Riley J. Mangan

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EDUCATION

Duke University, Durham, North Carolina — Aug 2018 –Present

- Ph.D. - Molecular Genetics and Microbiology, In Progress
  - Graduate Program in Cell and Molecular Biology
  - Cumulative GPA: 3.977 / 4.0
  - Laboratory of Craig B. Lowe, Ph.D.

Davidson College, Davidson, North Carolina — Aug 2012 – May 2016

- B.S. - Biology, *Magna Cum Laude*
  - Cumulative GPA: 3.79 / 4.0
  - Major GPA: 3.91 / 4.0

RESEARCH EXPERIENCE

Duke University School of Medicine, Durham, North Carolina — Aug 2018 – Present

- Graduate Student, Laboratory of Craig B. Lowe, Ph.D.
  - ***Central Focus***: My work combines interdisciplinary tools from computational genomics, neurodevelopment, and molecular evolution to investigate how human-specific gene regulatory innovation has led to human-unique disease susceptibility and derived human traits.
  - I have designed and implemented novel bioinformatic software to identify fast-evolving regions of the human genome and to identify the gene regulatory functions of these regions in the developing brain.
  - I developed *in vivo* STARR-seq, a high-throughput, single-cell, multiplex enhancer assay to quantify the cell type-specific enhancer activity of DNA sequences from extant and ancient vertebrate species in developing brain tissue.
  - Co-developer of Gonomics, an open-source genomics software platform for the Go programming language.

Duke Human Vaccine Institute, Durham, North Carolina — May 2016 – Jul 2018

- Research Technician II, Laboratory of Sallie R. Permar, MD., Ph.D.
  - ***Central Focus***: My work focused on vaccine and non-vaccine strategies for the prevention and elimination of postnatal virus infections, with particular focus on HIV, CMV, and the Zika virus.
  - Characterization of the determinants of interaction between Tenascin-C and the HIV-1 Env. *Mangan et. al, Mucosal Immunology 2019*
  - Assay development for the characterization of the HIV-1 Env-specific B cell repertoire by next-generation sequencing of immunoglobulin heavy chains from Env-vaccinated rhesus macaques.
  - Functional characterization of the vaccine elicited antibody repertoire in Env-vaccinated infant rhesus macaques by antigen-specific B cell sorting, monoclonal antibody generation, and ELISA epitope mapping.
  - Elicitation of widened neutralization breadth in SHIV-infected rhesus macaques as a potential protective strategy against mother to child transmission.

Davidson College Biology Department, Davidson, North Carolina — Aug 2015 – Dec 2015

- Student Research Assistant, Laboratory of Rachid El Bejjani, Ph.D.
  - ***Central Focus***: My work identified and characterized a novel function of *Rab-6.2* in cuticle development and skin permeability in *Caenorhabditis elegans*.

Department of Medicine, University of Illinois at Chicago, Chicago, Illinois — May 2015 – Aug 2015
Feinberg School of Medicine, Northwestern University, Chicago, Illinois — May 2012 – Aug 2014

- Summer Research Intern, Laboratory of Paul Grippo, Ph.D.
  - ***Central Focus***: My work focused on signaling in the tumor microenvironment of colorectal cancer and pancreatic ductal adenocarcinoma.
  - I evaluated the role of TGF-β in fibrosis, immune evasion, and PDAC tumorigenesis.
  - I investigated the tumor suppressive mechanisms of pigment epithelium-derived factor (PEDF) in pancreatic tumor progression.
  - I investigated the mechanism of high ω-6 fatty acid diets to pancreatic tumor susceptibility.

PUBLICATIONS **15 TOTAL, 2 AS FIRST AUTHOR**

Mangan RJ, Alsina FC, Mosti F, Sotelo-Fonseca JE, Snellings DA, Au EH, Carvalho J, Sathyan L, Johnson GD, Reddy TE, Silver DL, Lowe CB. (2022) Adaptive sequence divergence forged new neurodevelopmental enhancers in humans. ***Revised and Resubmitted***.

