The Vanderbilt Institute for Infection, Immunology, and Inflammation

VI4

established July 1st, 2017
VI4: Mission Statement

To train the next generation of scientists and physicians and make fundamental discoveries in the areas of infection biology, immunology, and inflammation with the goal of increasing knowledge and improving human health.
VI4
A convergence of need and opportunity

Microbiome
Cancer Immunology
Clinical Microbiology
Immunotherapies
Personalized Medicine
Structural Pathogenesis
The Need: A time of unprecedented threats to public health

Antibiotic Resistance
- We are entering a post-antibiotic era

Emerging Infectious Threats
- Global warming, vaccine non-compliance, bioterrorism

Inflammation and Disease
- Chronic inflammation is at the root of most diseases
The Opportunity: A time of unprecedented discovery and opportunity in the fields of Immunology and Microbiology

The Microbiome
-Our bodies are ecosystems supporting trillions of microbes

Cancer Immunotherapy
-Mobilizing the immune system to treat cancer
Vanderbilt Institute for Infection, Immunology and Inflammation (VI4)

An institute that serves as a foundation supporting the entire community of researchers in the areas of infection, immunology, and inflammation
VI4: Building on a Strong Foundation

Supportive Leadership

Existing Administrative Structure

Center for Microbial Pathogenesis

Center for Immunobiology
VI^4: A Strong Community is in Place

- Pediatric Infectious Diseases
- Digestive Disease Research Center
- Vaccine Research Program
- Institute of Chemical Biology
- Institute for Global Health
- Biological Sciences
- Vaccine Center
- Pulmonary and Critical Care
- Center for Structural Biology
- Diabetes Center
- Adult Infectious Diseases
- Institute of Genetics
- Rheumatology and Immunology
- Cancer Center
- Pathology, Microbiology, and Immunology
- Digestive Disease
- Pediatric Infectious Diseases
- Vaccine Center
- Institute of Chemical Biology
- Institute for Global Health
- Biological Sciences
- Vaccine Research Program
- Pulmonary and Critical Care
- Center for Structural Biology
- Diabetes Center
- Adult Infectious Diseases
- Institute of Genetics
- Rheumatology and Immunology
- Cancer Center
- Pathology, Microbiology, and Immunology
VI4: Supporting Existing Strengths

Dietary zinc alters the microbiota and decreases resistance to *Clostridium difficile* infection

Joseph P Zuckas1, Jessica L. Moore2,3, Ashley T Jordan1, Jillian J Jutadokonda1, Michael J Noto1,4, Maribeth R Nicholsom, Jonathan D Crews5, Matthew W Semler1, Xiaofang Zhang1, Lorraine B Ware1,4, M Kay Washington1, Walter J Chazin2,7,8, Richard M Caprioli3,4,7 & Eric P Skaar1,10

Germinal centre hypoxia and regulation of antibody qualities by a hypoxia response system

Sung Hoon Cho1, Ariel L. Raybuck1, Kristy Stengel1,4, Mel Weil1, Thomas C. Beck1, Emmanuel Volanakis1, James W. Thomas1,4, Scott Hiebert7,11, Volker H. Haase1,12,14 & Mark R. Boothby1,4,8

Prophage WO genes recapitulate and enhance *Wolbachia*-induced cytoplasmic incompatibility

Daniel P. LePage4, Jason A. Mercaft4, Sarah R. Borderstein1, Jungmin Oh1, Jessamyn L. Perlmutter1, I. Dylan Shoupshire1, Emily M. Layton1, Lisa J. Funkhouse-Jones1, John F. Beckmann7 & Seth R. Borderstein1,3

EGFR regulates macrophage activation and function in bacterial infection

Dana M. Hardbower1,2, Kshipra Singh1, Mohammad Asim1, Thomas G. Verriere1, Danyvid Olivares-Villagomez1, Daniel P. Barry1, Margaret M. Allaman1, M. Kay Washington1, Richard M. Peek Jr.1,3, M. Blanca Pizarro1, and Keith T. Wilson1,4,5,6

Cross-Neutralizing and Protective Human Antibody Specificities to Poxvirus Infections

Iulia Gilchuk1, Pavlo Gilchuk1,2,3, Gopal Sapparapu1,2, Rebecca Lamplrey1, Vidasha Singh1, Nargun Kose1, David L. Blum1, Laura J. Hughes1, Panugavapuli S. Satheshkumar1, Michael B. Townsend1, Ashley V. Koren1, Zachary Reed1,2, Zachary Weiner1, Victoria A. Olsen1, Erika Hammardlund1, Hans-Peter Rauw1, Mark K. Silka1, James C. Slaughter1,6, Banooy S. Graham1, Kathryn M. Edwards1, Roselyn J. Eisenberg1, Gary H. Cohen1, Sebastian Joyce1,7 and James E. Crowe, Jr.1,5,6,8,9

