DANIEL A. SNELLINGS

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EDUCATION

Ph.D. Molecular Genetics and Microbiology 2017 - 2022
Program in Cell and Molecular Biology
Duke University

B.S. Biochemistry and Molecular Biology 2013 - 2017
Pennsylvania State University

RESEARCH

The Role of Somatic Mutations in Vascular Malformations 2017 - 2022
Douglas A Marchuk, Duke University
My work in the Marchuk Lab focuses on the genetic changes that lead to hereditary and sporadic neurovascular malformations. Specifically, I have shown that vascular malformations in Hereditary Hemorrhagic Telangiectasia follow a Knudsonian two-hit mechanism; and that cerebral cavernous malformations accumulate multiple synergistic somatic mutations which contribute to pathogenesis.

Environmental Factors Influencing Bumblebee Pigmentation Academic Year 2014 - 2017
Heather M Hines, Pennsylvania State University
In the Hines Lab I studied the mechanism of pigment biosynthesis and deposition in developing bumblebees. I also investigated the impact of foraging success and nutrient diversity on the pigment intensity of adult bees for potential use in the field as a bioindicator of nutritional fitness.

The Mechanism of Cement Production in Barnacles Summers 2015 - 2016
Christopher M Spillmann, Naval Research Laboratory
At the Naval Research Lab I worked with a group focused on understanding the mechanism of barnacle cement production and deposition with the ultimate goal of developing a hull coating which could prevent barnacle biofouling of naval vessels. Towards this end, I studied a previously undescribed tissue and helped characterize its role in barnacle development.

PUBLICATIONS

* Authors contributed equally ORCID: 0000-0003-0615-9111

2022

D. A. Snellings, R. Girard, R. Lightle, A. Srinath, S. Romanos, Y. Li, C. Chen, A. A. Ren, M. L. Kahn, I. A. Awad, and D. A. Marchuk. Developmental venous anomalies are a genetic primer for cerebral cavernous malformations. *Nat Cardiovasc Res*, 1:246–252, 2022

F. Galeffi, **D. A. Snellings**, S.E. Wetzel-Strong, N. Kastelic, J. Bullock, C. J. Gallione, P. E. North, and D. A. Marchuk. A novel somatic mutation in *GNAQ* in Sturge-Weber Syndrome provides insight into disease pathogenesis. *Angiogenesis*, in press.

2021

D. A. Snellings*, C. C. Hong*, A. A. Ren*, M. A. Lopez-Ramirez*, R. Girard*, A. Srinath*, D. A. Marchuk, M. H. Ginsberg, I. A. Awad, and M. L. Kahn. Cerebral Cavernous Malformation: From Mechanism to Therapy. *Circ Res*, 129(1):195–215, 2021

A. A. Ren*, **D. A. Snellings***, Y. S. Su, C. C. Hong, M. Castro, A. T. Tang, M. R. Detter, N. Hobson, R. Girard, S. Romanos, R. Lightle, T. Moore, R. Shenkar, C. Benavides, M. M. Beaman, H. Mueller-Fielitz, M. Chen, P. Mericko, J. Yang, D. C. Sung, M. T. Lawton, M. Ruppert, M. Schwaninger, J. Korbelin, M. Potente, I. A. Awad, D. A. Marchuk, and M. L. Kahn. PIK3CA and CCM mutations fuel cavernomas through a cancer-like mechanism. *Nature*, 2021

2019

D. A. Snellings, C. J. Gallione, D. S. Clark, N. T. Vozoris, M. E. Faughnan, and D. A. Marchuk. Somatic Mutations in Vascular Malformations of Hereditary Hemorrhagic Telangiectasia Result in Bi-allelic Loss of ENG or ACVRL1. *Am J Hum Genet*, 105(5):894–906, 2019

J. Koskimaki, D. Zhang, Y. Li, L. Saadat, T. Moore, R. Lightle, S. P. Polster, J. Carrion-Penagos, S. B. Lyne, H. A. Zeineddine, C. Shi, R. Shenkar, S. Romanos, K. Avner, A. Srinath, L. Shen, M. R. Detter, **D. Snellings**, Y. Cao, M. A. Lopez-Ramirez, G. Fonseca, A. T. Tang, P. Faber, J. Andrade, M. Ginsberg, M. L. Kahn, D. A. Marchuk, R. Girard, and I. A. Awad. Transcriptome clarifies mechanisms of lesion genesis versus progression in models of Ccm3 cerebral cavernous malformations. *Acta Neuropathol Commun*, 7(1):132, 2019

