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# MICHAEL LAWRENCE MILLER, MD, PHD

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## Education

- New York–Presbyterian Hospital** New York, NY  
Resident Physician, Pathology 2018–2020  
Clinical Fellow, Neuropathology 2020–  
Postdoctoral Residency Fellow at Vagelos College of Physicians and Surgeons
- Icahn School of Medicine at Mount Sinai** New York, NY  
PhD in Neuroscience (2016), MD (2018) 2010–2018  
Dissertation Title: *Genetic and epigenetic risk factors of opiate abuse*
- Binghamton University** Binghamton, NY  
BS in Integrative Neuroscience, B.S. in Biochemistry, 2006–10  
Dean’s Certificate in evolutionary studies  
*Summa cum laude*

## Research Experience

- Icahn School of Medicine at Mount Sinai** New York, NY  
Fishberg Department of Neuroscience, Friedman Brain Institute 2012–2018  
Doctoral Candidate, Medical Scientist Training Program  
Dissertation Advisor: Yasmin L. Hurd, PhD
- Brookhaven National Laboratories** New York, NY  
Department of Medicine 2008–10  
Summer Undergraduate Researcher  
Supervisor: Panayotis (Peter) K. Thanos, PhD
- Binghamton University** Binghamton, NY  
Department of Biological Sciences 2007–10  
Undergraduate Researcher  
Honor’s Thesis Advisor: Anne B. Clark, PhD

## Grants and Fellowships

- Shelanski Research Innovation Award** Sept-2021–present  
Department of Pathology & Cell Biology, Vagelos College of Physicians and Surgeons \$5,000
- Ruth L. Kirschstein National Research Service Award Fellow** 2015–2018  
National Institute on Drug Abuse, National Institutes of Health \$171,370  
Project title: *Identifying distinct striatonigral and striatopallidal disturbances* (F30-DA-038954)
- Barry M. Goldwater Scholar in Mathematics, Science and Engineering** 2009–10  
The Barry M. Goldwater Foundation \$7,500

## Publications

Argenziano MG, Furnari JL, **Miller ML**, Sun Y, Banu MA, Neira JA, Snuderl M, Bruce JN, Welch M, McCormick P, & Canoll P. (in press). Thoracic low grade glial neoplasm with concurrent H3 K27M and *PTPN11* mutations. *Acta Neuropathologica Communications*.

