Cole J. Ferguson, MD, PhD

cferguson@health.ucsd.edu • 941.726.3045

Current Position

I am an assistant professor in the ladder rank series within the Neuropathology Division of the Pathology Department at the University of California San Diego (UCSD). My lab studies chromatin and epigenetic regulation by ubiquitin signaling during neurodevelopment. My clinical role is as the director of ophthalmic pathology at UCSD.

Education & Training

Instructor	2017-2020	Washington University, St. Louis, MO Physician Scientist Training Program Pathology & Immunology Department Laboratory of Dr. Azad Bonni, Neuroscience Department Topic: Ubiquitin signaling in the epigenetic regulation of neuronal development
Fellow	2015-2017	Washington University, St. Louis, MO Division of Neuropathology
Resident	2013-2015	Washington University, St. Louis, MO Division of Anatomic Pathology
MD/PhD	2005-2013	University of Michigan, Ann Arbor, MI Medical Scientist Training Program Laboratory of Dr. Miriam Meisler, Human Genetics Department Thesis: Autophagy and cell-autonomy in mouse models of $PI(3,5)P_2$ deficiency
Post-bacc	2003-2005	NHLBI, Intramural Research Training Award Laboratory of Dr. Cynthia Dunbar
BA	1999-2003	Yale University, *cum laude* Major: Music

CLINICAL ACTIVITIES

License & Certifications

2020-present	License, Medical Board of California
2017-2020	License, Missouri State Board of Registration for the Healing Arts
2017-present	Board Certified in Anatomic Pathology, American Board of Pathology
2017-present	Board Certified in Neuropathology, American Board of Pathology

Clinical Service

2020-present	Assistant Professor of Pathology, Neuropathology Division, UCSD
2015-2017	Neuropathology Fellowship, Barnes-Jewish Hospital
2013-2015	Anatomic Pathology Residency, Barnes-Jewish Hospital

RESEARCH ACTIVITIES

Peer-Reviewed Publications

1. **Ferguson CJ,** Urso OU, Bodrug T, Gassaway BM, Watson ER, Prabu JR, Lara-Gonzalez P, Martinez-Chacin RC, Brigatti KW, Puffenberger EG, Taylor CM, Haas-Givler B, Wu DY, Strauss KA, Jinks RN, Desai A, Gabel HW, Gygi SP, Schulman BA, Brown NG, Bonni A. APC7 Mediates Ubiquitin Signaling in Constitutive Heterochromatin of the Developing Mammalian Brain. *Molecular Cell* (revised and resubmitted).

2. Reddy NC, Majidi SP, Kong L, Nemera M, **Ferguson CJ**, Moore M, Goncalves TM, Liu HK, Fitzpatrick JA, Zhao G, Yamada T, Bonni A, Gabel HW. CHARGE syndrome protein CHD7 regulates epigenomic activation of enhancers in granule cell precursors and gyrification of the cerebellum. *Nature Communications.* Volume 12, Article number: 5702 (2021).

3. Maamari RN, Stunkel L, Kung NH, **Ferguson CJ**, Tanabe J, Schmidt RE, Dahiya S, Dhand A, Van Stavern GP, Rajagopal R, and Harocopos GJ. Acute posterior multifocal placoid pigment epitheliopathy complicated by fatal cerebral vasculitis. *Journal of Neuro-ophthalmology.* 2019 Jun; 39(2): 260-267

4. Binder ZA, Thorne AH, Bakas S, Wileyto EP, Bilello M, Akbari H, Rathore S, Ha SM, Zhang L, **Ferguson CJ,** Dahiya S, Bi WL, Reardon DA, Idbaih A, Felsberg J, Hentschel B, Weller M, Bagley SJ, Morrissette JJD, Nasrallah MP, Ma J, Zanca C, Scott AM, Orellana L, Davatzikos C, Furnari FB, O'Rourke DM. Epidermal Growth Factor Receptor Extracellular Domain Mutations in Glioblastoma Present Opportunities for Clinical Imaging and Therapeutic Development. *Cancer Cell*. 2018 Jul 9;34(1):163-177.e7.

