafede R., Brandi J., Manfredi M., Scambi I., Schiaffino L., Merigo F., **Turano E.**, Bonetti B., Marengo E., Cecconi D., Mariotti R. The Anti-Apoptotic Effect of ASC-Exosomes in an In Vitro ALS Model and Their Proteomic Analysis. *Cells*. 2019 Sep 14;8(9):1087. doi: 10.3390/cells8091087. PMID: 31540100; PMCID: PMC6770878.

Farinazzo A., Angiari S., **Turano E.**, Bistaffa E., Dusi S., Ruggieri S., Bonafede R., Mariotti R., Constantin G., Bonetti B. Nanovesicles from adipose-derived mesenchymal stem cells inhibit T lymphocyte trafficking and ameliorate chronic experimental autoimmune encephalomyelitis. *Sci Rep*. 2018 May 10;8(1):7473. doi: 10.1038/s41598-018-25676-2. PMID: 29748664; PMCID: PMC5945853.

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Zenaro E., Pietronigro E., Della Bianca V., Piacentino G., Marongiu L., Budui S., **Turano E.**, Rossi B., Angiari S., Dusi S., Montresor A., Carlucci T., Nani S., Tosadori G., Calciano L., Catalucci D., Berton G., Bonetti B., Constantin G. Neutrophils promote Alzheimer's disease-like pathology and cognitive decline via LFA-1 integrin. *Nat Med*. 2015 Aug;21(8):880-6. doi: 10.1038/nm.3913. Epub 2015 Jul 27. PMID: 26214837.

Farinazzo A, **Turano E**, Marconi S, Bistaffa E, Bazzoli E, Bonetti B. Murine adipose-derived mesenchymal stromal cell vesicles: in vitro clues for neuroprotective and neuroregenerative approaches. *Cytotherapy*. 2015 May;17(5):571-8. doi: 10.1016/j.jcyt.2015.01.005. Epub 2015 Mar 3. PMID: 25743633.

Turano E, Busetto G, Marconi S, Guzzo F, Farinazzo A, Commisso M, Bistaffa E, Angiari S, Musumeci S, Sotgiu S, Bonetti B. Neurotoxicity and synaptic plasticity impairment of N-acetylglucosamine polymers: implications for Alzheimer's disease. *Neurobiol Aging*. 2015 May;36(5):1780-91. doi: 10.1016/j.neurobiolaging.2014.12.033. Epub 2015 Jan 6. PMID: 25735590.

Marconi S, Bonaconsa M, Scambi I, Squintani GM, Rui W, **Turano E**, Ungaro D, D'Agostino S, Barbieri F, Angiari S, Farinazzo A, Constantin G, Del Carro U, Bonetti B, Mariotti R. Systemic treatment with adipose-derived mesenchymal stem cells ameliorates clinical and pathological features in the amyotrophic lateral sclerosis murine model. *Neuroscience*. 2013 Sep 17; 248:333-43. doi: 10.1016/j.neuroscience.2013.05.034. Epub 2013 May 28. PMID: 23727509.

Marconi S, Castiglione G, **Turano E**, Bissolotti G, Angiari S, Farinazzo A, Constantin G, Bedogni G, Bedogni A, Bonetti B. Human adipose-derived mesenchymal stem cells systemically injected promote peripheral nerve regeneration in the mouse model of sciatic crush. *Tissue Eng Part A*. 2012 Jun;18(11-12):1264-72. doi: 10.1089/ten.TEA.2011.0491. Epub 2012 Apr 3. PMID: 22332955.

Farinazzo A, Gini B, Milli A, Ruffini F, Marconi S, **Turano E**, Anghileri E, Barbieri F, Cecconi D, Furlan R, Bonetti B. 2D immunomic approach for the study of IgG autoantibodies in the experimental model of multiple sclerosis. *J Neuroimmunol*. 2011 Mar;232(1-2):63-7. doi: 10.1016/j.jneuroim.2010.10.004. Epub 2010 Nov 20. PMID: 21093930.

Constantin G, Marconi S, Rossi B, Angiari S, Calderan L, Anghileri E, Gini B, Bach SD, Martinello M, Bifari F, Galiè M, **Turano E**, Budui S, Sbarbati A, Krampera M, Bonetti B. Adipose-derived mesenchymal stem cells ameliorate chronic experimental autoimmune encephalomyelitis. *Stem Cells*. 2009 Oct;27(10):2624-35. doi: 10.1002/stem.194. PMID: 19676124.

Recchia AG, Musti AM, Lanzino M, Panno ML, **Turano E**, Zumpano R, Belfiore A, Andò S, Maggiolini M. A cross-talk between the androgen receptor and the epidermal growth factor receptor leads to p38MAPK-dependent activation of mTOR and cyclinD1 expression in prostate and lung cancer cells. *Int J Biochem Cell Biol*. 2009 Mar;41(3):603-14. doi: 10.1016/j.biocel.2008.07.004. Epub 2008 Jul 23. PMID: 18692155.

La sottoscritta autorizza il trattamento dei dati personali ai sensi del Decreto Legislativo 196/2003, coordinato con il Decreto Legislativo 101/2018, e dell'art. 13 del GDPR (Regolamento UE 2016/679) ai fini della ricerca e selezione del personale.
Dichiara inoltre la veridicità di quanto sopra riportato, resa ai sensi degli artt. 46 e 47 del D.P.R. 445/2000 (dichiarazione sostitutiva di certificazione o dell'atto di notorietà).