- Troy C, Gill B, **Miller ML**, Hickman R, Canoll P, Zacharoulis S, Feldstein N, & Bruce J. (in press). Adenocarcinoma arising in a yolk sac tumor of the pineal gland. *Journal of Neuropathology and Experimental Neurology*. doi: 10.1093/jnen/nlac002.
- Lin WV, Rand GM, **Miller ML**, Marr BP, & Suh L. (2022). A case of sight threatening complications from topical 1% 5-fluorouracil in the treatment of ocular surface squamous neoplasia. *American Journal of Ophthalmology Case Reports*, 25, article no. 101265. doi: 10.1016/j.ajoc.2022.101265.
- Hickman RA, Gionco JT, Faust PL, **Miller ML**, Bruce J, Page-Wilson G, Rosenblum MK, & Asa SL. (2022). Pituitary Corticotroph Tumour with Adrenocortical Cells: A distinct clinicopathologic entity with unique morphology and methylation profile. *Neuropathology & Applied Neurobiology*, 48, e12754. doi: 10.1111/nan.12754.
- Agopyan-Miu AHCW, Banu MA, **Miller ML**, Troy C, Hargus G, Canoll P, Wang TJC, Feldstein N, Haggiagi A, & McKhann II GM. (2021). Synchronous supratentorial and infratentorial oligodendrogliomas with incongruous *IDH1* mutations, a case report. *Acta Neuropathologica Communications*, 9, article no. 160. doi: 10.1186/s40478-021-01265-9.
- Thakur KT, Miller EH, Glendinning MD, Al-Dalahmah O, Banu MA, Boehme AK, Boubour AL, Bruce SS, Chong AM, Claassen J, Faust PL, Hargus G, Hickman RA, Jambawalikar S, Khandji AG, Kim CY, Klein RS, Lignelli-Dipple A, Lin CC, Liu Y, **Miller ML**, Moonis G, Nordvig AS, Overdevest JB, Prust ML, Przedborski S, Roth WH, Soung A, Tanji K, Teich AF, Agalliu D, Uhlemann AC, Goldman JE, & Canoll P. (2021). COVID-19 neuropathology at Columbia University Irving Medical Center/New York Presbyterian Hospital. *Brain*, 144, 2696–2708. doi: 10.1093/brain/awab148.
- Troy C, Sisti J, Maldonado-Soto A, Tosto-D'antonio G, **Miller ML**, Remotti F, & Mandigo G. (2021). A case of pediatric stroke: osteosarcoma embolus in the internal carotid artery. *Case reports in neurology*, 13, 269–275. doi: 10.1159/000514089.
- Manini AF, Gibson CL, **Miller ML**, Richardson LD, Vargas-Torres CC, Vedanthan R, & Hurd YL. (2021). Biomarkers of Endothelial Dysfunction in Cocaine Overdose and Overdose-Related Cardiovascular Events. *Addiction Biology*, 26, e12901. doi: 10.1111/adb.12901.
- Egervari G, Akpoyibo D, Rahman T, Fullard JF, Callens JE, Landry JA, Ly A, Zhou X, Warren N, Hauberg ME, Hoffman G, Ellis R, Ferland JN, **Miller ML**, Keller E, Zhang B, Roussos P, & Hurd YL. (2020). Chromatin accessibility mapping of the striatum identifies tyrosine kinase FYN as a therapeutic target for heroin use disorder. *Nature Communications*, 11, 4634. doi: 10.1038/s41467-020-18114-3.
- Michaelides M, **Miller ML**, Egervari G, Primeaux SD, Gomez JL, Ellis RJ, Landry JA, Szutorisz S, Hoffman AF, Lupica CR, Loos RJF, Thanos PK, Bray GA, Neumaier JF, Zachariou V, Wang G-J, Volkow ND, & Hurd YL. (2020). Striatal Rgs4 regulates feeding and susceptibility to diet-induced obesity. *Molecular Psychiatry*, 25, 2058–2069. doi: 10.1038/s41380-018-0120-7.
- Annunziata J, **Miller ML**, Park DC, Vlad G, Bhagat G, & Alobeid A. (2020). Detection of non-hematologic neoplasms by routine flow cytometry analysis. *American Journal of Clinical Pathology*, 153, 99–104. doi: 10.1093/ajcp/aqz138.
- Miller ML**, Tome-Garcia J, Waluszko A, Sidorenko T, Kumar C, Ye F, & Tsankova NM. (2019). Practical bioinformatic DNA-sequencing pipeline for detecting oncogene amplification and EGFRvIII mutational status in clinical glioblastoma samples. *Journal of Molecular Diagnostics*, 21, 514–524. doi: 10.1016/j.jmoldx.2019.02.001.
- Miller ML**, Chadwick B, Dickstein DL, Purushothaman I, Egervari G, Rahman T, Tessereau C, Hof PR, Roussos P, Shen L, Baxter MG, & Hurd YL. (2019). Adolescent exposure to  $\Delta^9$ -tetrahydrocannabinol alters the transcriptional trajectory and dendritic architecture of prefrontal pyramidal neurons. *Molecular Psychiatry*, 24, 588–600. doi: 10.1038/s41380-018-0243-x.
- Miller ML**, Ren Y, Szutorisz H, Warren NA, Tessereau C, Egervari G, Mlodnicka A, Kapoor M, Chaarani B, Morris CV, Schumann G, Garavan H, Goate AM, Bannon MJ, IMAGEN Consortium, Halperin JM, & Hurd YL. (2018). Ventral striatal regulation of *CREM* mediates impulsive action and drug addiction vulnerability. *Molecular Psychiatry*, 23, 1328–1335. doi: 10.1038/mp.2017.80.
- Michaelides M, **Miller ML**, DiNieri JA, Gomez JL, Schwartz E, Egervari G, Wang G-J, Mobbs CV, Volkow ND, & Hurd YL. (2017). Dopamine D2 receptor signaling in the nucleus accumbens comprises a metabolic-cognitive brain interface regulating metabolic components of glucose reinforcement. *Neuropsychopharmacology*, 42, 2365–2376. doi: 10.1038/npp.2017.112.