5. Kim AE, Kang P, Bucelli RC, **Ferguson CJ**, Schmidt, RE, Varadhachary AS, Day, GS. Autoimmune encephalitis with multiple autoantibodies: A diagnostic and therapeutic challenge. *Neurologist*. 2018 Mar;23(2):55-59.

6. Day GS, Gordon BA, Perrin RJ, Cairns, NJ, Beaumont H, Schwetye K, **Ferguson CJ**, Sinha N, Bucelli RC, Musiek ES, Ghoshal N, Rosana-Ponisio M, Vincent B, Mishra S Jackson K, Morris JC, Benzinger TS, Ances BM. In vivo [^{18}F]-AV-1451 tau-PET imaging in sporadic Creutzfeldt-Jakob disease. *Neurology*. 2018 Mar 6;90(10):e896-e906.

7. Johanns TM, **Ferguson CJ**, Grierson PM, Dahiya S, Ansstas G. Rapid Clinical and Radiographic Response with Combined Dabrafenib and Trametinib in Adults With BRAF-Mutated High-Grade Glioma. *J. Natl. Compr. Canc. Netw*. 2018 Jan; 16(1): 4–10.

8. Johanns TM, Miller CA, Dorward IG, Tsien C, Chang E, Perry A, Uppaluri R, **Ferguson CJ**, Schmidt RE, Dahiya S, Ansstas G, Mardis ER, Dunn GP. Immunogenomics of Hypermutated Glioblastoma: A Patient with Germline POLE Deficiency Treated with Checkpoint Blockade Immunotherapy. C*ancer Discovery*. 2016 Nov;6(11):1230-1236.

9. Baulac S, Lenk GM, Dufresnois B, Ouled Amar Bencheikh B, Couarch P, Renard J, Larson PA, **Ferguson CJ**, Noé E, Poirier K, Hubans C, Ferreira S, Guerrini R, Ouazzani R, El Hachimi KH, Meisler MH, Leguern E. Role of the phosphoinositide phosphatase FIG4 gene in familial epilepsy with polymicrogyria. *Neurology*. 2014 82:1068-1075.

10. Zhang Y, McCartney AJ, Zolov SN, **Ferguson CJ**, Meisler MJ, Sutton MJ, Weisman LS. Modulation of Synaptic Function by VAC14, a Protein that Regulates the Phosphoinositide PI(3,5)P_2. *EMBO Journal.* 2012 Aug 15;31(16):3442-56.

11. **Ferguson CJ***, Lenk GM*, Jones JM, Grant AE, Winters JJ, Dowling JJ, Giger RJ, Meisler MH. Neuronal expression of Fig4 is both necessary and sufficient to prevent spongiform neurodegeneration. *Human Molecular Genetics*. 2012 Aug 15;21(16):3525-34.

12. Winters JJ*, **Ferguson CJ***, Lenk GM, Giger-Mateeva VI, Shrager P, Meisler MH, Giger RJ. Congenital CNS Hypomyelination in the Fig4 Null Mouse Is Rescued by Neuronal Expression of the $PI(3,5)P_2$ Phosphatase Fig4. *Journal of Neuroscience*. 2011 Nov 30;31(48):17736-51.

13. Nicholson G, Lenk GM, Reddel SW, Grant AE, Towne CF, **Ferguson CJ**, Simpson E, Scheuerle A, Yasick M, Hoffman S, Blouin R, Brandt C, Coppola G, Biesecker LG, Batish SD, Meisler MH. Distinctive genetic and clinical features of CMT4J: a severe neuropathy caused by mutations in the $PI(3,5)P_2$ phosphatase FIG4. *Brain*. 2011 Jul;134(Pt 7):1959-71.

