**Daniel C. Brock**

MD/PhD Student at Baylor College of Medicine Medical Scientist Training Program (MSTP)

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Interests: Genetics, bioinformatics, neurodegeneration, retinal degeneration, gene editing, nutrition, and precision medicine.

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| **Baylor College of Medicine**, Houston, TX  Medical Scientist Training Program  PhD in Genetics & Genomics  MD Undecided Specialty | **Jul/2022 – Present** |
| **University of Washington**, Seattle, WA  B.S. with Honors and Distinction  Biochemistry, Molecular Cellular & Developmental Biology | **Aug/2015 – Jul/2019** |

**Education**

**Research Positions**

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| **Swaroop Lab**, *Retinal Development Genetics & Therapy Section, NEI-NIH*, Bethesda, MD  Postbac IRTA Fellow. Uncovering the role of diet in the epigenetic and transcriptomic aging process in the retina. | **Apr/2020 – Jun/2022** |
| **Kaplan Lab**, *Pediatric Oncology Branch, NCI-NIH*, Bethesda, MD  Postbac CRTA Fellow. Genetically engineering mesenchymal stem cells with extracellular matrix remodeling enzymes to target the tumor microenvironment of pancreatic cancer. | **Sep/2019 – Apr/2020** |
| **Brockerhoff Lab**, *Department of Biochemistry, University of Washington*, Seattle, WA  Undergraduate Research Assistant. Measuring calcium flux in the retinal photoreceptor mitochondria. Tracking circadian gene expression changes in zebrafish cone photoreceptors. | **Aug/2017 – Jul/2019** |

**Clinical Experience**

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| **Shadowing:** Clinical Center, NIH, Bethesda, MD  Henry Masur, MD – infectious diseases: 15 hours  Rosandra Kaplan, MD – pediatric oncology: 12 hours  Les Folio, MD – Radiology: 32 hours  Emily Chew, MD – Ophthalmology (virtual): ~20 hours | **Oct 2019 – Present** |
| **Sorror Lab**, *Clinical Research Division, Fred Hutch*, Seattle, WA  Summer Volunteer Intern. Monitoring the mental and physical health of elderly acute myeloid leukemia patients. 700 hours | **May/2016 – Nov/2016** |
| **University of Washington Medical Center**, Seattle, WA  Helped transport patients between various units, delivered gifts, and stocked hospital supplies. 252 hours | **Dec/2015 – May/2017** |

**Publications**

1. Smith AJ, Advani J, **Brock DC**, Nellissery J, Gumerson JD, Dong L, Aravind L, Kennedy B, Swaroop A. GATD3A, a mitochondrial deglycase with evolutionary origins from gammaproteobacteria, restricts the formation of advanced glycation end products. *BMC Biology*, 20 (1), 68. <https://doi.org/10.1186/s12915-022-01267-6>
2. Cleghorn WM, Burrell AL, Giarmarco MM, **Brock DC**, Wang Y, Chambers ZS, Du J, Kollman JM, Brockerhoff SE. (Nov 2021). A highly conserved zebrafish IMPDH retinal isoform produces the majority of guanine and forms dynamic protein filaments in photoreceptor cells. *Journal of Biological Chemistry*, 298 (1), 101441. <https://doi.org/10.1016/j.jbc.2021.101441>
3. Giarmarco MM, **Brock DC**, Robbings BM, Cleghorn WM, Tsantilas KA, Kuch KC, Ge W, Rutter KM, Parker ED, Hurley JB, Brockerhoff SE. (Nov 2020). Daily mitochondrial dynamics in cone photoreceptors. *Proceedings of the National Academy of Sciences of the United States of America*, 117(46), 28816–28827. <https://doi.org/10.1073/pnas.2007827117>
4. Hutto RA, Bisbach CM, Abbas F, **Brock DC**, Cleghorn WM, Parker ED, Bauer BH, Ge W, Vinberg F, Hurley JB, Brockerhoff SE. (Aug 2019). Increasing Ca2+ in photoreceptor mitochondria alters metabolites, accelerates photoresponse recovery, and reveals adaptations to mitochondrial stress. *Cell Death & Differentiation*, 27(3), 1067–1085. <https://doi.org/10.1038/s41418-019-0398-2>