- Miller ML** & Hurd YL. (2017). Testing the Gateway Hypothesis. *Neuropsychopharmacology*, *42*, 985–986. doi: 10.1038/npp.2016.279.
- Egervari G, Jutras-Aswad D, Landry J, **Miller ML**, Anderson SA, Michaelides M, Jacobs MM, Peter C, Yiannoulos G, Liu X, & Hurd YL. (2016). A functional 3UTR polymorphism (rs2235749) of Prodynorphin alters microRNA-365 binding in ventral striatonigral neurons to influence novelty seeking and positive reward traits. *Neuropsychopharmacology*, *10*, 2512–2520. doi: 10.1038/npp.2016.53.
- Thanos PK, Michaelides M, Subrize M, **Miller ML**, Bellezza R, Cooney RN, Leggio L, Wang G-J, Rogers AM, Volkow ND, & Hajnal A. (2015). Roux-en-Y gastric bypass alters brain activity in regions that underlie reward and taste perception. *PLoS One*, *10*, e0125570. doi: 10.1371/journal.pone.0125570.
- Miller ML**, Chadwick B, Morris CV, Michaelides M, & Hurd YL. (2015). Cannabinoid-Opioid Interactions. In P. Campolongo & L. Fattore (Eds.) *Cannabinoid Modulation of Emotion Memory and Motivation* (pp 393–407) New York NY: Springer New York. doi: 10.1007/978-1-4939-2294-9\_15.
- Maze I, Chaudhury D, Dietz DM, von Schimmelmann M, Kennedy PJ, Lobo MK, Sullivan SE, **Miller ML**, Bagot RC, Sun H, Turecki G, Neve RL, Hurd YL, Shen L, Han M-H, Schaefer A, & Nestler EJ. (2014). G9a influences neuronal subtype specification in striatum. *Nature Neuroscience*, *17*, 533–539. doi: 10.1038/nn.3670.
- Szutorisz H, DiNieri JA, Sweet E, Egervri G, Michaelides M, Carter JM, Ren Y, **Miller ML**, Blitzer RD, & Hurd YL. (2014). Parental THC exposure leads to compulsive heroin-seeking and altered striatal synaptic plasticity in the subsequent generation. *Neuropsychopharmacology*, *39*, 1315–1323. doi: 10.1038/npp.2013.352.
- Hurd YL, Michaelides M, **Miller ML**, & Jutras-Aswad D. (2014). Trajectory of adolescent cannabis use on addiction vulnerability. *Neuropharmacology*, *76*, 416–424. doi: 10.1016/j.neuropharm.2013.07.028.
- Chadwick B, **Miller ML**, & Hurd YL. (2013). Cannabis use during adolescent development: susceptibility to psychiatric illness. *Frontiers in Psychiatry*, *4*, 129. doi: 10.3389/fpsy.2013.00129.
- Michaelides M, **Miller ML**, Subrize M, Kim R, Robison L, Hurd YL, Wang G-J Volkow ND, & Thanos PK. (2013). Limbic activation to novel versus familiar food cues predicts food preference and alcohol intake. *Brain Research*, *1512*, 37–44. doi: 10.1016/j.brainres.2013.03.006.
- Miller ML**, Gallup AC, Vogel AR, Vicario SM, & Clark AB. (2012). Evidence for contagious behaviors in budgerigars (*Melopsittacus undulatus*): An observational study of yawning and stretching. *Behavioural Processes*, *89*, 264–270. doi: 10.1016/j.beproc.2011.12.012.
- Miller ML**, Gallup AC, Vogel AR, & Clark AB. (2012). Auditory disturbances promote temporal clustering of yawning and stretching in small groups of budgerigars (*Melopsittacus undulatus*). *Journal of Comparative Psychology*, *126*, 324–328. doi: 10.1037/a0026520.
- Miller ML**, Gallup AC, Vogel AR, & Clark AB. (2010). Handling-stress initially inhibits but then potentiates yawning in budgerigars (*Melopsittacus undulatus*). *Animal Behaviour*, *80*, 615–619. doi: 10.1016/j.anbehav.2010.05.018.
- Gallup AC, **Miller ML**, & Clark AB. (2010). The direction and range of ambient temperature change influences yawning in budgerigars (*Melopsittacus undulatus*). *Journal of comparative Psychology*, *124*, 133–138. doi: 10.1037/a0018006.
- Gallup AC, **Miller ML**, & Clark AB. (2009). Yawning and thermoregulation in budgerigars: Science as an incremental process. *Animal Behaviour*, *78*, e3–e5. doi: 10.1016/j.anbehav.2009.09.017.
- Gallup AC, **Miller ML**, & Clark AB. (2009). Yawning and thermoregulation in parakeets (*Melopsittacus undulatus*). *Animal Behaviour*, *77*, 109–113. doi: 10.1016/j.anbehav.2008.09.014.

## Presentations

### Talks

- Miller ML**, Fernandes H, Hsiao SJ, & Mansukhani MM. Comprehensive molecular profiling of pediatric CNS malignancies: A single-institution experience using a clinical platform. 97<sup>th</sup> Annual Meeting of the American Association of Neuropathologists, St. Louis, Missouri, 10–13 June 2021.