Berendam S*, Morgan-Asiedue PK*, **Mangan RJ**, Li S, Heimsath H, Luo K, Curtis A, Eudailey J, Faison W, Fox C, Phillips B, Tomai M, Kunz E, Itell H, Hudgens M, Cronin K, Wiehe K, Alam SM, Van Rompay KKA, De Paris K, Permar SR, Moody MA, Fouda GG. (2021) Different adjuvanted pediatric HIV envelope vaccines induced distinct plasma antibody responses despite similar B cell receptor repertoires in infant rhesus macaques. **PLOS One** (Accepted). *Indicates co-first author.

Nelson AN, Dennis M, Mangold JF, Li K, Saha PT, Cronin K, Kumar A, **Mangan RJ**, Shaw GM, Bar K, Haynes B, Moody MA, Alam M, Pollara J, Hudgens MG, Van Rompay KKA, De Paris K, Permar SR. (2021) Leveraging antigenic seniority for maternal vaccination to prevent mother-to-child transmission of HIV-1. ***Under Review (NPJ Vaccines)***.

Itell HL, Berenz A, **Mangan RJ**, Permar SR, Kaufman D. (2020) Systemic and mucosal levels of lactoferrin in very low birth weight infants supplemented with bovine lactoferrin. ***Biochemistry and Cell Biology.*** https://doi.org/10.1139/bcb-2020-0238.

Martinez DR, Tu JJ, Kumar A, Mangold JF, **Mangan RJ**, Goswami R, Giorgi EE, Chen J, Mengual M, Douglas AO, Heimsath H, Saunders KO, Nicely NI, Eudailey J, Hernandez G, Morgan-Asiedu PK, Wiehe K, Haynes BF, Moody MA, LaBranche C, Montefiori DC, Gao F, Permar SR. (2019) Maternal broadly neutralizing responses select for neutralization-resistant infant transmitted/founder HIV variants. ***mBio.*** 10.1128/mBio.00176-20.

Goswami R, Nelson AN, Tu JJ, Dennis M, Feng L, Kumar A, Mangold J, **Mangan RJ**, Mattingly C, Curtis AD, Obregon-Perko V, Mavigner M, Pollara J, Shaw GM, Bar K, Chahroudi A, De Paris K, Chan C, Van Rompay KKA, Permar SR. (2019) Analytical treatment interruption of postnatal SHIV infection after short-term anti-retroviral therapy in an infant rhesus macaque model. ***mBio.*** 10(5): e01971-19.

Nelson AN, Goswami R, Dennis M, Tu J, **Mangan RJ**, Saha P, Cain DW, Shen X, Bar K, Hudgens M, Pollara J, De Paris K, Van Rompay KKA, and Permar SR. (2019) SHIV CH505 infected infant and adult rhesus macaques exhibit similar HIV Env-specific antibody kinetics, despite distinct T follicular helper (Tfh) and germinal center B cell landscapes. ***Journal of Virology.*** 93(15): e00168-19.

Mangan RJ, Stamper L, Ohashi T, Eudailey JA, Go EP, Jeager F, Itell HL, Watts BE, Fouda GG, Erickson HP, Alam SM, Desaire H, Permar SR. (2019) Determinants of tenascin-C and HIV Env binding and neutralization. ***Mucosal Immunology***. 12: 1004-1012.

Kim J*, Chun A*, **Mangan RJ**, Doyle H, Mourao B, and El Bejjani R. (2019) A retromer-independent function for RAB-6.2/RAB6 in C. elegans epidermis integrity. ***Journal of Cell Science***. 8(3): 3826-2839. *Indicates co-first author.

Himes JE, Goswami R*, **Mangan RJ***, Kumar A, Jeffries TL, Eudailey JA, Hemsath H, Nguyen QN, Pollara J, LaBranche C, Chen M, Vandergrift NA, Schiro F, Midkiff C, Ferrari G, Montefiori DC, Alvarez-Hernandez X, Aye PP, Permar SR. (2018) Polyclonal anti-HIV envelope breast milk antibodies limit founder SHIV acquisition and cell-associated virus loads in infant rhesus monkeys. ***Mucosal Immunology.*** 11(6): 1716-1726. ***Co-second author.***

Nguyen QN, Martinez DR, Himes JE, Edwards RW, Han Q, Kumar A, **Mangan R**, Nicely NI, Shen X, Pollara J, Permar SR. (2018) Predominant envelope variable loop 2-specific and antibody-dependent cellular cytotoxicity antibody responses in acutely SIV-infected African green monkeys. **Retrovirology**. 15(1): 24.

