

CURRICULUM VITAE

Scopus Author ID: 55094430500

ORCID ID: <https://orcid.org/0000-0003-0696-7039>

A. NAME: Francesco Petrelli, PhD.

B. PROFESSIONAL ADDRESS: University of Lausanne (UNIL),
Department of Biomedical Sciences
(DSB), Rue du Bugnon 7, Lausanne,
CH-1005, Switzerland.
<https://wp.unil.ch/knobloch-lab/>
Email: francesco.petrelli.1@unil.ch

C. EMPLOYMENT HISTORY:

April 2020-Present: Research Associate, Department of Biomedical Sciences, Laboratory of Stem Cell Metabolism, University of Lausanne (UNIL), Switzerland (CH). I am currently investigating the role of lipid metabolism in health and Alzheimer's Disease. Additionally, I have explored the role of mitochondrial pyruvate carrier in adult neural stem cell.

2018-to April 2020: Research Associate, Department of Cellular Biology, University of Geneva (UNIGE), Switzerland (CH). During this time, I focused on studying the role of mitochondrial metabolism in astrocytes in both health conditions and in the context of Alzheimer's Disease.

D. CURRENT AREAS OF RESEARCH FOCUS:

2020-Present: Investigating the role of mitochondrial and lipid metabolism in glial cells, particularly in neuroinflammation, aiming to identify new pharmacological targets

- Leading research on the role of mitochondrial and lipid metabolism in astrocyte biology and its implications in neuroinflammation and neurodegenerative disorders.
- Conducting pharmacological characterization studies on novel inhibitors targeting mitochondrial pyruvate carrier, with the goal of developing therapeutic interventions for Alzheimer's Disease.

2020-Present: Exploring metabolism in adult neural stem cells, with a focus on identifying innovative pharmacological targets to stimulate neurogenesis.

- Studying the role of mitochondrial metabolism in neural stem cell behavior.
- Developing innovative pharmacological strategies to induce neurogenesis *in vivo*, especially in the contexts of neuropsychiatric disorders and Alzheimer's Disease.

E. PREVIOUS RESEARCH AREAS:

2012-2018: Identification and characterization of a new subset type of astrocytes (dopaminergic astrocytes) and their role in modulating dopamine levels.

2009-2011: I focused on unraveling the molecular mechanisms of neuroinflammation in brain ischemia, with the goal of identifying new pharmacological targets.

F. ADDITIONAL POSTGRADUATE TRAINING:

2012-2018: Postdoctoral Fellow, Department of Fundamental Neurosciences (DNF), University of Lausanne (UNIL), Switzerland (CH).

2016: Training at the International Astrocyte School. 10-16 April, Bertinoro, Italy.
<http://ias2016.azuleon.org>

2011: Visiting Scientist in Prof. Paola Bezzi's laboratory at the Department of Fundamental Neurosciences, University of Lausanne (UNIL), Switzerland (CH).

2010: Visiting Scientist at the Department of Medicine, University of Florence, Italy, under the mentorship of Prof. Flavio Moroni and Prof. Alberto Chiarugi.

G. EDUCATION:

Ph.D. in Biochimica ed Attività dei Farmaci in Oncologia, at University of Calabria, Pharmaco-Biology Department, Arcavacata di Rende (CS), Italy, (2009-2011).

Title of thesis: "Characterization of the neuroprotective effects of leptin in an experimental model of focal cerebral ischemia in rats".

PharmaD (110/110). Experimental thesis: "Role of metalloproteases in the mechanisms underlying brain damage induced by transient middle cerebral artery occlusion in rats". University of Calabria, , Arcavacata di Rende (CS), Italy, (2002-2008).

H. CERTIFICATION AND LICENSURE:

2008. Italian Board Certification for Pharmacist

2013. Suisse Animal Handling Certification, RESAL 1/93

2017. Statistic I, Basic knowledge, Lausanne, Switzerland

2017. Statistic II, Reminder in statistical tests, Lausanne, Switzerland

I. LANGUAGES: Italian Native, excellent spoken and written English, French (basic).

J. HONORS AND AWARDS:

2015. Best poster at the Department of Fundamental Neurosciences symposium, University of Lausanne (UNIL), Switzerland

2017. Best Volker Poster Prize in the category of “Developmental and Molecular Neuroscience” Swiss Society of Neuroscience (SSN) meeting: Title of presentation: Homeostatic control of dopamine by astrocytes in the postnatal maturation of prefrontal cortex. Basel, Switzerland.