**Presentations**

1. **Brock DC,** Rowan S, Mondal AK, English M, Taylor A, Swaroop A. *Nrf2 Knockout Mice Exhibit High Glycemic Index Diet Associated Transcriptomic Alterations in Liver and Retina.* Future presentation at Association for Research in Vision and Ophthalmology (ARVO), (May 2022).
2. Mondal AK, **Brock DC,** Gumerson J, Jiang K, Nellissery J, Chew E, Swaroop A. *Retinal responses to aging and nutrition.* Future presentation at Association for Research in Vision and Ophthalmology (ARVO), (May 2022).
3. **Brock DC**, Rowan S, Mondal AK, Taylor A, Swaroop A. *Nrf2 Knockout Mice Exhibit High Glycemic Associated Transcriptomic Alterations in the Retina*. Future presentation at the Postbac Poster Day at the NIH, Bethesda, MD (April 2021).
4. **Brock DC**, Rowan S, Mondal AK, Taylor A, Swaroop A. *Nrf2 Knockout Mice Exhibit High Glycemic Diet Associated Transcriptomic Alterations in the Retina*. Presented at the American Physician Scientist Association South Regional Conference at the South Texas Medical Scientist Training Program, (March 2022).
5. **Brock DC,** Mondal AK, Jiang K, Nellissery J, Gumerson J, Swaroop A. *Dietary Factors such as the Western and Mediterranean Diet Modulate Aging in the Mouse Retina*. Presented at the APSA West Regional Conference at Oregon Health & Science University, (Jan 2022).
6. **Brock DC,** Mondal AK, English M, Geiser L, Rowan S, Taylor A, Swaroop A. *Transcriptomic alterations in Nrf2 knockout mice reveal susceptibility to retinal degeneration in response to a high glycemic diet.* Presented at the NIH Postbac PEP Talks, (Nov 2021).
7. **Brock DC,** Mondal AK, English M, Geiser L, Rowan S, Taylor A, Swaroop A. *Transcriptomic alterations in Nrf2 knockout mice reveal susceptibility to retinal degeneration in response to a high glycemic diet.* Presented at the 2021 Focus on Fellows Retreat at the National Eye Institute, (Oct 2021).
8. **Brock DC**, Smith AJ, Advani J, Nellissery J, Gumerson J, Swaroop A. *Function of the Novel Mitochondrial Deglycase Enzyme GATD3A in the Mouse Retina*. Virtual poster presented at the Association for Research in Vision and Ophthalmology (ARVO), (April 2021).
9. **Brock DC**, Smith AJ, Advani J, Nellissery J, Gumerson J, Swaroop A. *Function of the Novel Mitochondrial Deglycase Enzyme GATD3A in the Mouse Retina*. Virtual poster presented at Postbac Poster Day at the NIH, Bethesda, MD (April 2021).
10. **Brock DC.** *A Multi-Omics Study of how Dietary Choices Modulate the Epigenome of Aging Mouse Retinas*. Virtual talk given at the Postbac Seminar Series at the NIH, Bethesda, MD (Feb 2021).
11. **Brock DC**, Sowder ME, Ju W, Kaplan RN. *Understanding Common Signaling Axes in Osteosarcoma to Target Tumor Cells and the Microenvironment.* Virtual poster presented at Postbac Poster Day at the NIH, Bethesda, MD (April 2020).
12. Giarmarco MM, **Brock, DC**, Cleghorn WM, Tsantilas KA, Rutter KM, Robbings BM, Kuch KC, Ge W, Evans A, Parker E, Hurley HB, Brockerhoff SE. *A day in the life of a photoreceptor: Mitochondrial dynamics support daily energy demands.* Poster presented at the University of Washington Biochemistry Retreat, Bainbridge Island, WA (Sep 2019).
13. **Brock DC**, Giarmarco MM, Cleghorn WM, Tsantilas KA, Kuch KC, Ge W, Brockerhoff SE. *Circadian Mitochondrial Dynamics in Zebrafish Cone Photoreceptors*. Poster presented at the University of Washington Undergraduate Research Symposium, Seattle, WA (May 2019).
14. **Brock DC**, Giarmarco MM, Cleghorn WM, Tsantilas KA, Ge W, Brockerhoff SE. *Mitochondrial Biogenesis in Zebrafish Cone Photoreceptors*. Poster presented at the Association for Research in Vision and Ophthalmology (ARVO), Vancouver, BC (April 2019).
15. **Brock DC**, Hutto RA, Bisbach CM, Brockerhoff SE. *Ca2+ Regulation in the Retinal Mitochondria*. Poster presented at the University of Washington Undergraduate Research Symposium, Seattle, WA (May 2018).

**Volunteering and Community Service**

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| **Office of Intramural Training,** Bethesda, MD  Advised MD/PhD applicants on schools lists and personal statements | **Mar 2022 – Present** |
| **Silver Spring Village**, Silver Spring, MD  Delivered food and prescriptions to elderly during the pandemic | **May 2020 – May 2021** |
| **Maskeraid and Johns Hopkins University**, Baltimore, MD  Emergency PPE manufacturing and delivery | **Apr 2020 – May 2021** |
| **Montgomery Parks**, Bethesda, MD  Maintained local trails and parks in Montgomery County | **Jan 2020 – Present** |
| **Washington Trails Association**, Seattle, WA  Maintained Blanca Lake Trail in the Cascade Mountains | **Jul 2016 – Sep 2018** |

**Leadership**

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| **Postbac Committee**, Bethesda, MD  Chair | **Mar 2021 – Mar 2022** |
| **University of Washington Pre-Physician Scientist Club**, Seattle, WA  Founder and Alumni Leader | **July 2020 – Present** |
| **NIH Bike Club, NIH Hiking Club, NIH Movie Club**, Bethesda, MD  Founder and President  **NIH Postbac Seminar Series**, Bethesda, MD  Co-chair | **May 2020 – Present** |
| **University of Washington Undergraduate Research Leader**, Seattle, WA | **Sep 2018 – Jun 2019** |

**Grants and Awards**

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| **Second Place Poster Award,** APSA South Regional Conference, South Texas MSTP | **March 2022** |
| **Office of Dietary Supplements Grant** ($100k), assisted with writing a research grant with Anupam Mondal in the Swaroop Lab. | **Oct 2020 – Present** |
| **Cum Laude**, University of Washington | **June 2019** |
| **Distinguished Research in Biochemistry Award**, University of Washington | **June 2019** |
| **Undergraduate Research Travel Award** ($500), University of Washington, recipient and first author | **April 2019** |
| **Levinson Scholarship** ($7000), University of Washington, recipient and first author | **Sep 2018 – Jun 2019** |