

# QUANTITATIVE BIOSCIENCES AT MERCK

Greg Adam, Principal Scientist

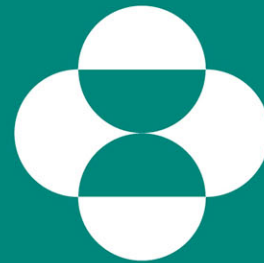
Allison Kemper, Senior Scientist

William Rose, Associate Principal Scientist

Laura Struzyna, Associate Scientist, Postdoctoral Fellow

February 06, 2020

Rutgers University - Robert Wood Johnson Medical School



**MERCK**

**INVENTING FOR LIFE**

# Quantitative Biosciences Panel Members



Greg Adam  
*Principal Scientist*



Allison Kemper  
*Senior Scientist*



William Rose  
*Associate Principal Scientist*

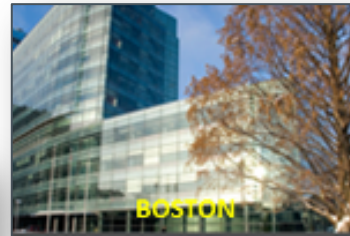


Laura Struzyna  
*Associate Scientist*  
*Postdoctoral Fellow*

# Locations of Merck Research Laboratories



South SF, CA



Boston, MA



Cambridge, MA



London



Kenilworth, NJ



West Point, PA

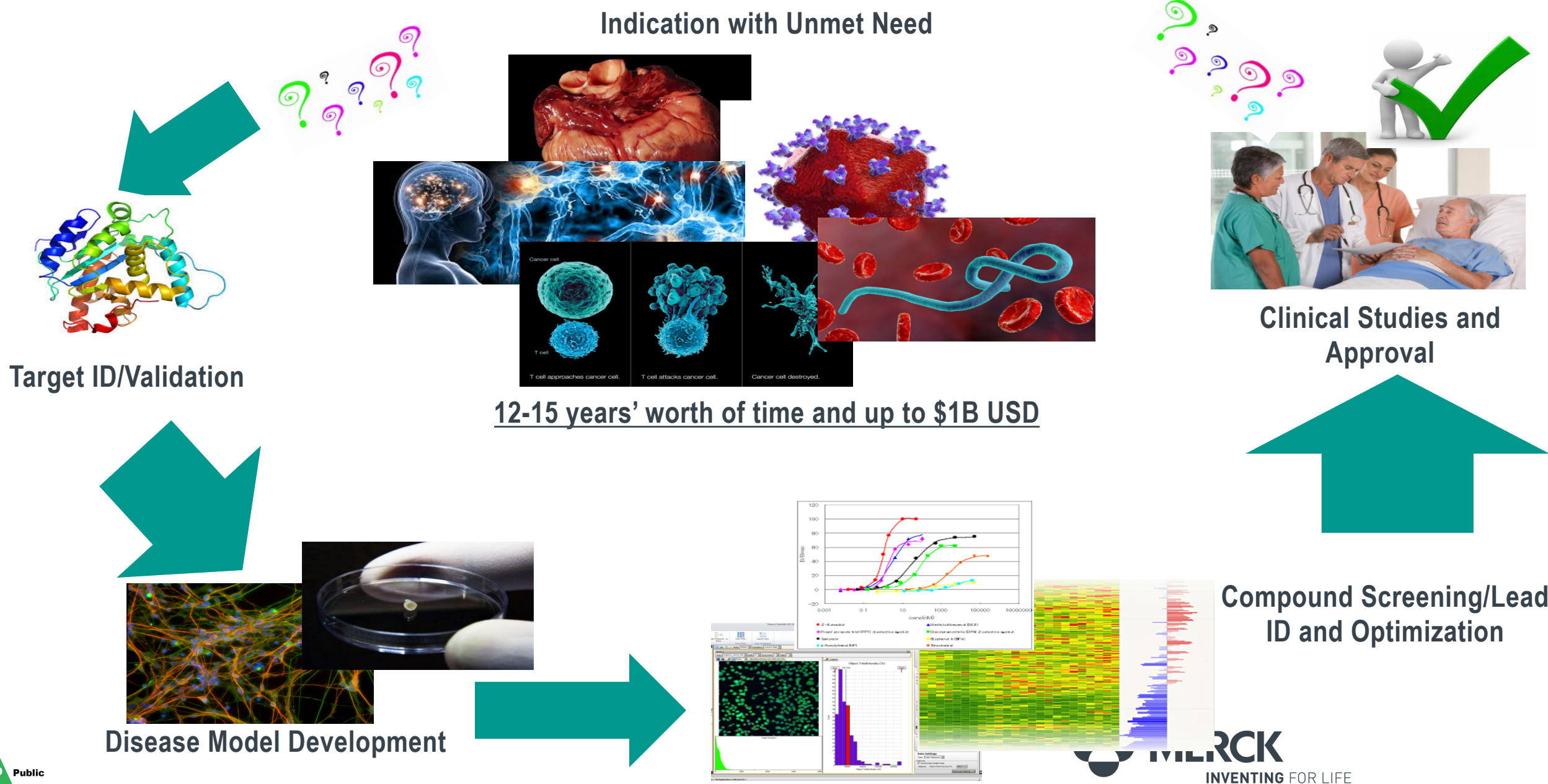


Singapore





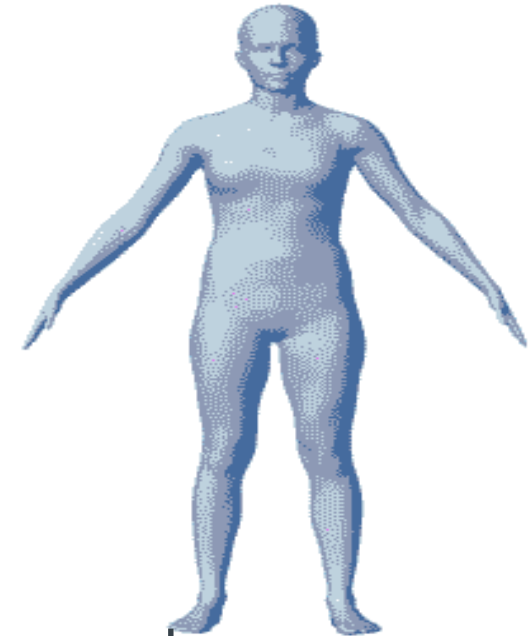
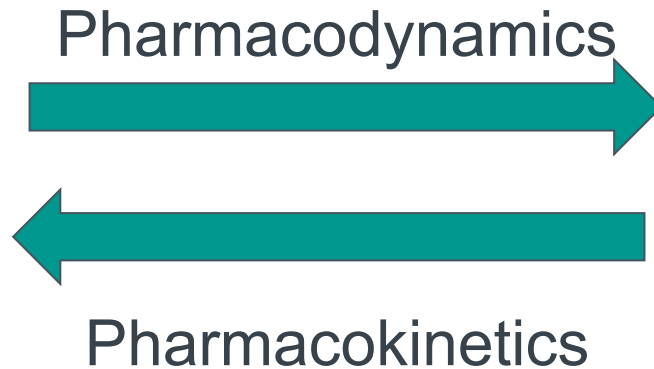
# The Drug Discovery Process: A High Level Overview



# What is Pharmacology?

The branch of biology concerned with the study of drug action

- Pharmacodynamics studies the effects of a drug on biological systems



- Pharmacokinetics studies the effects of biological systems on a drug.

