



# Orphan Disease Center

Fostering Therapeutic Development and Innovative Research Initiatives

## Welcome to the first issue of the Orphan Disease Center Newsletter!

The Orphan Disease Center (ODC) was created to accelerate and expand upon the orphan disease research activities already underway in our community. Building on the legacy of translational research at Penn, the ODC focuses on the development of novel treatments for rare diseases. Our success is predicated on three basic principles: innovation, partnership and execution. Therapies based on small molecules and gene therapy vectors developed in Penn laboratories are showing tremendous promise in the clinic.



James M. Wilson, MD, PhD

I am honored to have served as the ODC director for the past two years, as it gives me the privilege of bearing witness to a transformation process in the diagnosis and treatment of rare diseases. This is only the beginning of a revolution in the practice of medicine that will play out in the laboratories and clinics at Penn. We are proud to share a small portion of that work with you in this newsletter.

Sincerely,

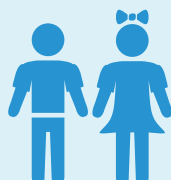
## Our Mission

Orphan diseases represent a collection of disorders that affect fewer than 200,000 individuals for any single disease type, yet there are more than 7,000 distinct orphan diseases. In the aggregate, more than 25 million people in the United States suffer substantial morbidity and mortality from orphan diseases. Despite this huge number, research in most disease types has lagged far behind other major areas due to a combination of technological and funding limitations.

The Orphan Disease Center will develop **transformative** therapies through use of **platform** technologies and development of research strategies that can be deployed across multiple rare diseases. We will emphasize disorders with substantial **unmet need**, independent of their incidence and will strive to assure **access** to patients of all populations.

## WHAT IS AN Orphan Disease?

An orphan (rare) disease is defined in the United States as one that



About **50%** affected are **children** and about **30%** of them will only live to be **5 years of age**.

**95%** of all rare diseases do not have an FDA approved drug treatment.



There are approximately **7,000** different rare diseases, affecting **350 million people worldwide** and **30 million in the United States alone** (that's 1 in 10 Americans).

We serve the purpose of making science and research accessible to rare diseases.

# Orphan Disease Center Groundbreaking Achievements and Milestones

Penn scientists from the ODC have made huge strides toward our goal of treating and potentially curing rare diseases. The team is delighted to share with you some of these accomplishments:

1. **Jean Bennett, MD, PhD** and **Al Maguire, MD** from the Center for Advanced Retinal and Ocular Therapeutics continue their pioneering work on gene therapy for inherited blindness. In collaboration with a local biotechnology company called SPARK Therapeutics, they have advanced a gene therapy trial for the treatment of a form of congenital blindness into phase III, which is likely to be the first FDA-approved gene therapy in the United States.
2. Gene therapy vectors discovered in the laboratory of **James Wilson, MD, PhD** have become the industry standard for in vivo gene therapy for rare diseases. This technology has been licensed to more than 10 companies and is in research and development in 28 diseases. Some spectacular results have already been achieved in patients with hemophilia B and spinal muscular atrophy.
3. **Dan Rader, MD** from the Department of Genetics has developed a number of novel treatments for rare, inherited forms of hypercholesterolemia. His group developed the preclinical and clinical proof-of-concept data for a small molecule drug, lomitapide, which received FDA approval for treating these orphan diseases. Dr. Rader will soon be enrolling patients with this same disease in a clinical trial based on permanent correction of the disease using gene therapy.

## 2017 MILLION DOLLAR BIKE RIDE SATURDAY, MAY 20th, 2017 | STARTS 7:30 AM



### REGISTERED TEAMS

PITT HOPKINS PEDALERS  
TEAM CASTLEMAN DISEASE  
TEAM FARA (FRIEDREICH'S ATAXIA)  
BIKE 4 SIGHT (RETINAL BLINDNESS)  
TEAM NPC (NIEMANN-PICK TYPE C)  
TEAM MPS (MUCOPOLYSACCHARIDOSES)  
TEAM CURE ML4 (MUCOLIPIDOSIS TYPE IV)  
STOP ALD FOUNDATION (ADRENOLEUKODYSTROPHY)  
PENN SCIENTISTS FOR ORPHAN DISEASE RESEARCH  
RARING TO GO FOR CHI (CONGENITAL HYPERINSULINISM)  
TEAM LGDA (LYMPHANGIOMATOSIS & GORHAM'S DISEASE)  
TEAM NTSAD (TAY-SACHS, SANDHOFF, GM1, AND CANAVAN)

