

Federica FREGNAN

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Curriculum Vitae

Personal

Surname: Fregnan

Name: Federica

Date of birth: Torino, 02-07-1976



CURRENT POSITION

- Research technician, Department of Clinical and Biological Sciences - University of Turin (IT).

EDUCATION

- March 2011: PhD degree in Neuroscience at University of Turin (IT). The research focused on the role of ErbB4 receptors and the migration of neuronal progenitors.
- March 2006: Master Degree in Biological Sciences at University of Turin (IT)

PROFESSIONAL EXPERIENCES

- 2011-2015: Research Contract at the University of Turin, entitled: "Moving again: integrated therapies to cure post-traumatic paralysis"
- 2015-2020: Research Fellowship at the University of Turin, entitled: "Bio-hybrid matrices for the regeneration of peripheral nerves"
- Jan 16th-19th 2012: attending to "BIOHYBRID in vitro training course" at the University of Hannover, Germany, organized by European Project FP7-BIOHYBRID.
- Feb 2013: Internship at Medovent GmbH Mainz, Germany. Main duties: Production of biomaterials (pipes, membranes and fibers), Quality management and risk analysis
- March 2018-December 2018: Scientific consultant for SILK BIOMATERIALS S.r.l. Como (IT) within the research project entitled: "Post-traumatic paralysis: preclinical study to evaluate the implantation of NerveGraft – Silk Nerve Prosthesis for bridging peripheral nerve defects in rats."

TEACHING ACTIVITIES

- 2013-2020: Contract Professor of Human Anatomy - Bachelor's degree course in Motor Sciences, University of Turin (IT).
- 2012-present: Human Anatomy (Teaching Assistant) – Bachelor's degree course in Psychiatric Rehabilitation Technicians, University of Turin (IT)
- 2012-present: Neuroanatomy (Teaching Assistant) – Bachelor's degree course in Psychiatric Rehabilitation Technicians, University of Turin (IT)
- 2011: Teaching collaboration for practical laboratory of Cell Biology and Pathology (Art.33)
- 2007-present: Human Anatomy (Teaching Assistant) - Degree course in Medicine and Surgery, Nursing School and Medical Radiology Techniques for Imaging and Radiotherapy, University of Turin (IT).

COMMISSIONS OF TRUST

- 2024: scientific committee member of the International Symposium on Peripheral Nerve Regeneration (ISPNR)
- 2024: Guest Associate Editor for the special issue "Recent Advances in the Anatomy, Physiology, And Pathophysiology of the Peripheral Nervous System" of Frontiers in neuroanatomy
- Member of ESPNR (The European Society for the Study of Peripheral Nerve Repair and Regeneration)
- 2021-present: Member of the research commission, Department of Clinical and Biological Sciences, University of Turin (IT)
- Reviewer for Scientific International Journal (Frontiers, Acta Biomaterialia, BioMed Research International, MDPI)
- 2021: Italian translation of the anatomical atlas "Atlas of Anatomy, 2e" by Thomas R. GEST, Piccin.

INVITED SPEAKER

The 7th Seminar for Young Researchers, February at Kyushu Institute of Technology, Kitakyushu, Japan, February, 14th 2024. Communication entitled: "In Vitro and In Vivo Study of Autonomic and Somatic Nerve Regeneration Through Engineered Biomaterials".

TRAVEL GRANTS

- Travel fellowship for the 15th International Symposium on Neural Regeneration (ISNR), Pacific Grove, California USA, 11-15 December 2013