2018

M. R. Detter, **D. A. Snellings**, and D. A. Marchuk. Cerebral Cavernous Malformations Develop Through Clonal Expansion of Mutant Endothelial Cells. *Circ Res*, 123(10):1143–1151, 2018

C. Wang, J. N. Schultzhaus, C. R. Taitt, D. H. Leary, L. C. Shriver-Lake, **D. Snellings**, S. Sturiale, S. H. North, B. Orihuela, D. Rittschof, K. J. Wahl, and C. M. Spillmann. Characterization of longitudinal canal tissue in the acorn barnacle Amphibalanus amphitrite. *PLoS One*, 13(12):e0208352, 2018

SOFTWARE

gonomics (github.com/vertgenlab/gonomics) Role: Developer
A collection of genomics software tools written in Go (golang).
My work in gonomics focuses on developing a somatic variant caller that operates on sequencing data aligned to traditional linear references as well as data aligned to genome graphs.

weaver (github.com/ddsnellings/weaver) Role: Creator & Developer
An open source toolkit for analyzing sequencing data generated by the Tapestri platform.

FUNDING

F31 NIH/NHLBI (1F31HL152738-01) Role: PI April 2020 - March 2023
Investigating the Role of Somatic Mutations in Arteriovenous Malformations

SELECTED PRESENTATIONS

Angioma Alliance Scientific Meeting November 2021
Plenary Talk: "Developmental Venous Anomalies are a Genetic Primer for Sporadic CCM"

EMBO Workshop: Vascular Malformations October 2021
Talk: "Developmental Venous Anomalies are a Genetic Primer for Cerebral Cavernous Malformations"

American Society of Human Genetics 2021 Annual Meeting October 2021
Featured Plenary Talk (Abstract 2021-A-1022-ASHG)
"Developmental Venous Anomaly: A genetic primer to *PIK3CA*-related neurological disease?"

Invited Mission Bio Tapestri Webinar February 2021
Talk: "Multiple Somatic Mutations in a Single Clonal Population Drive CCM Pathogenesis"

Angioma Alliance 2020 Annual Scientific Meeting November 2020
Talk: "Biallelic Somatic Mutation of *KRIT1*, *CCM2*, and *PDCD10* in Sporadic CCMs"

American Society of Human Genetics 2020 Annual Meeting October 2020
Poster 1720: "A Novel Mutation in *GNAQ* Identified in Sturge-Weber Syndrome"

American Society of Human Genetics 2019 Annual Meeting October 2019
Flash Talk: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"

American Society of Human Genetics 2019 Annual Meeting October 2019
Poster 1238/F: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"

13th HHT International Scientific Conference June 2019
Talk: "HHT Telangiectases Contain Biallelic Mutations in *ENG* or *ACVRL1*"

OUTREACH

Undergraduate Career Development Panel October 2019
Served as a panelist detailing my path to graduate school and discussed career options with 1st year undergraduates.

The Great Insect Fair May 2016
Displayed samples and taught children about the importance of bumblebee coloration and the presence of color mimics in the wild.

MENTORSHIP

Jake Lowy, Rotation Student	2021
Duke CMB Peer Mentorship Program	2021
Jeff Reitano, Rotation Student	2021
Daichi Shonai, Rotation Student	2021
Makenzie Beaman, Rotation Student	2020
Taylor Anglen, Rotation Student	2020
Nicole Kastelic, Undergraduate Researcher	2019 - 2020
Makala Moore, Rotation Student	2019
Layne Clements, Undergraduate Summer Student	2018

REVIEWER

Cellular and Molecular Life Sciences, Communications Biology

PROFESSIONAL MEMBERSHIPS

American Society of Human Genetics (ASHG)	2019 - Present
American Heart Association (AHA)	2019 - Present
American Association for the Advancement of Science (AAAS)	2019 - 2021

HONORS AND AWARDS

Chancellor's Award for Research Excellence Duke University	February 2022
Best Talk (2nd) EMBO Workshop: Vascular Malformations	October 2021
Charles J. Epstein Award Semifinalist ASHG 2021 Annual Meeting	October 2021
Reviewers Choice Abstract ASHG 2019 Annual Meeting	October 2019
Best Scientific Oral Presentation 13th HHT International Scientific Conference	June 2019
Molecular Genetics and Microbiology Travel Award Duke University	April 2019
Eberly College of Science Research Award Pennsylvania State University	November 2016
Apes Valentes Research Award Center for Pollinator Research, Penn State	May 2015