**Miller ML.** Transcriptional microdissection of striatal neurocircuits: applications for studying substance use disorder. Undergraduate Research Symposium in Biological, Chemical, Structural, and Computational Sciences, Icahn School of Medicine at Mount Sinai, New York, NY, 17 September 2016.

## Posters

**Miller ML,** Katsyv I, Fernandes H, Hsiao SJ, & Mansukhani MM. Whole exome and transcriptome sequencing of pediatric ependymomas: A single institution experience. Association for Molecular Pathology's 25<sup>th</sup> Annual Meeting and Expo, Baltimore Convention Center, Baltimore, MD, 7–9 November 2019.  
doi: 10.1016/S1525-1578(19)30391-5.

**Miller ML,** Ye F, Tome-Garcia J, Zhang DY, & Tsankova NM. Assessment of focal gene amplifications and EGFRvIII mutation in glioblastoma through next-generation sequencing. 93<sup>rd</sup> Annual Meeting of the American Association of Neuropathologists, Hyatt Regency Orange County, Garden Grove, CA, 8–11 June 2017.

**Miller ML,** Ren Y, Szutorisz H, Egervári G, Morris CV, Sperry J, & Hurd YL. Striatal *CREM* mediates impulsive action and associates with fatal overdose in heroin abusers. 7<sup>th</sup> Annual Neuroscience Retreat at the Icahn School of Medicine at Mount Sinai, The New York Academy of Medicine, New York, NY, 13 May 2015.

**Miller ML,** Chadwick B, & Hurd YL. Identifying distinct striatonigral and striatopallidal disturbances after developmental cannabis exposure: pathway-specific changes in miRNAs and their contribution to heroin addiction. 6<sup>th</sup> Biennial Gordon Research Conference on Cannabinoid Function in the CNS, Renaissance Tuscany Il Ciocco, Barga LU, Italy, 24–29 May 2015.

**Miller ML & Hurd YL.** Identifying distinct striatonigral and striatopallidal disturbances after developmental cannabis exposure: pathway-specific changes in miRNAs and their contribution to heroin addiction. 14<sup>th</sup> Annual Medical-Scientist Training Program Retreat at the Icahn School of Medicine at Mount Sinai, Honors Haven Resort, Ellenville, NY, 5–7 September 2014.

**Miller ML & Hurd YL.** The impact of adolescent THC on mesolimbic microRNA regulation. 5<sup>th</sup> Biennial Gordon Research Conference on Cannabinoid Function in the CNS, Waterville Valley, NH, 4–9 August 2013.

## Mentorship and Teaching

- **Teaching Assistant for Brain & Behavior**  
Fall 2012 through Fall 2015, Directed by Carrie Ernst, M.D.
  - **Teaching Assistant for Principles of Neurobiology: Systems Neuroscience**  
Winter 2013, Directed by Elizabeth Cropper, Ph.D.
  - **Teaching Assistant for General Pathology**  
Winter 2012, Directed by Margret S. Magid, M.D.
  - **Undergraduate Teaching Assistant for Cellular Neurobiology**  
Fall 2008 and Fall 2009, Directed by Carol I. Miles, Ph.D.
- Mentored summer undergraduate interns and Master's students**
- J Rodriguez (2013), N Downer (2014), Y Valentine (2015) and T Rahman (2015–2016).  
Directed by Yasmin L. Hurd, Ph.D.

## Awards

- Association of Pathology Chairs' Society of '67 Scholar (July 2019), conference registration and travel
- Icahn School of Medicine Medical Student Travel Award (Spring 2017), \$500
- Icahn School of Medicine Graduate Student Travel Award (Spring 2015, Spring 2017), \$400 each
- Society for Neuroscience Graduate Student Travel Award (2013)
- Gordon Research Conference (GRC) Graduate Student Poster Award (2013)

- President's Award for Undergraduate Student Excellence (2010), \$1000
- State University of New York Chancellor's Award (2010)
- John L. Fuller Memorial Award (2010), \$100
- Binghamton University Undergraduate Research Award (2008, 2009), \$169 & \$250
- Edward Thorsen Memorial Scholarship (2008), \$400
- Freshman Chemistry Award (Fall 2006, Spring 2007), \$50 each
- Brain Awareness Week Travel Award (2009), \$750 + conference registration
- Sigma Xi Undergraduate Research Poster Award (2008, 2009), \$100 each
- U.S. Department of Energy Summer Undergraduate Lab Internship (Summer 2009), \$3200 stipend
- Plainview Diner Scholarship (2006), \$500