FIBROUS DYSPLASIA TEAM  
RASOPATHIES NETWORK RIDERS  
TEAM CDKL5 RIDING FOR A CURE  
MILES FOR MILLIE (GLUT1 DEFICIENCY)  
TEAM SNYDER-ROBINSON SYNDROME  
MOVIN' FOR MALLORY (CYSTIC FIBROSIS)  
TEAM LMI (LYMPHATIC MALFORMATIONS)  
CURE CMD (CONGENITAL MUSCULAR DYSTROPHY)  
A-T CHILDREN'S PROJECT (ATAXIA-TELANGELECTASIA)  
THE EASY BREATHERS (LYMPHANGIOLEIOMYOMATOSIS)  
TEAM JOSH & THE DCO RIDERS (DYSKERATOSIS CONGENITA)  
BIKE TO END DUCHENNE (DUCHENNE MUSCULAR DYSTROPHY)  
APBD TOUR DE FRIENDS (ADULT POLYGLUCOSAN BODY DISEASE)

NBIA DISORDERS (NEURODEGENERATION WITH BRAIN IRON ACCUMULATION)

ALL REGISTRANTS RECEIVE A COMPLIMENTARY T-SHIRT  
ALL FUNDRAISERS RECEIVE A COMPLIMENTARY JERSEY

## ODC Grant Programs

**\$17.5  
Million**

Nearly  awarded since 2012 to

**50+** institutions  in  **8** countries!

## ODC Programs

### Programs of Excellence

Based on the existing strengths within the Penn and CHOP communities, we have identified eight Programs of Excellence for the Center. Each program is designed to further the mission of the ODC, and we anticipate that more programs will be added as the Center evolves.

- Inherited Blindness
- Liver Metabolic Disorders
- Neurologic and Muscle Diseases
- Lysosomal Storage and Related Diseases
- Pulmonary Diseases
- Mucopolysaccharidoses
- CDKL5 Deficiency
- Motor Neuron Diseases

### Symposia

The ODC hosts several scientific symposia throughout the year focused on different areas of rare disease research and therapy, bringing together key opinion leaders from academia, patient foundations and the pharmaceutical industry. Since 2015, the ODC has hosted symposia on the following:

- Castleman Disease
- Cystic Fibrosis
- Lymphangioleiomyomatosis
- Duchenne Muscular Dystrophy
- Crigler-Najjar Syndrome
- Spinal Muscular Atrophy
- Angelman Syndrome

### Grant Programs

The ODC proudly supports five pilot grant programs in the following areas:

- Mucopolysaccharidosis I
- Million Dollar Bike Ride (27 diseases)
- High-Throughput Screening Core
- CDKL5 Deficiency
- Genome Editing

# Patient Spotlight: On the Other Side of Fear Is Joy



*"Having Sickle Cell Anemia has taught me not to be afraid. It has taught me that on the other side of fear is joy. There's nothing but complete bliss after you get over your fear."*  
— Ilesha

"It's like a huge giant is squeezing you and just before you pop, he lets go," Ilesha says, describing the pain associated with having Sickle Cell Anemia (SCD). "And then he grabs you again and squeezes harder. You can't move; you don't want to even breathe because these actions will make everything worse. You're at the whim of this giant as he squeezes you and squeezes you."

This level of pain, called a "sickle cell crisis," sends Ilesha straight to an extended stay at the hospital, where her doctors work to bring her pain back to a manageable level.

Still, despite these regular bouts with tremendous pain, Ilesha says that she thinks of herself as a "blessed" individual when it comes to having SCD.

"I'm only in the hospital once or twice a year," she explains. "Other people are hospitalized much more often."

Having lived with this disease her whole life, Ilesha is level-headed and practical about how she deals with the debilitation brought on by a crisis. "I know what I need to be comfortable," she says. "I always have to have my blanket, my laptop, my heat pack and my books from

school. I'm immediately in communication with my professors to let them know I'm in the hospital. Some of them don't like for me to do work then, but I try to get done what I can." Now in her senior year at Southern Connecticut State University studying political science, Ilesha says that her experience of balancing her condition with being a student has been mostly a positive one—unlike her childhood, where things were much more challenging.

"Elementary school and high school were really hard," she says, looking down at her hands folded neatly in her lap. As a child, Ilesha stood out as being different from the other kids. "I couldn't participate in gym because I was short of breath. No one wanted me on their team," she recalls. "It was not a nice feeling. The kids didn't understand why I was always missing school. But I kept my condition a secret, because I didn't want them to judge me." Ilesha has an older brother who also has SCD, but they both kept the disease very private and shared the weight of it only with immediate family, most particularly their mother. "My mom was always with me," Ilesha says. "It was often just me and her in the hospital." Her eyes fill with tears, remembering. "Times when I almost died, and my mom was right there, but no one else. That means something to me."

Then, when Ilesha was 15, one of her nurses started an SCD support group for teens. Meeting others with her condition was a huge turning point for Ilesha. "For the first time, I met other people like me. They shared how their friends knew about their condition, their school knew. And I was like WHAT? Everyone KNOWS? I was shocked. I didn't realize that this disease was something that people might..." She pauses, looking for words, moving her hand to her heart. "A disease that people might come toward. I thought it was just something that people pushed away."

