

GIAMPAOLO MILIOR

Rome, Italy, 16/04/1988

Contacts

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- **Neuroglial Interactions in Cerebral Physiopathology**,
Center for Interdisciplinary Research in Biology, Nathalie Rouach lab,
Collège de France, Paris, France
- **Molecular Imaging Reserach Center- Jacob Institute- CEA**, Fontenay aux Roses, France



Research topic:

Interaction between glial cells and neurons in human brain development and epilepsy

Education & Research Activity

-December 2024

Researcher position, Laboratoire des Maladies Neurodégénératives, MIRCen CEA, Fontenay aux Roses, France.



The human microglia-microbiota modulation of the inhibitory cortical circuit during brain development: role in cortical formation and childhood epilepsies

-January 2019 to November 2024

Post doc position, Nathalie Rouach lab, Neuroglial Interactions in Cerebral Physiopathology, Center for Interdisciplinary Research in Biology, **College de France**, Paris, France.



Astrocytic calcium signalling effects on synaptic activity: role in brain development and in the peri-tumoral human brain.

Technical competences:

- Astrocytic calcium live imaging in mouse and human brain preparations (acute and organotypic slices);
- Satellite cells preparations from human tissues and handling in culture.

February 2016 to December 2018

Post doc position, Richard Miles lab, "Cortex and Epilepsy ", ICM - Hôpital Pitié Salpêtrière, Paris, France.



Microglia multiple phenotypes and behaviors in the human epileptic cortex: role in Development and Adult Epilepsy.

Technical competences:

- Satellite cells preparations from human tissues and handling in culture;
- Human organotypic slice cultures preparation and manipulation;
- Two Photon Imaging techniques and electrophysiology;
- Genetic manipulations: Viral vectors transduction;
- Microglia two photon live imaging on human ex vivo brain slices for dynamic motility.

-May 2016

PhD in Neurophysiology with honors, Sapienza University of Rome, Italy.

Thesis: *"Depressive-like Behavior: new insights in the role of the environment and microglia cells"*.

Supervisor: **Prof. Cristina Limatola, Dr. Laura Maggi.**

-Nov 2015- Jan 2016

"Cenci-Bolognetti, Pasteur Institute" scholarship, Dept. of Physiology and Pharmacology, Sapienza University of Rome, Italy. Supervisor: Prof. Cristina Limatola, Dr. Laura Maggi.



Dissection of the dorsal-ventral hippocampal axis for studying the synaptic and neuronal network activities.

-Oct 2012- Oct 2015

PhD student in Neurophysiology, Dept. of Physiology and Pharmacology, Sapienza University of Rome, Italy, Lab of Neuroimmunology. Supervisor: Prof. Cristina Limatola, Prof. Laura Maggi.



- Microglia- CX3CL1 signalling in synaptic plasticity and mice behavior.
- Microglial inflammatory properties in the brain.
- Microglial relationship with excitatory and inhibitory synapses.

Technical competences:

- Electrophysiological recordings (patch clamp, LFP and MEA) on cell culture, acute brain slices (rodents, human);
- Microglial confocal imaging and electron microscopy.

-Dec 2012

Enrolment in the **National Order of Pharmacists**, Italy.

-Nov 2006 - July 2012

Master's degree in "Pharmacy and Industrial Pharmacy", Sapienza University of Rome, Italy.

Thesis: *"A new experimental approach for the treatment of Alzheimer's disease based on the modulation of the cerebral Rho GTPase"*. Supervisor: **Prof. Giovanni Diana**, National Health Institute, Rome, Italy.



Study of a new RhoGTPase inhibitor as a new treatment for Alzheimer disease in a mouse model.

Scientific activities

Speaker

- **Symposium organizer , XVII European Meeting on Glial Cells in Health and Disease**, Marseille 8–11 July 2025, *" Human microglial activities in brain physio-pathological contexts"* Milior G. Tremblay M.E. Madry C, Coufal N.
- **Dutch Neuroscience conference, Amsterdam, June 2024**: *"Microglial cells in the human brain: specific motilities, phenotypes and neuronal interactions in development and pathology"*.
Invited speaker for the conference symposium: *"Microglia Balancing the Neuronal Circuits: From Physiological Regulation to Pathogenesis"*.
- **Cajal School, Glial cells in health and diseases, Bordeaux, June 2023**: *"Glial cells in the human brain: new insights and perspectives from work on human epileptic tissues"*. **Invited speaker**.
- **Neurology meeting, Hôpital Pitié-Salpêtrière, Paris, November 2017**: *"Microglial phenotypes and motility in the human epileptic temporal lobe"*. **Invited speaker**.
- **UCL- ICM workshop Institute of Neurology (IoN-UCL), London, October 2017**: *"ON-OFF responses to purinergic stimulation of microglia in pathological human tissue"*. **Selected speaker**.
- **8th meeting of Young Researchers in Physiology, Florence, May 2014**: *"Role of environmental conditions and neuro-inflammation in the antidepressant efficacy"*. **Selected speaker**.