14. Lenk GM, **Ferguson CJ**, Chow CY, Jin N, Jones JM, Grant AE, Zolov SN, Winters JJ, Giger RJ, Dowling JJ, Weisman LS, Meisler MH. Pathogenic mechanism of the FIG4 mutation responsible for Charcot-Marie-Tooth disease CMT4J. *PLoS Genet*. 2011 Jun;7(6):e1002104.

15. **Ferguson CJ**, Lenk GM, Meisler MH. $PtdIns(3,5)P_2$ and autophagy in mouse models of neurodegeneration. *Autophagy*. 2010 Jan 1; 6:1,1-2.

16. **Ferguson CJ**, Lenk GM, Meisler MH. Defective autophagy in neurons and astrocytes from mice deficient in $PI(3,5)P_2$. *Human Molecular Genetics*. 2009 Dec 15;18(24):4868-78.

17. Bauer TR Jr, Hai M, Tuschong LM, Burkholder TH, Gu YC, Sokolic RA, **Ferguson C**, Dunbar CE, Hickstein DD. Correction of the disease phenotype in canine leukocyte adhesion deficiency using ex vivo hematopoietic stem cell gene therapy. *Blood*. 2006 Nov 15;108(10):3313-20.

18. **Ferguson C**, Larochelle A, Dunbar CE. Hematopoietic stem cell gene therapy: dead or alive? *Trends in Biotechnology*. 2005 Dec;23(12):589-97.

19. Seggewiss R, Pittaluga S, Adler RL, Guenaga FJ, **Ferguson C**, Pilz IH, Ryu B, Sorrentino BP, Young WS, Donahue RE, von Kalle C, Nienhuis AW, Dunbar CE. Acute myeloid leukemia is associated with retroviral gene transfer to hematopoietic progenitor cells in a rhesus macaque. *Blood*. 2006 May 15;107(10):3865-7.

20. Calmels B, **Ferguson C**, Laukkanen MO, Adler R, Faulhaber M, Kim HJ, Sellers S, Hematti P, Schmidt M, von Kalle C, Akagi K, Donahue RE, Dunbar CE. Recurrent retroviral vector integration at the Mds1/Evi1 locus in nonhuman primate hematopoietic cells. *Blood*. 2005 Oct 1;106(7):2530-3.

21. Hematti P*, Hong BK*, **Ferguson C***, Adler R, Hanawa H, Sellers S, Holt IE, Eckfeldt CE, Sharma Y, Schmidt M, von Kalle C, Persons DA, Billings EM, Verfaillie CM, Nienhuis AW, Wolfsberg TG, Dunbar CE, Calmels B. Distinct genomic integration of MLV and SIV vectors in primate hematopoietic stem and progenitor cells. *PLoS Biology*. 2004 Dec;2(12):e423.

*co-first author

Ongoing Research Support

K08 K08HD099314 Ferguson (PI) 09/10/2019 – 08/31/2024
Eunice Kennedy Shriver National Institute of Child Health & Development (NICHD)
Title: Ubiquitin signaling in epigenetic regulation of neuronal development

This project examines the role of dysregulated heterochromatin formation in the pathogenesis of a novel class of inherited developmental disorder that results from mutation of the E3 ubiquitin ligase Anaphase-Promoting Complex.

Completed Support

2008-2010 Systems and Integrative Biology Training Grant, Molecular & Integrative Physiology Department (T32 GM008322)

Symposium Presentations

2019 American Association of Neuropathologists
Ubiquitin Signaling in the Epigenetic Pathogenesis of a Novel Neurodevelopmental Disorder

2010 Gordon Research Conference on Autophagy
Impaired Macroautophagy In Neurodegeneration Due To Altered PI(3,5)P_2 Signaling

2005 American Society of Gene Therapy
Analysis of Common Integration Sites into the Genome of Rhesus Macaque Long-Term Repopulating Cells