

Curriculum Vitæ

María Cecilia ANGULO JARAMILLO

Research ID: B-8236-2014; ORCID: 0000-0002-0758-0496

Nationalities: Colombian and French; Married, two children

Present position

Research Director (DR1) at CNRS

Team leader of the group: “Interactions between neurons and oligodendroglia in myelination and myelin repair”; Institut de Psychiatrie et Neurosciences de Paris (IPNP), INSERM U1266, Univ. Paris Descartes, Paris, France (Director: Thierry Galli)

Previous positions

[2011-2017] Research Director (DR2) at CNRS; Team leader of the group: “Physiology of NG2 cells”, Neurophysiology and New Microscopies Laboratory, INSERM U1128, Univ. Paris Descartes, Paris, France (Director: Serge Charpak)

[2002-2010] Scientist at CNRS (CR2 and CR1), Laboratory of Neurophysiology and New Microscopies, INSERM U603, CNRS UMR8154, Univ. Paris Descartes, Paris, France (Director: Serge Charpak)

[2000-2001] Postdoctoral training; Dept. of Experimental Biomedical Science; Padova, Italy (Directors: Tullio Pozzan and Giorgio Carmignoto).

Education

[2010] Habilitation to Supervise Research (HDR); Univ. Paris Descartes.

[1996-1999] PhD Thesis; Univ. Pierre et Marie Curie and Lab. of Neurobiology, ESPCI, CNRS UMR7637; highest honors and best thesis award.

[1995-1996] DEA; Univ. Pierre et Marie Curie, Lab. of Neurobiology, ESPCI, CNRS UMR 7637; highest honors (Ranked 1st).

[1989-1995] Undergraduate diploma in Biology, National University of Colombia, Bogotá (Ranked 1st at the faculty of Sciences).

Fellowships, awards and honors

[2021-2024] “Equipe FRM 2021” award from the French Research Medical Foundation (FRM, France)

[2019] Promotion from Research Director 2 (DR2) to DR1 at CNRS (Ranked 1st)

[2018] Recognition as a high quality reviewer of The Journal of Neuroscience

[2016] Selected team by an international scientific advisory board to integrate the new Institute of Psychiatry and Neuroscience of Paris (IPNP, Dir. Thierry Galli). The team moved in September 2017.

[2016-2019] “Equipe FRM 2015” award from the French Research Medical Foundation (FRM, France)

[2014-2017] “Prime d'encadrement doctoral et de recherche” from CNRS

[2014] Selected for the oral defense of an ERC-consolidator grant

[2007-2010] Young investigator grant from ANR

[2005-2007] Young Investigator Award from NARSAD, USA

[2000-2001] HFSPO postdoctoral fellowship

[2000] EMBO postdoctoral fellowship (withdrawn since HFSPO accepted)

[2000] Best PhD thesis award, French Society for Neuroscience

[1995-1999] PhD fellowship from Colciencias (Colombia) and from FRM (France)

[1995] Award for the best student of the Faculty of Sciences in 1995, National University of Colombia

Institutional responsibilities and commissions of trust

- [From 2022]** Member of the INSERM Scientific Committee of Neuroscience (CSS4 Neuroscience)
- [From 2022]** Associated editor (handling) of the journal *Cellular and Molecular Life Science*, Springer Nature
- [2017-2022]** Member of the scientific committee of the Fondation pour la Recherche sur le Cerveau (FRC)
- [2014-2021]** Administrative committee of the “French Club of glial cells”, France
- [2021]** Member of the peer-review panel of the european program ERA-Net Neuron (call on Transnational Research Projects on Neurodevelopmental Disorders)
- [2019-2023]** Elected Treasurer of the French Society of Neuroscience; member of the office and administrative council of the society (around 2 000 members)
- [2018]** Member of the international “in-depth evaluation panel” to select a director for a Center supported by the Institute for Basic Science (IBS), Daejeon, South Korea
- [2017-2018]** Member of the scientific committee of Agence Nationale de la Recherche (ANR), Section : Molecular and Cellular Neuroscience
- [2017-2020]** Representative of researchers/professors in the Administrative Council of the Ecole des Neurosciences de Paris (ENP)
- [2013-2017]** Representative of INSERM U1128 in the scientific committee of Neuroscience Department (CNRS FR3636), University Paris Descartes, Paris, France
- [2012-2016]** Elected member of the Administrative Council of the Faculty of Fundamental and Biomedical Sciences, University Paris Descartes, Paris, France