K. MEMBERSHIPS IN PROFESSIONAL SOCIETIES:

1. Italian Neuroscience Society (SINS).
2. Federation of European Neuroscience Societies (FENS)
3. Swiss Society of Neuroscience (SSN).
4. Neuroimmune Pharmacology (SNIP, US).
5. International Society for Stem Cell Research (ISSCR).
6. International Society of Neurochemistry (ISN)

L. ADVISING/MENTORING/TUTORING:

2009. Tutor in Molecular Pharmacology, Pharmacotherapy and Toxicology at University of Calabria, Italy.

2014-Present. I have mentored graduate and undergraduate students, guiding them to successfully complete their master’s degrees. This mentoring involved diverse research-related activities, including teaching and encouraging their participation in seminars and conferences. Supervision of Master’s and Bachelor’s students:

2023: teaching at “Ricerca ed innovazione per la cura delle malattie cronico-degenerative ed oncologiche” 9-10th June 2023, Cosenza (Italy), (Corso per 9 crediti ECM)

2024: teaching at “Corso di perfezionamento in genetica clinica, epigenetica e medicina funzionale” 19-20 April, Firenze (Italy).

M. REFEREE TASKS:

Manuscript reviewing with Prof. Knobloch for Cell Stem Cell, Neuron, Cell Reports, EMBO reports and Science Advances.

1-Editorial contribution for the article, "Olig2-Lineage Astrocytes: A Distinct Subtype of Astrocytes that Differs from GFAP Astrocytes". Published the 14th of February on Frontiers in Neuroanatomy (2018).

2- Review Editor for Brain Disease Mechanisms, sezione speciale di Frontiers in Molecular Neuroscience.

3- Editorial Comment on "Brain lipid metabolism: the emerging role of lipid droplets in glial cells". Current Opinion in Lipidology: February 2022 - Volume 33 - Issue 1 - p 86-87, Department of Biomedical Sciences, University of Lausanne, Lausanne, Switzerland.

4- Guest Associated Editor with Dr. Carmen Falcone on research topic "15 Years of Frontiers in Cellular Neuroscience: Morphological Heterogeneity of Astrocytes" (2023-present).

5-Manuscript reviewing for important journals such as Cell Death and Differentiation (2024)

N. OTHER ACTIVITIES:

1- **Co-founder of the Italian Glial Network (IGN)**, together with Prof. Enrica Boda-Unito, Dr. Carmen Falcone-SISSA Trieste, Prof. Laura Civiero-UniPd, Prof. Nunzio Iraci-UniCt and Dr. Gabriele Losi-UniFe. <https://www.italianglianetwork.com/>

2- Part of the scientific committee for the organization of the first astrocyte café conference in Trieste in Italy 10-12 July, Trieste Italy

ORAL PRESENTATIONS AT INTERNATIONAL CONFERENCES:

- 1) **F.Petrelli** (Oral Presentation): "How lipid droplet turnover shapes postnatal brain development". Astrocyte Café 2024, July 10-12. Trieste, Italy. **Invited by Dr. Carmen Falcone and Dr. Nilhan Gunhanlar**
- 2) **F.Petrelli** (oral presentation): "Mitochondrial pyruvate metabolism regulates the activation of quiescent neural stem cells". **Selected short talk** at 5th meeting-Adult Eurogenesis 12-14 June 2024, Bordeaux, France
- 3) **F.Petrelli** (oral presentation): "The role of mitochondrial metabolism in astrocytes and neural stem cells". SINS, 14-17th September 2023, Turin (Italy), **Invited by Prof. Laura Civiero and Prof. Nunzio Iraci.**
- 4) **F.Petrelli** (Oral presentation). Seminar in the conference "Ricerca ed innovazione per la cura delle malattie cronico-degenerative ed oncologiche" 9-10th June 2023,

Cosenza (Italy), (Corso per 9 crediti ECM).