ORAL COMMUNICATIONS

- F. Fregnan, L. Muratori, M. El Soury, F. Zen, I. Tonazzini, L. Scaccini, F. Porpiglia, G. Gambarotta, S. Geuna, S. Raimondo. DEVELOPMENT OF CHITOSAN MICROSTRUCTURED AND FUNCTIONALIZED MEMBRANES FOR IMPROVING REGENERATIVE CAPABILITIES OF PERIPHERAL NERVOUS CELLS. 6th International Symposium on Peripheral Nerve Regeneration 7 - 8 July, University College London
- Federica Fregnan, Luisa Muratori, Giulia Alessandra Bassani, Marco Biagiotti, Valentina Vincoli, Stefano Geuna, Antonio Alessandrino, Giuliano Freddi, Giulia Ronchi. SILKBRIDGE™, A NOVEL HYBRID TEXTILE-ELECTROSPUN TUBULAR ARCHITECTURE: PRECLINICAL VALIDATION FOR PERIPHERAL NERVE REGENERATION. FESSH ON LINE WEEK. September 1-5, 2020
- F. Fregnan, L. Muratori, S. Raimondo, S. Geuna. STUDY OF PERIPHERAL NERVE REGENERATION THROUGH IN VITRO MODELS: AN OVERVIEW. 26th national congress of the "gruppo italiano per lo studio della neuromorfologia" G.I.S.N. Verona November 24-25, 2016.
- F. Fregnan, S. Raimondo, E. Ciglieri, D. Pascal, I. Perroteau, G. Gambarotta, S. Geuna. IN VITRO STUDIES ON BIOMATERIALS: PERSPECTIVE OF THEIR EMPLOYMENT IN PROMOTING PERIPHERAL NERVE REGENERATION. 23th national congress of the "gruppo italiano per lo studio della neuromorfologia" G.I.S.N. Cagliari, Novembre 22-23, 2013

MAJOR COLLABORATIONS

During these years I have participated in research activities in collaboration with both national and international research groups, including:

NATIONAL COLLABORATIONS:

- Research group of Prof. Silvia De Marchis (University of Turin)
- Research group of Prof. Patrizia Bovolín (University of Turin)
- Research group of Prof. Mauro Giacca (ICGEB, Trieste)
- Research group of Prof. Gianluca Ciardelli (Department of Mechanics, Polytechnic University of Turin)
- Collaboration with Prof. Francesco Porpiglia (University of Turin)
- Collaboration with Dr. Pierluigi Tos (Gaetano Pini Institute, Milan)

INTERNATIONAL COLLABORATIONS

- Research group of Prof. Claudia Grothe (Medizinische Hochschule Hannover, Germany)
- Research group of Prof. Maurício, Ana Colette (ICBAS-University of Porto)
- Research group of Prof. Varejão, Artur S.P. (University of Porto)
- Research group of Prof. Santos, José Domingos (University of Porto)
- Research group of Prof. Abraham Shahar (NVR - Neural and Vascular Reconstruction Laboratories, Israel)
- Research group of Prof. Yuki Shirosaki (Kyushu Institute of Technology, Kitakyushu, Japan)

PATENT

- Geuna S., Shahar A., Ziv-Polat O., Gambarotta G., Fregnan F. Potentiation of the effect of type I beta 1 Neuregulin1 on peripheral nerve regeneration by covalent conjugation to iron nanoparticles. November 11, 2015 (n° ITUB20155471).

LIST OF PUBLICATIONS

Papers published on journal with Impact Factor

1. Shirosaki Y*, Fregnan F*, Muratori L, Yasutomi S, Geuna S, Raimondo S. The Impact of the Molecular Weight of Degradation Products with Silicon from Porous Chitosan-Siloxane Hybrids on Neuronal Cell Behavior. *Polymers (Basel)*. 2023 Aug 1;15(15):3272. doi: 10.3390/polym15153272

2. Ronchi G, Fregnan F, Muratori L, Gambarotta G, Raimondo S. Morphological Methods to Evaluate Peripheral Nerve Fiber Regeneration: A Comprehensive Review. *Int J Mol Sci*. 2023 Jan 17;24(3):1818. doi: 10.3390/ijms24031818.

3. Muratori L, Fregnan F, Maurina M, Haastert-Talini K, Ronchi G. The Potential Benefits of Dietary Polyphenols for Peripheral Nerve Regeneration. *Int J Mol Sci*. 2022 May 5;23(9):5177. doi: 10.3390/ijms23095177. PMID: 35563568 Free PMC article. Review.