Principe DR, Diaz AM, Torres C, **Mangan RJ**, DeCant B, McKinney R, Tsao MS, Lowy A, Munshi HG, Grippo PJ. (2017) TGFβ engages MEK/ERK to differentially regulate benign and malignant pancreas cell function. ***Oncogene***. 36(30):4336-4348.

Principe DR, **Mangan RJ**, Grippo PJ. (2017) Transforming Growth Factor β. ***Cancer Therapeutic Targets***, pp.503-516. (Textbook Chapter)

Principe DR, DeCant B, Staudacher J, Vitello D, **Mangan RJ**, Wayne E, Mascariñas E, Diaz AM, Bauer J, McKinney RD, Khazaie K, Pasche B, Dawson DW, Munshi HG, Grippo PJ, Jung B. (2016) Loss of TGFβ signaling promotes colon cancer progression and tumor-associated inflammation. ***Oncotarget***. 8(3):3826-3839.

Principe DR, Decant B, Diaz AM, **Mangan RJ**, Hwang R, Lowy A, Shetuni BB, Sreekumar BK, Chung C, Bentrem DJ, Munshi HG, Jung B, Grippo PJ, Bishehsari F. (2016) PEDF inhibits pancreatic tumorigenesis by attenuating the fibroinflammatory reaction. ***Oncotarget***. 7(19): 28218-28234.

PRESENTATIONS

POSTER PRESENTATIONS

2019 Duke University Division of Human Genetics Retreat

2017 and 2018 Duke University Department of Pediatrics Research Retreat

2016, 2017, and 2018 Center for AIDS Research (CFAR) Retreat, Duke University

2016 Math and Science Research Symposium, Davidson College Biology Department

2016 Community-Based Learning Poster Session, Davidson College Department of Mathematics and Computer Science

INVITED TALKS

2022 Annual Meeting, American Society of Human Genetics ***"Adaptive sequence divergence forged new neurodevelopmental enhancers in humans."***

2020 Duke University Division of Human Genetics Retreat. ***"High-throughput functional analysis of the fastest evolving regions of the human genome."***

2019 Duke University Department of Molecular Genetics and Microbiology Research Retreat. ***"Exploring the fastest evolving regions of the human genome."***

AWARDS & SCHOLARSHIPS

- Triangle Center for Evolutionary Medicine Graduate Student Award — Fall 2020
- Sigma Xi Grants-In-Aid of Research. — 2019
  Matching contribution from the Duke Graduate School.
- Steinway Piano Gallery-Charlotte Award — May 2016
  For pianistic excellence and academic achievement.
  2016 Davidson College Honoree.
- Donald B. Plott and J. Estes Millner Scholarship, Davidson College — 2012–2016
  For students with exceptional talent and passion for music.

RESEARCH SKILLS

- In Vivo Research
  Mouse handling and husbandry, genotyping, survival surgery, behavior, tissue resection, and perfusion. Human and non-human primate blood and tissue sample processing. C. elegans colony maintenance, Mendelian genetics, behavioral and pharmacological assays.

- Molecular Biology
  Western blotting, immunoprecipitation, histology, flow cytometry, ELISA, cell culture, plasmid production and cloning, monoclonal antibody production, next-generation sequencing, confocal and super-resolution microscopy.

- Mathematics and Statistics
  Experience and knowledge of statistical modeling and Bayesian inference(MLE/MCMC), vector calculus and linear algebra, machine learning in Tensorflow, and numerical analytic methods.
- Software Engineering

  - Co-developer of Gonomics, an open-source genomics software platform for the Go programming language.
  - Proficiency in Go, Python, R, bash/csh/tcsh, HTML/CSS, and LaTeX with previous experience in Java and Matlab.
  - Extensive experience with cluster computing environments with slurm and Git version control.
  - Extensive knowledge and development of open-source bioinformatic pipelines for phylogenetics, comparative genomics, bulk and single-cell RNA sequencing, and common bioinformatic formats (SAM/VCF/BED).