Reviewer for: Science, Science Translational Medicine, Nature Neuroscience, Nature Communications, eLife, The Journal of Neuroscience, Glia, European Journal of Neuroscience among others

Reviewer for grant agencies: Wellcome Trust (UK), Swiss National Science Foundation (SNF, Switzerland), German Research Foundation (DFG, Germany), Agence Nationale de la Recherche (ANR, France), French Multiple Sclerosis Society (ARSEP), Italian Multiple Sclerosis Society (FISM), University of Tübingen (Germany), Sorbonne University (Emergence program), University of Paris (Emergence program), University of Strasbourg (Emergence program)

Jury: 7 HDR, 21 PhD theses, 2 Associate Professors, several juries for ATER, doctoral schools (including ENP) and master degrees

Teaching activities

- [From 2019]** Master 2 in Neurosciences, Neuron-glia interaction: effect of neuronal activity on oligodendroglial development, 2 hours/year, University of Paris.
- [From 2016]** Master 2 in Genetics, Relationship between neuronal activity and oligodendrogenesis, 2 hours/year, University of Paris.
- [From 2008]** Master 2 in Integrative Biology and Physiology, 2 hours/year, Sorbonne University
- [2004-2018]** Master 1, Neuron-glia interactions, 2 hours/year, Ecole Normale Supérieure (ENS), Paris.
- [2010-2012]** Master 2, Neuron-glia interactions, 2 hours/year, Univ. Paris Descartes, Paris.
- [2005-2007]** Master 2, Role of astrocytes in neurovascular coupling, 2 hours/year, Univ. Paris VI, Paris.

Invited conferences (last five years)

August 2023: 15th Biennial ISN satellite meeting on myelin biology. Lecture.

July 2023: 16th European meeting of glial cells in health and disease, Berlin, Germany. Symposium: Oligodendrocyte precursors shape brain circuits. “Early parvalbumin interneuron-OPC synapses sculpt cortical inhibition and behavior”

Jan 2023: Seminar of Interdisciplinary Biomedical Research Center, University of Liege, Liege, Belgium.

Dec 2022: Series seminars of Institute of Pharmacology & Toxicology, University of Zurich, Zurich, Switzerland.

Nov 2022: Neuroscience and neuronal networks workshop, virtual, Mexico. Symposium: “Participacion de la glia en la funcion y estructura de las redes neuronales” (Spanish), Queretaro, Mexico (virtual).

Oct 2022: 4th symposium on Physiology and Pathology of Neuroglia, Queretaro, Mexico (hybrid).

July 2022: FENS Forum 2022, Paris, France. Symposium: Not just insulation: Oligodendrocyte function and myelination in brain plasticity and behavior. “Myelination of parvalbumin interneurons shape cortical inhibition and mouse behavior”

April 2022: meeting: Fresh look on brain inhibition, Marseille, France.

March 2022: Series seminars of Institute for Functional Genomics, Montpellier, France.

September 2021: “18th Synapse and network day” meeting, Bordeaux, France.

July 2021: 15th European meeting of glial cells in health and disease, virtual. Introductory Course: Neuron-oligodendroglia interactions.

June 2021: Series seminars of the Achucarro Basque Center for Neuroscience, Bilbao, Spain (virtual).

January 2021: ERA-NET NEURON Cofund Meeting. Mid-Term Symposium of 2018 call: “Mental Disorders” (virtual).

February 2020: Series seminars of the Centre for Discovery Brain Sciences, University of Edinburgh, UK.

December 2019: JeCCO XIIth Symposium, Paris, France. New technologies Empowering Biomedical Research. Symposium: On a Cellular level. “Optogenetics and Neurology”.