1 The Vanderbilt Vaccine Center, Vanderbilt University Medical Center, Nashville, TN 37232, USA.
VI4: Supporting Existing Strengths

- Institute represents over 140 investigators from 19 Departments across 3 Institutions (VUMC/VU/Meharry)

- Institute members currently receive $120,000,000 in total grant support
VI4: Outstanding Research Support
The VUIIS and MSRC provide unparalleled tools to study infection biology

The bacterial response to iron deprivation

The innate immune response to infection
VI4: Integrating with the Vanderbilt Health Affiliated Network
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VI4: Regional Strategic Partners
VI4: Enhancing Research, Education, and Clinical Care

The Goal: Establish Vanderbilt as the global leader in research focused on infection, immunology, and inflammation

- Targeted faculty hires
- Strategic infrastructure improvements
- Investments in education and training
- Support services for multi-investigator grants
- A coordinated marketing campaign
VI4: Faculty Recruitment

Strategy: Grow where we have need and grow where we have strength

- Have provided funds for one faculty hire to-date (Heather Pua)
- Worked in collaboration with related departments to successfully complete 2 additional faculty recruits
- Currently conducting visits for candidates to fill 4 faculty positions in 17-18
- Hosting two “future leaders” who fill unmet needs at Vanderbilt
VI4: Facilities and Infrastructure Improvements

Strategy: Support creation and improvement of facilities to enable VI4-related research

- Renovated space
(A corridor, 4th and 5th floors, MCN)

- Support core services and launch new cores
  - Single cell analysis
  - Viral Diagnostic Core
  - Metalloproteomics
  - Microbiome support and gnotobiotic facilities
  - BSL-3 and ABSL-3
VI4: Education and Training

Strategy: Enhance training programs focused on infection, immunity, and inflammation

- Enhance existing training programs focused on infection, immunity, and inflammation (T32 and curriculum)
- Infection and Immunology Frontiers Seminar Series
- Annual Infection and Immunology Symposium (April 13)
- Submission of NIH T32 focused on immunology
- Creation of VI4-3D in partnership with the CSB
- Launch Germs, Defense, and Disease UG research program
- Weekly working group meeting
- 3 pilot awards in immunology (collaboration between VI4, VCI, VICC)

- 6 pilot award in microbiome research (collaboration between VI4 and VMI)

- Submission of application to NIH to fund program focused on targeted antibiotic resistant pathogens

- Early stages of launching microVU

- Early stages of launching Nashville Microbiome

- Planned pilot funding competition to support gnotobiotic experiments
BioVU/MicroVU

Patient Microbe
- A disease
- A drug
- A complication

A genetic variant

Find the genes

Find the diseases
Nashville Microbiome Project

Interactions between the microbiome and:
- Diet
- Genetics
- Diseases
- Lifestyle
VI4: Marketing & Engagement

Strategy: Increase visibility of Vanderbilt research in Infection, Immunology, Inflammation

- **Media & Distribution:**
  - Website ([https://www.vumc.org/viiii/](https://www.vumc.org/viiii/))
  - Twitter (152 followers and growing)
  - New [VI4research@Vanderbilt.edu](mailto:VI4research@Vanderbilt.edu) email
  - Weekly announcements & newsletter
  - Nextdoor App
  - Print and Web: VU Reporter & Tennessean
  - TV: Segment on *Today in Nashville*

- **Events:**
  - MEGAMicrobe
  - Presented to VCC BoO
  - Presented to Departments and Divisions
  - VI4 faculty lunches
  - Planning for junior faculty retreat
  - Planned regular newsletter
VI4: Community Outreach

MEGAMicrobe

- **October 28, 2017**, Martin Professional Development Center (MPDC)
- **October 20, 2018**, MPDC
  - Early stages of planning pre-event activities with local schools and orgs
VI4: Leadership and Administration

Eric Skaar
Director

Megan Simonson
Program Manager

Kaleigh Johnson
Communications Coordinator

Seth Bordenstein
Jim Cassat
Maria Hadjifrangiskou
Jeff Rathmell

Associate Directors

-Strategic planning committee
12 faculty stake holders from across Vanderbilt

-External advisory committee
To be named

-Set goals for year 1, year 3, and year 5
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