4. Carta G, Fornasari B.E., Fregnan F., Ronchi G., De Zanet S., Muratori L., Nato G., Fogli M., Gambarotta G., Geuna S. and Raimondo S. Neurodynamic Treatment Promotes Mechanical Pain Modulation in Sensory Neurons and Nerve Regeneration in Rats. *Biomedicines* (2022)10,1296. <https://doi.org/10.3390/biomedicines10061296>

5. Muratori L., Fregnan F., Maurina M., Haastert-talini K., Ronchi G. The Potential Benefits of Dietary Polyphenols for Peripheral Nerve Regeneration. *International Journal of Molecular Sciences* (2022). DOI: 10.3390/ijms23095177

6. Carta G., Gambarotta G., Benedetta EF., Muratori L., El Soury M., Geuna S., Raimondo S., & Fregnan F. The neurodynamic treatment induces biological changes in sensory and motor neurons in vitro. *Scientific Reports* (2021). <https://doi.org/10.1038/s41598-021-92682-2>

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7. Lizarraga-Valderrama L.R., Ronchi G., Nigmatullin R., Fregnan F., Basnett P., Paxinou A., Geuna S., Roy I. Preclinical study of peripheral nerve regeneration using nerve guidance conduits based on polyhydroxyalkanoates. *Bioengineering and Translational Medicine*. (2021)
8. Fregnan F, Muratori L, Bassani GA, Crosio A, Biagiotti M, Vincoli V, Carta G, Pierimarchi P, Geuna S, Alessandrino A, Freddi G, Ronchi G. preclinical validation of silkbridgetm for peripheral nerve regeneration. *Front Bioeng Biotechnol*. (2020);8:, pp. 835. doi: 10.3389/fbioe.2020.00835.
9. Ronchi, G., Gambarotta, G., Morano, M., Fregnan, F., Pugliese, P., Tos, P., Geuna, S., Haastert-Talini, K. Critical analysis of the value of the rabbit median nerve model for biomedical research on peripheral nerve grafts. (2020) *Journal of Tissue Engineering and Regenerative Medicine*, 14 (5), pp. 736-740.
10. Alessandrino A, Fregnan F, Biagiotti M, Muratori L, Bassani GA, Ronchi G, Vincoli V, Pierimarchi P, Geuna S, Freddi G. (2019). SilkBridge™: a novel biomimetic and biocompatible silk-based nerve conduit. *Biomater Sci*. 7(10):4112-4130.
11. Ronchi G., Morano M., Fregnan F., Pugliese P., Crosio A., Tos P., Geuna S., Haastert-Talini K. and Gambarotta G. (2019). The Median Nerve Injury Model in Preclinical Research – A Critical Review on Benefits and Limitations. *Front Cell Neurosci*. 2019 Jun 28;13:288
12. Muratori L., Fregnan F., Ronchi G., Haastert-Talini K., Metzen J., Bertolo R., Porpiglia F., and Geuna S. (2019). New basic insights on the potential of a chitosan-based medical device for improving functional recovery after radical prostatectomy. doi:10.1111/bju.14834.
13. Porpiglia F, Manfredi M, Checcucci E, Garrou D, De Cillis S, Amparore D, De Luca S, Fregnan F, Stura I, Migliaretti G, Fiori C. (2018) Use of chitosan membranes after nerve-sparing radical prostatectomy improves early recovery of sexual potency: results of a comparative study. *BJU Int*. 2018 Oct 10. doi: 10.1111/bju.14583.
14. Geuna S, Muratori L, Fregnan F, Manfredi M, Bertolo R, Porpiglia F. (2018) Strategies to improve nerve regeneration after radical prostatectomy: a narrative review. *Minerva Urol Nefrol*. 2018 Dec;70(6):546-558. doi: 10.23736/S0393-2249.18.03157-0. Epub 2018 Jul 23.
15. Muratori L, Gnavi S, Fregnan F, Mancardi A, Raimondo S, Perroteau I, Geuna S. (2018) Evaluation of Vascular Endothelial Growth Factor (VEGF) and Its Family Member Expression After Peripheral Nerve Regeneration and Denervation. *Anat Rec (Hoboken)*. 2018 Apr 30. doi: 10.1002/ar.23842.