August 2019: ISN-ASN meeting, Montréal, Canada. Symposium: Interneuron Development and Interaction with Other Cell Types in the Developing Brain. “Roles of long-lasting interactions between GABAergic interneurons and oligodendrocyte progenitors in the neocortex”.

August 2019: Satellite in New Perspectives in Myelin Function and Disease at the ISN-ASN meeting, Montréal, Canada. Symposium: Oligodendrocyte function in learning and synaptic transmission. “Role of GABAergic synapses of oligodendrocyte progenitors in regulating axonal myelination and function of parvalbumin interneurons” (selected abstract for an oral presentation).

July 2019: 14th European meeting of glial cells in health and disease, Porto, Portugal. Symposium organizer: Role of GABAergic neurons in controlling oligodendroglia function and shaping their own myelination. “Embryonic oligodendrocyte progenitors form postnatal functional clusters with their lineage-related cortical interneurons”.

May 2019: Neurofrance 2019, Marseille, France. Symposium: Critical periods for postnatal cortical development: Current transversal views. “Embryonic oligodendrocyte progenitors form postnatal functional clusters with their lineage-related interneurons”.

Nov 2018: Inauguration of IPNP, Paris, France. Symposium: Neurodevelopment and Psychiatry. “Neuronal activity *in vivo* promotes functional myelin repair”

Oct 2018: Series seminars of Institut de neurobiologie de la méditerranée (INMED), Marseille, France.

july 2018: Institute of Basic Science symposium in Neuroscience, Daejeon, South Korea. Symposium.

june 2018: First Achucarro International Glia School, Bilbao (Spain). Lecture.

April 2018: Symposium on Uncoding Multiple Roles of Glial Cells in the Brain, organized by the French Society of Biologie (Société de Biologie), Institut Curie, Paris.

march 2018: The Myelin Gordon Research Conference, Ventura (USA). Symposium: Adolescent Myelin. Development and Disease.

march 2018: Series seminars of Icahn Medical School of Medicine at Mount Sinai, New York, USA.

march 2018: Series seminars of the Department of Physiology and Neurobiology, University of Connecticut, Storrs, USA.

oct 2017: MSPARIS2017, Paris. European (ECTRIMS) and American (ACTRIMS) committees for treatment and research in Multiple Sclerosis. *Hot topic* Symposium.

june 2017: Swiss and French MS meeting, ARSEP, Paris. Symposium. “Effect of neuronal activity in remyelination”.

Publications

Peer-reviewed articles (*Co-first authors; #Co-last authors)

Maas DA, Manot-Saillet B, Bun P, Habermacher H, Poilbout C, Rusconi F, Angulo MC. Versatile and automated workflow for the analysis of oligodendroglial calcium signals. bioRxiv (In Revision)

Mozafari S, Starost L, Manot-Saillet B, Garcia-Diaz B, Xu YKT, Roussel D, Levy MJF, Antel JP, Martino G, Angulo MC, Kuhlmann T, Baron-Van Evercooren A (2020) Multiple sclerosis iPS-derived oligodendroglia conserve their intrinsic properties to functionally interact with axons and glia in vivo. *Sci Adv* 6(49):eabc6983

Benamer N, Vidal M, Balia M, Angulo MC (2020) Myelination of parvalbumin interneurons shapes the function of sensory cortical inhibitory circuits. *Nat Commun* 11(1):5151

Riva M*, Genescu I*, Habermacher H*, Orduz D, Ledonne F, Rijli FM, Lopez-Bendito G, Coppola E, Garel S#, Angulo MC#, Pierani A# (2019) Activity-dependent elimination of Cajal-Retzius cells regulates the wiring of upper cortical layers. *eLife* 8:e50503.

Orduz D*, Benamer N*, Ortolani D*, Coppola E, Vigier L, Pierani A, Angulo MC (2019) Developmental cell death regulates lineage-related interneuron-oligodendroglia functional clusters and oligodendrocyte homeostasis. *Nat. Commun.* 10(1):4249

Ortiz FC*, Habermacher C*, Graciarena M, Houry P-Y, Nishiyama A, Nait Oumesmar B, Angulo MC (2019) Neuronal activity in vivo enhances functional myelin repair. *JCI Insight* 4(9): e123434.

