

# 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.



## Education

**Baylor College of Medicine, Houston, TX**

Medical Scientist Training Program

PhD: Genetics & Genomics

MD: Undecided Clinical Specialty

**Jul/2022 – Present**

**University of Washington, Seattle, WA**

B.S. with Honors and Distinction

Biochemistry, Molecular Cellular & Developmental Biology

**Aug/2015 – Jul/2019**

## Research Positions

**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**

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

**Shadowing: Baylor College of Medicine, Houston, TX**

Reid Sutton, MD – Medical Genetics: 15 hours

**Sep/2022 – Present**

**Shadowing: 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: 20 hours

**Oct/2019 – Jun/2022**

**Sorrer 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**, Robbins 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 Ca<sup>2+</sup> 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, Robbins 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. *Ca<sup>2+</sup> Regulation in the Retinal Mitochondria*. Poster presented at the University of Washington Undergraduate Research Symposium, Seattle, WA (May 2018).

## Volunteering and Community Service

**OpenGate Homeless Ministries, Houston, TX**  
 Conducted vision screenings for Houston's homeless

**Nov/2022 – Present**

<b>HOMES Clinic, Houston, TX</b> Volunteer Student-run Clinic serving Houston's homeless	<b>Sep/2022 – Present</b>
<b>Office of Intramural Training, Bethesda, MD</b> Advised MD/PhD applicants on schools lists and personal statements	<b>Mar/2022 – Jun/2022</b>
<b>Silver Spring Village, Silver Spring, MD</b> Delivered food and prescriptions to elderly during the pandemic	<b>May/2020 – May/2021</b>
<b>Maskeraid and Johns Hopkins University, Baltimore, MD</b> Emergency PPE manufacturing and delivery	<b>Apr/2020 – May/2021</b>
<b>Montgomery Parks, Bethesda, MD</b> Maintained local trails and parks in Montgomery County	<b>Jan/2020 – Jun/2022</b>
<b>Washington Trails Association, Seattle, WA</b> Maintained Blanca Lake Trail in the Cascade Mountains	<b>Jul/2016 – Sep/2018</b>

## Leadership

<b>American Physician Scientists Association</b> Peer mentor and social media manager for Twitter	<b>Jul/2022 – Present</b>
<b>Postbac Committee, NIH, Bethesda, MD</b> Chair	<b>Mar/2021 – Mar/2022</b>
<b>University of Washington Pre-Physician Scientist Club, Seattle, WA</b> Founder and Alumni Leader	<b>July/2020 – Present</b>
<b>NIH Bike Club, NIH Hiking Club, NIH Movie Club, Bethesda, MD</b> Founder and President	<b>May/2020 – Jun/2022</b>
<b>University of Washington Undergraduate Research Leader, Seattle, WA</b>	<b>Sep/2018 – Jun/2019</b>

## Grants and Awards

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