Student supervision and teaching

Teaching

- **Invited instructor for the 2023 Cajal School, Glial cells in health and diseases, Bordeaux, June 2023:**
Specific research topic: *"The human astrocyte role in epilepsy"*.
➤ **72 hours of experimental and theoretical training** for PhD students and Post docs.

Master, PhD students and post doc supervision and training

- **Mariagiovanna Di Chiano, PhD student** at the University of Bari (Italy), Pr. Anna Gallone laboratory.
International internship, March to August 2024.
Research project: *"The role of microbiota- microglia interaction in human cortical development"*.
- **Anais Venard, Master 2 student**, University of Medicine Paris-Saclay (France)
Internship, November 2022 to November 2023.
Research project: *"Role of the astrocytic IP3R1 in human peri-tumoral epilepsy"*.
- **Dr. Assunta Virtuoso, post doc internship training program**, University of Campania Luigi Vanvitelli, Naples (Italy), March to August 2023.
Research project: *"The dynamic of glioblastoma- associated glia: evidence from mouse and human tissue"*.
- **Tom Lakomy, PhD student**, Laboratory of Neurodegenerative Diseases, MIRCen, CEA.
Laboratory training, March to June 2023.
Training and supervision for neuronal extracellular recordings techniques and analysis.
- **Yiannis Poulot, PhD student**, Laboratory of Neurodegenerative Diseases - MIRCen, CEA.
Training and supervision for astrocytic two photon imaging FRAP experiments and analysis, December 2021 to December 2022.
Research project: *"Astrocyte heterogeneity in Alzheimer's disease: a key to understand the pathology"*.

Peer review activity

- **Editorial Board Member**, *Glial Health Research* journal, Elsevier.
- **Guest Editorial Board Member for Frontiers Cellular Neuroscience'** journal ("Non Neuronal Cells" section)

Related scientific activities

- **Scientific popularization** in french middle and high schools during “La Semaine du Cerveau” 2023 and 2024 edition: “Une heure avec une chercheuse ou chercheur en Neurosciences”.

Research Network



- Prof. Thomas Blauwblomme

Head of the department : Paediatric Neurosurgery, Hospital Necker. Université de Paris, Institut Imagine, France.

Expert in human paediatric brain pathologies; brain tissue resection and analysis.



Dr. Gilles Huberfeld

Department of EEG & Epileptologie adulte / Neurologie Hôpital Fondation Adolphe de Rothschild and Team leader at the IPNP, Paris, France.

Expert in human epilepsy and neuropathology.



Dr. Alessandra Pierani

Genetics and development of the brain cortex, IPNP and Imagine Institute, Paris, France.

Expert in genetics and mechanism in the cortical development.



Prof. Johan Pallud

Head of the department: GHU Paris psychiatrie & neurosciences, Site Sainte-Anne. MD, PhD Professor (Full) at Université de Paris Cité-Paris, France.

Expert in human adult glioma and glioblastoma; brain tissues resection and analysis.



Dr. Marie-Eve Tremblay

Professor, Canada Research Chair (Tier II) of Neurobiology of Aging and Cognition.

Division of Medical Sciences, University of Victoria, Canada.

Expert in electron microscopy of microglia and astrocytes. New 3D electron microscopy techniques.



Alexis Bemelmans, PhD

Team “Cell-Cell Interaction in Neurodegenerative Diseases: Models and Biotherapies”, Neurodegenerative Diseases Lab (UMR9199). MIRCen / CEA, Fontenay-aux-Roses, France.

Expert in plasmid and viral constructions: design and applications in rodents and human brain tissues.



Dr. Daniela Fiocco

Biology department, University of Foggia, Italy.

Expert in microbiota isolation and manipulations.



Dr. Dimitri Tanese

Material and optical physicist: Researcher and teaching assistant at the Paris Descartes University, France.

Expert in optical physics and optogenetics.