- 5) **F. Petrelli** (Oral presentation): “The role of astrocytic fatty acid beta-oxidation in health and in Alzheimer’s Disease”. Synapsis Forum (Synapsis foundation, Alzheimer Research Switzerland), November 2022, Gerzensee (Switzerland).
- 6) **F. Petrelli** (Oral Presentation): “Disruption of pyruvate transport into mitochondria triggers adult hippocampal neural stem cell activation and neurogenesis”. Short talk at conference “Neurogenesis from development to adulthood in health and disease”, Ascona (Switzerland), March 2022.
- 7) **F. Petrelli** (Oral Presentation): “How mitochondrial metabolism influences glial cells behavior”. Seminar to Drexel University, Philadelphia (US), March 2021, **Invited by Prof. Olimpia Meucci.**
- 8) **F. Petrelli** (Oral Presentation): “Astrocytes control dopamine homeostasis during postnatal maturation of the prefrontal cortex”. Glia-Neuron interactions in developing Circuits Symposium, Rockefeller University, NY, US. 25th September 2018.
- 9) **F. Petrelli** (Oral Presentation): “Dysregulation of dopamine homeostatic control by astrocytes in developing prefrontal cortex leads to psychiatric phenotypes”. Seminar to Columbia University, NY, US. **Invited by Prof. David Sulzer.**
- 10) **F. Petrelli**. (Oral Presentation): “Homeostatic control of dopamine by astrocytes in the postnatal maturation of prefrontal cortex “ 23rd Society of NeuroImmune-Pharmacology (SNIP) conference, Philadelphia (PA), March 29- April 1, 2017.
- 11) **F. Petrelli** (Oral Presentation): “UNICAL-52 011: a drug to target neuroinflammation in stroke”. Oral Presentation in Translational research in stroke therapy, Rende (CS), Italy, 16 November, 2011.

PUBLICATIONS:

PUBLICATIONS: 24

H-INDEX (SCOPUS JULY 2024): 16

TOTAL CITATION : 981

- 1) Ceyzériat K., Badina A.M., **Petrelli F.**, Montessuit S., Nicolaidis A., Millet P., Savioz A., Martinou JC., Tournier B.B. Inhibition of mitochondrial pyruvate carrier in astrocytes reduces amyloid and tau accumulation in the 3xTgAD mouse model of Alzheimer’s disease. **Neurobiol Dis.**, published August, 2024.

- 2) **Petrelli F.**, Rey A., Panfilova D., Madsen S., Heritier N., Knobloch M. An optimized method to visualize lipid droplets in the brain tissue demonstrates their substantial accumulation in aged brains. **BioRxiv**, published May 13, 2024.
- 3) **Petrelli F.**, Scandella V., Montessuit S., Zamboni N., Martinou JC and Knobloch M. Mitochondrial pyruvate metabolism regulates the activation of quiescent adult neural stem cells. **Science Advances**, published March 1, 2023.
- 4) Scandella* V., **Petrelli F*.**, Moore A.L., Braun S.M.G., Knobloch M. Neural stem cell metabolism revised: a critical role of mitochondria. **Trends in Endocrinology and Metabolism (Cell Press)**, published June 26, 2023. ***Equal contribution**
- 5) **Petrelli F.**, Zehnder T., Pucci L., Cali C., Bondiolotti B.M., Perez A.M., Dallerac G., Déglon N., GirosB., Magara F., Magrassi L., Mothet JP., Simmler L and Bezzi P. Disruption of astrocyte-dependent dopamine control in the developing medial prefrontal cortex leads to excessive grooming in mice. **Biological Psychiatry**, published December 5, 2022.
- 6) De Oliveira E.C., Cali C., **Petrelli F.** and Bezzi B. Emerging evidence for astrocytes dysfunction in schizophrenia. **Glia**, 70(9) 1585-1604, published May 30, 2022.
- 7) **Petrelli F.**, Knobloch M. and Amati F. Brain Lipid Metabolism: the emerging role of lipid droplets in glial cells. **Current Opinion in Lipidology**, 1:33:86-87, published February 2022.
- 8) Miozzo F., Valencia-Alarcon E.P., Stickley L., Dorcikova M.M., **Petrelli F.**, Tas D., Loncle N., Nikonenko I., Buo Dib P., Nagoshi E. Maintenance of mitochondrial integrity in midbrain dopaminergic neurons governed by a conserved developmental transcription factor. **Nature Communication**, 13(1):1426, published March 17, 2022.
- 9) Zehnder T., **Petrelli F*.**, Romanos J., De Oliveira Figueiredo E.C., Lewis T.L. Jr., Déglon N., Polleux F., Santello M. and Bezzi P. Mitochondrial Biogenesis in developing astrocytes regulates astrocyte maturation and synapse maturation. **Cell Reports**, published April 13, 2021. ***Equal contribution.**
- 10) Zangari J., **Petrelli F.**, Maillot B. and Martinou JC. The multifaceted pyruvate metabolism: role of the mitochondrial pyruvate carrier. **Biomolecules MDPI**, published July 9, 2020.
- 11) **Petrelli F.** et al. Dysfunction of homeostatic control of dopamine by astrocytes in the developing prefrontal cortex leads to cognitive impairments. **Molecular Psychiatry**

published August 20, 2018.