## ODC Steering Committee

### Jonathan A. Epstein, MD

William Wikoff Smith Professor  
Executive Vice Dean and  
Chief Scientific Officer  
Perelman School of Medicine,  
University of Pennsylvania

### Glen N. Gaulton, PhD

Professor of Pathology  
and Laboratory Medicine  
Vice Dean and Director,  
Center for Global Health  
PSOM, University of Pennsylvania

### Kevin B. Mahoney

Executive Vice President, University of  
Pennsylvania Health System  
Executive Vice Dean,  
Perelman School of Medicine  
Perelman Center for Advanced Medicine

### Michael S. Parmacek, MD

Frank Wister Thomas Professor of  
Medicine  
Chair, Department of Medicine  
PSOM, University of Pennsylvania

### Daniel J. Rader, MD (Chair)

Seymour Gray Professor of Molecular  
Medicine; Chair, Department of Genetics  
Chief, Division of Translational Medicine  
and Human Genetics, Department of  
Medicine, PSOM, UPenn  
Chief, Division of Human Genetics  
in Pediatrics, CHOP

### Joseph W. St. Geme, III, MD

Leonard and Madlyn Abramson  
Professor of Pediatrics and Microbiology  
Physician-in-Chief and Chair, Department  
of Pediatrics, CHOP  
Chair, Department of Pediatrics, PSOM,  
University of Pennsylvania

### Bryan A. Wolf, MD, PhD

Executive Vice-President and Chief  
Scientific Officer, CHOP  
Edmond F. Notebaert Endowed Chair  
in Pediatric Research, CHOP  
Professor of Pathology and Laboratory  
Medicine, PSOM, University  
of Pennsylvania

## ODC External Advisory Committee

### Arthur L. Caplan, PhD

Drs. William F and Virginia Connolly Mitty  
Chair  
Director, Division of Medical Ethics  
NYU Langone Medical Center

### John F. Crowley

Chairman & CEO, Amicus Therapeutics

### Stephen L. Eck, MD, PhD

Vice President, Oncology Medical Sciences,  
Astellas Pharma

### Marlene E. Haffner, MD, MPH

Haffner Associates, LLC  
Orphan Solutions

### Tadataka "Tachi" Yamada, MD

Venture Partner, Frazier Healthcare Partners

### Joseph B. Martin, MD, PhD

Edward R. and Anne G. Lefler Distinguished  
Professor of Neurobiology  
Emeritus and Former Dean, Faculty of  
Medicine  
Harvard Medical School

## Orphan Disease Center Staff

### James M. Wilson, MD, PhD

Rose H. Weiss Professor and Director,  
Orphan Disease Center  
Professor of Medicine and Pediatrics,  
University of Pennsylvania  
[wilsonjm@upenn.edu](mailto:wilsonjm@upenn.edu)

### Monique R. Molloy

Executive Director  
[moniquek@upenn.edu](mailto:moniquek@upenn.edu)

### Samantha Charleston

Assistant Director  
[scharle@upenn.edu](mailto:scharle@upenn.edu)

### David Fajgenbaum, MD, MBA, MSc

Associate Director, Patient Impact  
[davidfa@upenn.edu](mailto:davidfa@upenn.edu)

### Ashley Winslow, PhD

Senior Director, Translational Research  
[awinslow@upenn.edu](mailto:awinslow@upenn.edu)



Penn Medicine

Orphan Disease Center  
125 S. 31st Street  
TRL, Suite 1200  
Philadelphia, PA 19146



**Saturday,  
May 20, 2017**



**Sign up now!**

## The Penn Medicine Orphan Disease Center Invites You to the 4th Annual Million Dollar Bike Ride

### 2017 MDBR: Registration is Open!

**When?** Saturday, May 20, 2017 (Start 7:30 a.m.)

**Where?** Highline Park (31st St. and Chestnut)

**Routes:** 13, 34 and 72 mile options

**Register:** Contact Samantha Charleston  
(scharle@upenn.edu) or visit  
[www.milliondollarbikeride.org](http://www.milliondollarbikeride.org).

**Twitter:** @MDBRide4Rare

**Facebook:** The Million Dollar Bike Ride  
for Orphan Disease Research

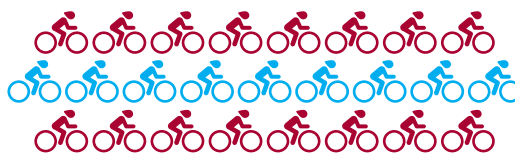
**Instagram:** @MDBRide4Rare

**MDBR Website:** [www.milliondollarbikeride.org](http://www.milliondollarbikeride.org)

**ODC website:** [www.med.upenn.edu/orphandisease/](http://www.med.upenn.edu/orphandisease/)

### 2016 MDBR In Review

\$ **3 500 000** in 3 years



**600+** participants

**27** rare disease teams



riding **17,538** miles

**100%**  
of all money raised directly  
funds rare disease research  
(no administrative cut).



from **30** states