Dr. Alberto Bacci

Team Leader, ICM, Paris Brain Institute, Paris, France.

Expert on cortical inhibitory transmission physiology and pathology.

Publications

1. Zonca L, Bellier FC, **Milior G**, Aymard P, Visser J, Rancillac A, Rouach N, Holcman D. *Unveiling the functional connectivity of astrocytic networks with AstroNet, a graph reconstruction algorithm coupled to image processing*. Commun Biol. 2025 Jan 24;8(1):114. doi: 10.1038/s42003-024-07390-0. PMID: 39856404; PMCID: PMC11759710.
2. Di Chiano, M., Rocchetti, M. T., Spano, G., Russo, P., Allegretta, C., **Milior, G.**, Gadaleta, R. M., Sallustio, F., Pontrelli, P., Gesualdo, L., Avolio, C., Fiocco, D., & Gallone, A. (2024). *Lactobacilli Cell-Free Supernatants Modulate Inflammation and Oxidative Stress in Human Microglia via NRF2-SOD1 Signaling*. Cellular and Molecular Neurobiology, 44(1), 60.
3. **Milior G.**, Di Chiano M., Morin- Brureau M. *Specificities of living human microglial cells*. Advances in Neurobiology, Springer, 2024, (Adv Neurobiol. 2024;37:569-578).
4. **Milior G.***, Vasile F.*, Moulard J.*, Ezan P., Arnoux I., Mozheiko D., Breton R.,Zonca L., Masse F., Bemelmans A., Mailly P., Holcman D., Rouach N. *Control of brain excitability and mental health by local calcium signalling via astroglial IP3R1*. Nature Neuroscience, 2024 (under revision), ref: NN-A82940A-Z. *equal contribution.
5. Vissier J., **Milior G.**, Breton R., Moulard J., Garnerio M., Ezan P., Ribot J., Rouach N. *Astroglial collicular networks shape visual maps and perception during behaviour*. Cell Reports, 2024, (in press).
6. Dossi E., Zonca L., Pivonkova H., **Milior G.**, Moulard J., Vargova L., Chever O., Holcman D., Rouach N. *Astroglial gap junctions strengthen hippocampal network activity by sustaining afterhyperpolarization via KCNQ channels*. Cell Reports, 2024, May 8;43(5):114158. doi: 10.1016/j.celrep.2024.114158.
7. **Milior G.**, Morin-Brureau M., Pallud J., Miles R., Huberfeld G. *Animal models and human tissue compared to better understand and treat the epilepsies*. Epilepsia, 2023 May; 64(5):1175-1189. doi: 10.1111/epi.17552.
8. Oudart M., Avila-Gutierrez K., Moch C., Dossi E., **Milior G.**, Boulay AC., Gaudy M., Moulard J., Lombard B, Loew D., Bemelmans AP, Rouach N, Chapat C, Cohen-Salmon M. *The ribosome- associated protein RACK1 represses Kir4.1 translation in astrocytes and influences neuronal activity*. Cell Reports 2023 May 30;42(5):112456. doi: 10.1016/j.celrep.2023.112456.
9. **Milior G.**, Morin-Brureau M., Chali F., Le Duigou C., Savary E., Huberfeld G., Rouach N., Pallud J., Capelle L., Navarro V., Mathon B., Clemenceau S., Miles R. *Distinct P2Y Receptors Mediate Extension and Retraction of Microglial Processes in Epileptic and Peritumoral Human Tissue*. Journal of Neuroscience, 2020, Feb 12;40(7):1373-1388. doi: 10.1523/JNEUROSCI.0218-19.2019.
10. **Milior G.**, Chali F., Dos Santos T., Royer J., Miles R., Morin-Brureau M. *Transcriptomics and Live Imaging to Define Functional Phenotypes of Microglia in Pathological Human Tissue*. Methods Molecular Biology, 2019; 2034:325-336. doi: 10.1007/978-1-4939-9658-2_24.
11. Avignone E., **Milior G.**, Arnoux I., Audinat E. *Electrophysiological Investigation of Microglia*. Methods Molecular Biology 2019;2034:111-125. doi: 10.1007/978-1-4939-9658-2_9.
12. Poggini S., Golia MT., Alboni S., **Milior G.**, Sciarria LP., Viglione A., Matte Bon G., Brunello N., Puglisi-Allegra S., Limatola C., Maggi L., Branchi I. *Combined Fluoxetine and Metformin Treatment Potentiates Antidepressant Efficacy Increasing IGF2*

Expression in the Dorsal Hippocampus. **Neural Plasticity**, 2019 Jan 21;2019:4651031. doi: 10.1155/2019/4651031.

