



**Carmen V. Melendez-Vasquez**, Associate Professor

**Email:** melendez@genectr.hunter.cuny.edu  
**Office:** 912 HN  
**Phone:** 212 772-4594  
**Lab:** 911 HN 212 650-3022  
**Fax:** 212 772-5227

**Lab Web Site** <http://melendez.bioweb.hunter.cuny.edu>

**Education:**

- Postdoc 1998-2003 New York University School of Medicine
- Postdoc 1997 London University, England
- PhD 1996 London University, England
- MSc 1992 Instituto Venezolano de Investigaciones Cientificas
- BSc 1991 Universidad Central de Venezuela

**Research Interest:****Cytoskeletal Regulation of Myelin Formation & Repair**

Myelin is a specialized membrane, which wraps around axons in the peripheral (PNS) and central (CNS) nervous systems. In diseases such as Multiple Sclerosis (CNS) and Guillain-Barre Syndrome (PNS), loss of myelin around the nerve cells results in conduction block and underlies the clinical deficit characteristic of these disorders. Remyelination restores nerve conduction and leads to resolution of symptoms. However there are currently no treatments designed to directly target the efficiency of myelin repair and the return of nerve function. Our studies focus on the role of cytoskeletal signaling and its impact on myelinating glial cell differentiation, a fundamental knowledge that is currently lacking in the field. There are two types of specialized myelin-forming glial cells: Schwann cells (SC) in the PNS, and oligodendrocytes (OL) in the CNS. We have found that a cytoskeletal protein: non-muscle myosin II (NMII) regulates the development of myelinating glial cells. NMII inhibition impairs myelin formation in the PNS, but enhances CNS myelination. Our laboratory uses *in vitro* and *in vivo*

models to elucidate the mechanisms behind these observations. The long-term goal of our research is to apply this knowledge to help the development of novel therapeutic tools to treat human demyelinating diseases.

**Selected Publications:**

Urbanski, M; Kingsbury, L; Moussouros, D; Kassim, I; Mehjabeen, S; Paknejad, N; Melendez-Vasquez, C.V (2016) Myelinating glia differentiation is regulated by extracellular matrix elasticity. *Sci Rep.* Sep 20; 6:33751. doi: 10.1038/srep33751.

Lim, H., Sharoukhov, D., Kassim, I., Zhang, Y., Salzer, J.L., Melendez-Vasquez, C.V., Label-free imaging of Schwann cell myelination by third harmonic generation microscopy. *Proc Natl Acad Sci.* 2014 111(50):18025-30. doi: 10.1073/pnas.1417820111. Epub 2014 Dec 1

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Dutta D, Zameer A, Mariani JN, Zhang J, Asp L, Huynh J, Mahase S, Laitman BM, Argaw AT, Melendez-Vasquez CV, Casaccia P, Hayot F, Bottinger EP, Brown CW and GR John. Combinatorial actions of Tgf $\beta$  and Activin ligands promote oligodendrocyte development and CNS myelination. *Development* 2014 (12):2414-28. doi: 10.1242/dev.106492. PMID: 24917498

Wang, H., Rusielewicz T., Leitman, A, Tewari, A., Einheber, Steve Melendez-Vasquez C Myosin IIB is a negative regulator of oligodendrocyte differentiation (2012). *J Neurosci Res* 90:1547-1556. PMID: 22437915

Leitman E., Tewari A., Horn, M., Urbanski M., Damanakis, E., Einheber S., Salzer J., de Lanerolle P., Melendez-Vasquez, C.V. (2011) MLCK regulates Schwann cell cytoskeletal organization, differentiation and myelination. *J Cell Sci* 124: 3784-96. PMID: 22100921.

Zhang J, Kramer E, Asp L, Dutta D, Navrazhina K, Pham T, Mariani J, Argaw A, Melendez-Vasquez CV, John GR. Promoting myelin repair and return of function in multiple sclerosis (2011). *FEBS Letters* 585:3813-20. PMID: 21864535.

He, Y, Kim JY, Dupree J, Tewari A, Melendez-Vasquez, C, Svaren J, Cassacia, P (2010) Yy1: a molecular link between neuregulin and transcriptional regulation of peripheral myelination. *Nat Neurosci* 2010 13:1472-80. PMID: 21864535.

Wang, H, Tewari A., Einheber S., Salzer J. and Melendez-Vasquez, Carmen V. (2008) Myosin II has distinct roles during PNS and CNS myelin sheath formation. *J Cell Biol* 182:1171-84

Zhang Y., Taveggia C., Melendez-Vasquez, CV., Einheber S., Raine C S., Salzer J L., Brosnan C F and Gareth R. John (2006) Interleukin-11 potentiates oligodendrocyte survival and maturation, and myelin formation *J.Neurosci* 26: 12174-12185

Melendez-Vasquez, C.V., Carey D., Zanazzi, G., Reizes, O., Maurel P., Salzer J.L. (2005) Differential expression of proteoglycans at central and peripheral Nodes of Ranvier *Glia* 52:301-308.

John GR, Chen L, Riviaccio MA, Melendez-Vasquez CV, Hartley A, Brosnan CF.(2004) Interleukin-1beta induces a reactive astroglial phenotype via deactivation of the Rho GTPase-Rock axis. *J Neurosci.* 24: 2837-2845.

Melendez -Vasquez, C.V., Einheber S., Salzer J.L (2004) Rho kinase regulates Schwann cell myelination and formation of associated axonal domains. *J.Neurosci.* 24:3953-3963

Melendez-Vasquez, C.V., Rios, J.C., Zanazzi, G., Lambert, S., Bretscher, A. & Salzer, J. (2001) Nodes of Ranvier form in association with ERM (ezrin-radixin-moesin)-positive Schwann cell processes. *Proc. Natl. Acad. Sci.* 98:1235-1240

Rios, J.C.\*, Melendez -Vasquez, C.V\*., Einheber, S., Lustig,M., Grumet, M., Gollan, L., Peles, E., Hemperly, J.J. & Salzer, J.L. (2000) Caspr and contactin co-localize in the paranodal and internodal membranes of myelinated axons. *J. Neuroscience* 20: 8354-8364. (\*equal contribution).

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