Ortolani D*, Manot-Saillet B*, Ortiz FC#, Angulo MC# (2018) In vivo optogenetic approach to study neuron-oligodendroglia interactions in mouse pups. *Front Cell Neurosci* 12:477

- Remaud S, Ortiz FC, Perret-Jeanneret M, Aigrot MS, Gothié JD, Fekete C, Kváta-Papp Z, Gereben B, Langui D, Lubetzki C, Angulo MC, Zalc B, Demeneix B. (2017) Transient hypothyroidism promotes functional brain remyelination in vivo. *eLife* 6:e29996
- Balia M, Benamer N, Angulo MC (2017) A specific GABAergic synapse onto oligodendrocyte precursors does not regulate cortical oligodendrogenesis. *Glia* 65(11):1821-1832
- Ledonne F, Orduz D, Mercier J, Vigier L, Grove EA, Tissir F, Angulo MC, Pierani A[#], Coppola E[#]. (2016) Targeted inactivation of Bax reveals subtype-specific mechanism of Cajal-Retzius neuron death in the postnatal cerebral cortex. *Cell Rep* 17(12) 3133
- Wake H*, Ortiz FC*, Woo DH, Lee P, Angulo MC, Fields D (2015) "Non-synaptic junctions on myelinating glia promote preferential myelination of electrically-active axons". *Nat Commun* 6:7844
- Orduz D*, Maldonado PP*, Balia M, Vélez-Fort M, de Sars V, Yanagawa Y, Emiliani V, Angulo MC (2015) Interneurons and oligodendrocyte progenitors form a structured synaptic network in the developing neocortex. *eLife* 4:e06953
- Sahel, A*, Ortiz, FC*, Kerninon, C, Maldonado PP, Angulo MC[#], Nait Oumesmar B[#] (2015) Alteration of synaptic connectivity of oligodendrocyte precursor cells following demyelination. *Front Cell Neurosci* 9:77
- Balia M*, Vélez-Fort M*, Passlick S, Schäfer C, Audinat E, Steinhäuser C, Seifert G, Angulo MC (2015) Postnatal down-regulation of the GABA_A receptor $\gamma 2$ subunit in neocortical NG2 cells accompanies synaptic-to-extrasynaptic switch in GABAergic transmission mode. *Cereb Cortex* 25(4):1114-23
- Maldonado PP, Vélez-Fort M, Levavasseur F, Angulo MC (2013) Oligodendrocyte precursor cells are accurate sensors of local K⁺ in mature gray matter. *J Neurosci* 33(6):2432-42
- Vélez-Fort M, Maldonado PP, Butt AM, Audinat E, Angulo MC (2010) Postnatal switch from synaptic to extrasynaptic transmission between interneurons and NG2 cells. *J Neurosci* 30(20):6921-9
- Zahid, M*, Vélez-Fort, M*, Papagiakoumou, E, Ventalon, C, Angulo, MC, Emiliani, V (2010) Holographic photolysis to stimulate multiple cells in brain slices. *PLoS One* 5(2):e9431
- Vélez-Fort, M, Audinat, E, Angulo, MC (2009) Functional $\alpha 7$ -containing nicotinic receptors of NG2-expressing cells in the hippocampus. *Glia* 57:1104-14
- Le Meur, K, Galante, M, Angulo, MC, Audinat, E (2007) Tonic activation of NMDA receptors by ambient glutamate of non-synaptic origin in the rat hippocampus. *J Physiol* 580:373-83
- Kozlov, AS*, Angulo, MC*, Audinat, E, Charpak, S (2006) Target cell-specific modulation of neuronal activity by astrocytes. *Proc Natl Acad Sci USA* 103:10058-63
- Angulo MC, Kozlov, AS, Charpak, S, Audinat, E (2004) Glutamate released from glial cells synchronizes neuronal activity in the hippocampus. *J Neurosci* 24:6920-7
- Zonta, M*, Angulo, MC*, Gobbo, S, Rosengarte, B, Hossmann, K-A, Pozzan, T, Carmignoto, G (2003) Neuron-to-astrocyte signaling is central to the dynamic control of brain microcirculation. *Nat Neurosci* 6:43-50
- Angulo, MC, Staiger, JF, Rossier, J, Audinat, E (2003) Distinct local circuits between neocortical pyramidal cells and fast-spiking interneurons in young adult rats. *J Neurophysiol* 89: 943-953