13. Chali F., **Milior G.**, Marty S., Morin-Brureau M., Le Duigou C., Savary E., Blugeon C., Jourdren L., Miles R. *Lipid markers and related transcripts during excitotoxic neurodegeneration in kainate-treated mice.* **European Journal of Neuroscience**, 2019 Jul;50(1):1759-1778. doi: 10.1111/ejn.14375.
14. Morin-Brureau M., **Milior G.**, Royer J., Chali F., Le Duigou C., Savary E., Blugeon C., Jourdren L., Akbar D., Dupont S., Navarro V., Baulac M., Bielle F., Mathon B., Clemenceau S., Miles R. *Microglial phenotypes in the human epileptic temporal lobe.* **Brain**, 2018, Dec 1;141(12):3343- 3360. doi: 10.1093/brain/awy276.
15. Le Duigou C., Savary E., Morin-Brureau M., Gomez-Dominguez D., Sobczyk A., Chali F., **Milior G.**, Kraus L., Meier JC., Kullmann DM., Mathon B., de la Prida LM., Dorfmüller G., Pallud J., Eugène E., Clemenceau S., Miles R. *Imaging pathological activities of human brain tissue in organotypic culture.* **J Neurosci Methods**, 2018, Mar 15;298:33-44. doi: 10.1016/j.jneumeth.2018.02.001. Epub 2018 Feb 7.
16. Alboni S., van Dijk M., Poggini S., **Milior G.**, Perrotta ML., Drenth T., Brunello N., Wolfer D., Limatola C., Amrein I., Cirulli F., Maggi L., Branchi I. *Hippocampus- related effects of fluoxetine treatment under stressful vs enriched conditions.* **Mol. Psychiatry**, 2017 Apr;22(4):483. doi: 10.1038/mp.2017.69. PMID: 28331213.
17. **Milior G.**, Di Castro MA., Sciarria LP., Garofalo S., Branchi I., Ragozzino D., Limatola C., Maggi L. *Electrophysiological Properties of CA1 Pyramidal Neurons along the Longitudinal Axis of the Mouse Hippocampus.* **Scientific Reports**, 2016 Dec 6;6:38242. doi: 10.1038/srep38242.
18. Di Castro MA., Trettel F., **Milior G.**, Maggi .L, Ragozzino D., Limatola C. *The chemokine CXCL16 modulates neurotransmitter release in hippocampal CA1 area.* **Scientific Reports**, 2016, Oct 10;6:34633. doi: 10.1038/srep34633.
19. Alboni S., Poggini S., Garofalo S., **Milior G.**, El Hajj H., Lecours C., Girard I., Gagnon S., Boisjoly-Villeneuve S., Brunello N., Wolfer DP., Limatola C., Tremblay MÈ., Maggi L., Branchi I. *Fluoxetine treatment affects the inflammatory response and microglial function according to the quality of the living environment.* **Brain Behavior and Immunity**, 2016,Nov;58:261-271. doi: 10.1016/j.bbi.2016.07.155.
20. Bisht K., Sharma KP., Lecours C., Sánchez MG., El Hajj H., **Milior G.**, Olmos-Alonso A., Gómez-Nicola D., Luheshi G., Vallières L., Branchi I., Maggi L., Limatola C., Butovsky O., Tremblay MÈ. *Dark microglia: A new phenotype predominantly associated with pathological states.* **Glia**, 2016 May;64(5):826-39. doi: 10.1002/glia.22966.
21. Alboni S., van Dijk RM., Poggini S., **Milior G.**, Perrotta M., Drenth T., Brunello N., Wolfer DP., Limatola C., Amrein I., Cirulli F., Maggi L., Branchi I. *Fluoxetine effects on molecular, cellular and behavioral endophenotypes of depression are driven by the living environment.* **Mol Psychiatry**, 2017 Apr;22(4):552-561. doi: 10.1038/mp.2015.142.
22. **Milior G.***, Lecours C.*, Samson L., Bisht K., Poggini S., Pagani F., Deflorio C., Lauro C., Alboni S., Limatola C., Branchi I., Tremblay ME., Maggi L. *Fractalkine receptor deficiency impairs microglial and neuronal responsiveness to chronic stress.* **Brain Behav Immun**, 2016 Jul;55:114-125. doi: 10.1016/j.bbi.2015.07.024. *equal contribution.