- 12) **Petrelli F.** and Bezzi P. mGlu5-mediated signalling in developing astrocyte and the pathogenesis of autism spectrum disorders. **Current Opinion in Neurobiology** /doi.org/10.1016/j.conb.2017.12.014, published December 22, 2017.
- 13) **Petrelli F.**, Muzzi M., Chiarugi A., Bagetta G., Amantea D. (2016). Poly(ADP-ribose) polymerase is not involved in the neuroprotection exerted by azithromycin against ischemic stroke mice. **Eur J Pharmacology** 791:518-522, published November 15, 2016.
- 14) **Petrelli F.**, Pucci L., Bezzi P. Astrocytes and microglia and their potential link with Autism Spectrum Disorders. **Frontier in Cellular Neuroscience**. 10:21. doi: 10.3389/fncel.2016.00021, published February 12, 2016.
- 15) Amantea D., Certo M., **Petrelli F.**, Tassorelli C., Micieli G., Corasaniti M.T., Puccetti P., Fallarino F., Bagetta G. Azithromycin protects mice against ischemic stroke injury by promoting macrophage transition towards M2 phenotype. **Exp Neurology** 275 Pt 1:116-25. doi: 10.1016/j.expneurol.2015.10.012, published January, 2016;
- 16) Amantea D., Certo M., **Petrelli F.**, Bagetta G. Neuroprotective properties of a macrolide antibiotic in a mouse model of middle cerebral artery occlusion: characterization of the immunomodulatory effects and validation of the efficacy of intravenous administration. **Assay Drug Dev Technol**, published July 8, 2016.
- 17) **Petrelli F.** and Bezzi P. Novel insights into gliotransmitters. **Current Opinion Pharmacology**. 138-45. doi: 10.1016/j.coph.2015.11.010, published February 26, 2016.
- 18) Sultan S., Li L., Moss J., **Petrelli F.**, Cassé F., Gebara E., Lopatar J., Pfrieder F.W., Bezzi P., Bischofberger J., Toni N. Synaptic integration of adult-born hippocampal neurons is locally controlled by astrocytes. **Neuron** 88(5):957-72, published December 2, 2015.
- 19) Cali C., Lopatar J., **Petrelli F.**, Pucci L., Bezzi P. G-protein coupled receptor-evoked glutamate exocytosis from astrocytes: role of prostaglandins. **Neural Plasticity** 2014;2014:254574, published 2014.
- 20) Amantea D., Tassorelli C., Micieli G., **Petrelli F.**, Certo M., Bezzi P., Corasaniti M.T., and Bagetta G. Understanding the multifaceted role of inflammatory mediators in ischemic stroke. **Current Medical Chemistry**, published 2014.

- 21) Greco R., Amantea D., Mangione A.S., **Petrelli F.**, Gentile R., Nappi G., Blandini F., Corasaniti M.T. and Tassorelli C. Modulation of RAGE isoforms expression in the brain and plasma of rats exposed to transient focal cerebral ischemia. **Neurochem Res**, 37:1508-16, published 2012.
- 22) Armogida M., Spalloni A., Amantea D., Nutini M., **Petrelli F.**, Longone P., Bagetta G., Nisticò R. and Mercuri N.B. On the protective role of catalase against cerebral ischemia in vitro and in vivo. **Journal of immunopathology and pharmacology** 24:735-247, published 2011.
- 23) Amantea D., Tassorelli C., Russo R., **Petrelli F.**, Bagetta G. and Corasaniti M.T. Neuroprotection by leptin in a rat model of permanent cerebral ischemia: effects on STAT3 phosphorylation in discrete cells of the brain. **Cell death and disease**. 8;2:e238, published 2011.

DATA 5th September 2024

Signature: Dr. Francesco Petrelli

A handwritten signature in black ink that reads "Francesco Petrelli". The signature is written in a cursive style with a prominent initial 'F'.