Angulo, MC, Staiger, JF, Rossier, J, Audinat, E (1999) Developmental synaptic changes increase the range of integrative capabilities of an identified excitatory neocortical synapse. *J Neurosci* 19: 1566-1576.

Angulo, MC, Rossier, J., Audinat, E. (1999) Postsynaptic glutamate receptors and integrative properties of fast-spiking cells in the rat neocortex. *J Neurophysiol* 82: 1295-1302.

Angulo, MC, Parra, P, Dieudonné, S (1998) Chick cerebellar Purkinje cells express omega-conotoxin GVIA-sensitive rather than funnel-web spider toxin-sensitive calcium channels. *Neuroscience* 83: 1-6.

Angulo, MC, Lambolez, B, Audinat, E, Hestrin, S, Rossier, J (1997) Subunit composition, kinetic and permeation properties of AMPA Receptors in single neocortical nonpyramidal cells. *J Neurosci* 17: 6685-6696.

Cauli, B, Audinat, E, Lambolez, B, Angulo, MC, Ropert, N, Tsuzuki, K, Hestrin, S, Rossier, J (1997) Molecular and physiological diversity of cortical nonpyramidal cells. *J Neurosci* 17: 3894-3906.

Review articles

Maas D, Angulo MC (2021) Can enhancing neuronal activity improve myelin repair in Multiple Sclerosis? *Front Cell Neurosci* 15:645240 (Invited Review in a Special Issue edited by M Kukley)

Benamer N, Vidal M, Angulo MC (2020) The cerebral cortex is a substrate of multiple interactions between GABAergic interneurons and oligodendrocyte lineage cells. *Neurosci Lett* 715:134615. (Invited Review in a Special Issue edited by A Nishiyama)

Habermacher C, Angulo MC[#], Benamer N[#]. (2019) Glutamate versus GABA in neuron-oligodendroglia communication. *Glia* 67(11):2092-2106 (Invited Review in the Special Issue: Plasticity of Myelinating Cells by RD Fields and WD Richardson)

Maldonado, PP, Angulo, MC (2015) Multiple modes of communication between neurons and oligodendrocyte precursor cells. *Neuroscientist* 21(3):266-76 (Invited review)

Vélez-Fort, M, Audinat, E, Angulo, MC (2012) The central role of GABA in neuron-glia interactions. *Neuroscientist* 18(3):237-50 (Invited review)

Maldonado, PP, Vélez-Fort, M, Angulo, MC (2011) Is neuronal communication with NG2 cells synaptic or extrasynaptic? *J Anat* 219(1):8-17 (Invited review)

Angulo, MC, Le Meur, K, Kozlov, AS, Charpak, S, Audinat, E (2008) GABA, the forgotten gliotransmitter. *Prog Neurobiol* 86:297-303

Zonta, M, Angulo, MC, Carmignoto, G (2003) Response: Astrocyte-mediated control of cerebral microcirculation. *TINS* 26: 344-345 (Invited response to comment)

Book chapter

Guevara C, Varas R, Angulo MC, Ortiz FC. Electrophysiological recordings of oligodendroglia in adult mouse brain slices. *Neuromethods* (In Press; Invited by Maria Kukley)

Habermacher C, Manot-Saillet B, Ortolani D, Ortiz FC, Angulo MC (2021) Optogenetics to interrogate neuron-glia interactions in pups and adults. *Methods Mol Biol.* 2191:135-149 (Invited by Robert Dempksi)

Lay article

Angulo MC (2020) Les cellules du lignage oligodendrocytaire sont des partenaires actifs clés des neurones. La Lettre des Neurosciences, Société des Neurosciences française. 26 May 2020.