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16. Fregnan F., Ciglieri E., Tos P., Crosio A., Ciardelli G., Ruini F., Tonda-Turo C., Geuna S., Raimondo S. (2016) Chitosan Crosslinked Flat Scaffolds For Peripheral Nerve Regeneration. *Biomedical Materials*. Aug 10;11(4):045010. Doi: 10.1088/1748-6041/11/4/045010.
17. Geuna S, Raimondo S, Fregnan F, Haastert-Talini K, Grothe C. (2015). In Vitro Models For Peripheral Nerve Regeneration. *Eur J Neurosci*. Aug 26. Doi: 10.1111/Ejn.13054. Review.
18. Carvalho M, Costa Lm, Pereira Je, Shirosaki Y, Hayakawa S, Santos Jd, Geuna S, Fregnan F, Cabrita Am, Maurício Ac, Varejão As (2015). The Role Of Hybrid Chitosan Membranes On Scarring Process Following Lumbar Surgery: Post-Laminectomy Experimental
19. Beck-Broichsitter Be, Becker St, Lamia A, Fregnan F, Geuna S, Sinis N. (2014). Sensoric Protection After Median Nerve Injury: Babysitter-Procedure Prevents Muscular Atrophy And Improves Neuronal Recovery. *Biomed Res Int*. Doi: 10.1155/2014/724197
20. Ziv-Polat O, Shahar A, Levy I, Skaat H, Neuman S, Fregnan F, Geuna S, Grothe C, Haastert-Talini K, Margel S (2014). The Role Of Neurotrophic Factors Conjugated To Iron Oxide Nanoparticles In Peripheral Nerve Regeneration: In Vitro Studies. *Biomed Res Int*. Doi: 10.1155/2014/267808
21. Pereira T, Gärtner A, Amorim I, Almeida A, Caseiro Ar, Armada-Da-Silva Pa, Amado S, Fregnan F, Varejão As, Santos Jd, Bartolo Pj, Geuna S, Luís Al, Mauricio Ac (2014). Promoting Nerve Regeneration In A Neurotmesis Rat Model Using Poly(DILactide-E-Caprolactone) Membranes And Mesenchymal Stem Cells From The Wharton's Jelly: In Vitro And In Vivo Analysis. *Biomed Res Int* Doi: 10.1155/2014/302659
22. Morano M, Wrobel S, Fregnan F, Ziv-Polat O, Shahar A, Ratzka A, Grothe C, Geuna S, Haastert-Talini K (2014). Nanotechnology Versus Stem Cell Engineering: In Vitro Comparison Of Neurite Inductive Potentials. *Int J Nanomedicine*. Nov 14;9:5289-306.
23. Pascal D, Giovannelli A, Gnavi S, Hoyng Sa, De Winter F, Morano M, Fregnan F, Dell'albani P, Zaccheo D, Perroteau I, Pellitteri R, Gambarotta G (2014). Characterization Of Glial Cell Models And In Vitro Manipulation Of The Neuregulin1/ErbB System. *Biomed Res Int*. Doi:10.1155/2014/310215
24. Beck-Broichsitter Be, Lamia A, Geuna S, Fregnan F, Smeets R, Becker St, Sinis N (2014). Does Pulsed Magnetic Field Therapy Influence Nerve Regeneration In The Median Nerve Model Of The Rat? *Biomed Res Int*.; Doi: 10.1155/2014/401760
25. Fregnan F, Gnavi S, Macrì L, Perroteau I, Gambarotta G. (2014) The Four Isoforms Of The Tyrosine Kinase Receptor ErbB4 Provide Neural Progenitor Cells With An Adhesion Preference For The Transmembrane Type

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III Isoform Of The Ligand Neuregulin 1. Neuroreport. Mar 5;25(4):233-41. Doi: 10.1097/Wnr.0000000000000073.

26. Moimas S, Novati F, Ronchi G, Zacchigna S, Fregnan F, Zentilin L, Papa G, Giacca M, Geuna S, Perroteau I, Arnež Zm, Raimondo S. (2013) Effect Of Vascular Endothelial Growth Factor Gene Therapy On Post-Traumatic Peripheral Nerve Regeneration And Denervation-Related Muscle Atrophy. Gene Ther.. Doi: 10.1038/Gt.2013.26.

27. Gambarotta G, Fregnan F, Gnani S, Perroteau I. (2013) Neuregulin 1 Role In Schwann Cell Regulation And Potential Applications To Promote Peripheral Nerve Regeneration. Int Rev Neurobiol. 2013;108c:223-256. Doi: 10.1016/B978-0-12-410499-0.00009-5.

28. Fregnan F, Muratori L, Rodriguez Simões A, Giacobini-Robecchi Mg, Raimondo S. (2013)Role Of Inflammatory Cytokines In Peripheral Nerve Injury, Neural Regeneration Research (Issn:1673-5374), Pp. 2259- 2266. Vol. 7.

29. Gärtner A, Pereira T, Armada-Da-Silva Pa, Amorim I, Gomes R, Ribeiro J, França Ml, Lopes C, Porto B, Sousa R, Bombaci A, Ronchi G, Fregnan F, Varejão As, Luís Al, Geuna S, Maurício Ac. (2012) Use Of Poly(DI-Lactide--Caprolactone) Membranes And Mesenchymal Stem Cells From The Wharton's Jelly Of The Umbilical Cord For Promoting Nerve Regeneration In Axonotmesis: In Vitro And In Vivo Analysis., Differentiation (Issn:0301-4681), Pp. 355- 365. Vol. 84.

30. Chintawar S, Fregnan F, Pandolfo M, Geuna S. (2012) Stereological Quantification Of Cerebellar Purkinje Cells: Literature Review And Description Of A Variation Of The Physical Disector Method Adapted To Confocal Laser Microscopy., Neuroquantology (Issn:1303-5150), Pp. 125- 131. Vol. 10.

31. Pregno G, Zamburlin P, Gambarotta G, Farcito S, Licheri V, Fregnan F, Perroteau I, Lovisolo D, Bovolin P. (2011) Neuregulin1/ErbB4-Induced Migration In St14a Striatal Progenitors: Calcium-Dependent Mechanisms And Modulation By Nmda Receptor Activation. BMC Neurosci. 12;12:103

32. Fregnan F, Petrov V, Garzotto D, De Marchis S, Offenhauser N, Grosso E, Chiorino G, Perroteau I, Gambarotta G (2011) Eps8 Involvement In Neuregulin1-ErbB4 Mediated Migration In The Neuronal Progenitor Cell Line St14a. Exp Cell Res 317:757-769.

33. Amado S, Simoes Mj, Armada Da Silva Pa, Luis Al, Shirotsaki Y, Lopes Ma, Santos Jd, Fregnan F, Gambarotta G, Raimondo S, Fornaro M, Veloso Ap, Varejao As, Mauricio Ac, Geuna S (2008) Use Of Hybrid Chitosan Membranes And N1e-115 Cells For Promoting Nerve Regeneration In An Axonotmesis Rat Model. Biomaterials 29:4409-4419.

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34. Luis Al, Rodrigues Jm, Geuna S, Amado S, Shirotsaki Y, Lee Jm, Fregnan F, Lopes Ma, Veloso Ap, Ferreira Aj, Santos Jd, Armada-Da-Silva Pa, Varejao As, Mauricio Ac (2008b) Use Of Plga 90:10 Scaffolds Enriched With In Vitro-Differentiated Neural Cells For Repairing Rat Sciatic Nerve Defects. *Tissue Eng Part A* 14:979-993.

35. Luis Al, Rodrigues Jm, Geuna S, Amado S, Simoes Mj, Fregnan F, Ferreira Aj, Veloso Ap, Armada-Da-Silva Pa, Varejao As, Mauricio Ac (2008a) Neural Cell Transplantation Effects On Sciatic Nerve Regeneration After A Standardized Crush Injury In The Rat. *Microsurgery* 28:458-470.

36. Luis Al, Rodrigues Jm, Amado S, Veloso Ap, Armada-Da-Silva Pa, Raimondo S, Fregnan F, Ferreira Aj, Lopes Ma, Santos Jd, Geuna S, Varejao As, Mauricio Ac (2007b). Plga 90/10 And Caprolactone Biodegradable Nerve Guides For The Reconstruction Of The Rat Sciatic Nerve. *Microsurgery* 27:125-137

37. Luis Al, Amado S, Geuna S, Rodrigues Jm, Simoes Mj, Santos Jd, Fregnan F, Raimondo S, Veloso Ap, Ferreira Aj, Armada-Da-Silva Pa, Varejao As, Mauricio Ac (2007a). Long-Term Functional And Morphological Assessment Of A Standardized Rat Sciatic Nerve Crush Injury With A Non-Serrated Clamp. *J Neurosci Methods* 163:92-104.

Papers published on journal without Impact Factor

Muratori, L., Fregnan, F., Carta, G. and Geuna, S. Autonomic Nervous System Repair and Regeneration. *Peripheral Nerve Tissue Engineering and Regeneration, Reference Series in Biomedical Engineering* (2021) https://doi.org/10.1007/978-3-030-06217-0_2-1