# Quantitative Biosciences at MRL's West Point Facility

In support of Infectious Diseases, Neuroscience, Cardio-metabolic, Oncology

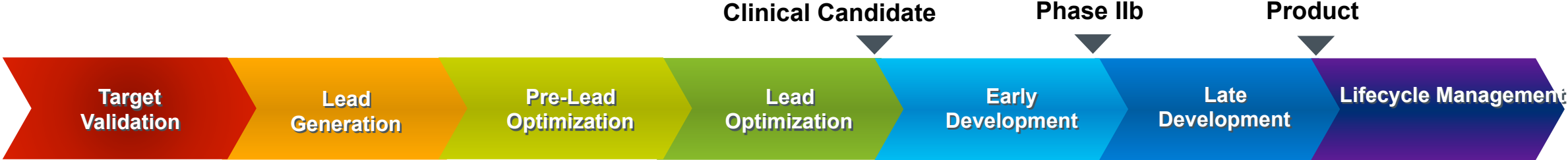
## In Vitro

- Characterize and differentiate lead series using biochemistry, biophysics, receptor pharmacology, *etc.*
- Assay development and execution

## In Vivo

- Link *in vitro* activity of compounds to efficacy in animal models of disease (IVIVC)
- Establish relationship between compound exposure and efficacy in animal model (PK/PD)
- Large and small animal species

# Drug Discovery and Development at Merck - Enabled by Pharmacology at All Phases



Will engaging this target likely produce the desired pharmacological effect?



What classes of molecules can engage the target?



Are there active molecules with desired drug-like properties?



Is there **an active molecule** with all of the desired drug-like properties?



Does the molecule have desired human PK? What types of side-effects are observed and at what dose? Is there evidence of efficacy in small studies?



Is the molecule safe and effective in larger clinical trials?

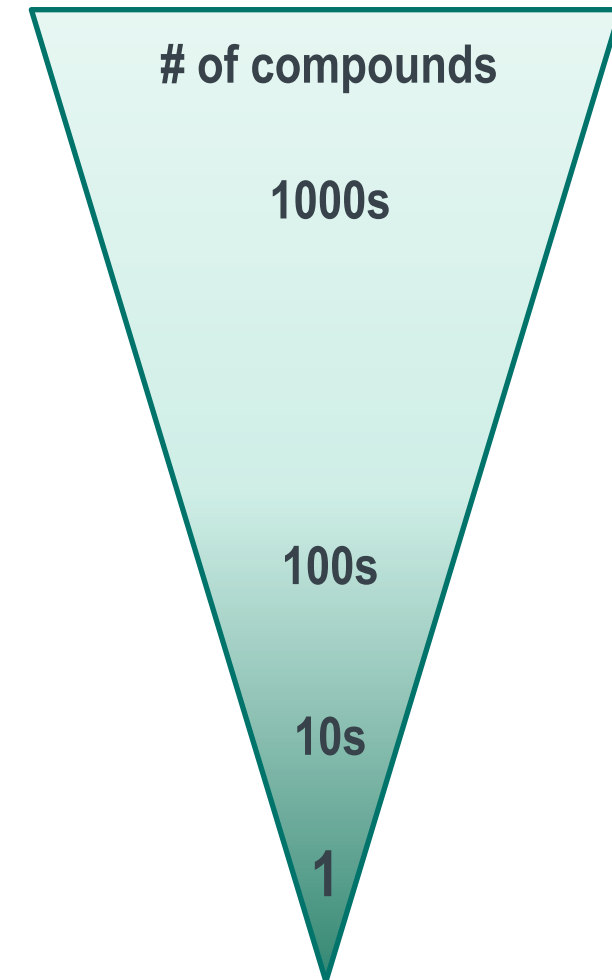
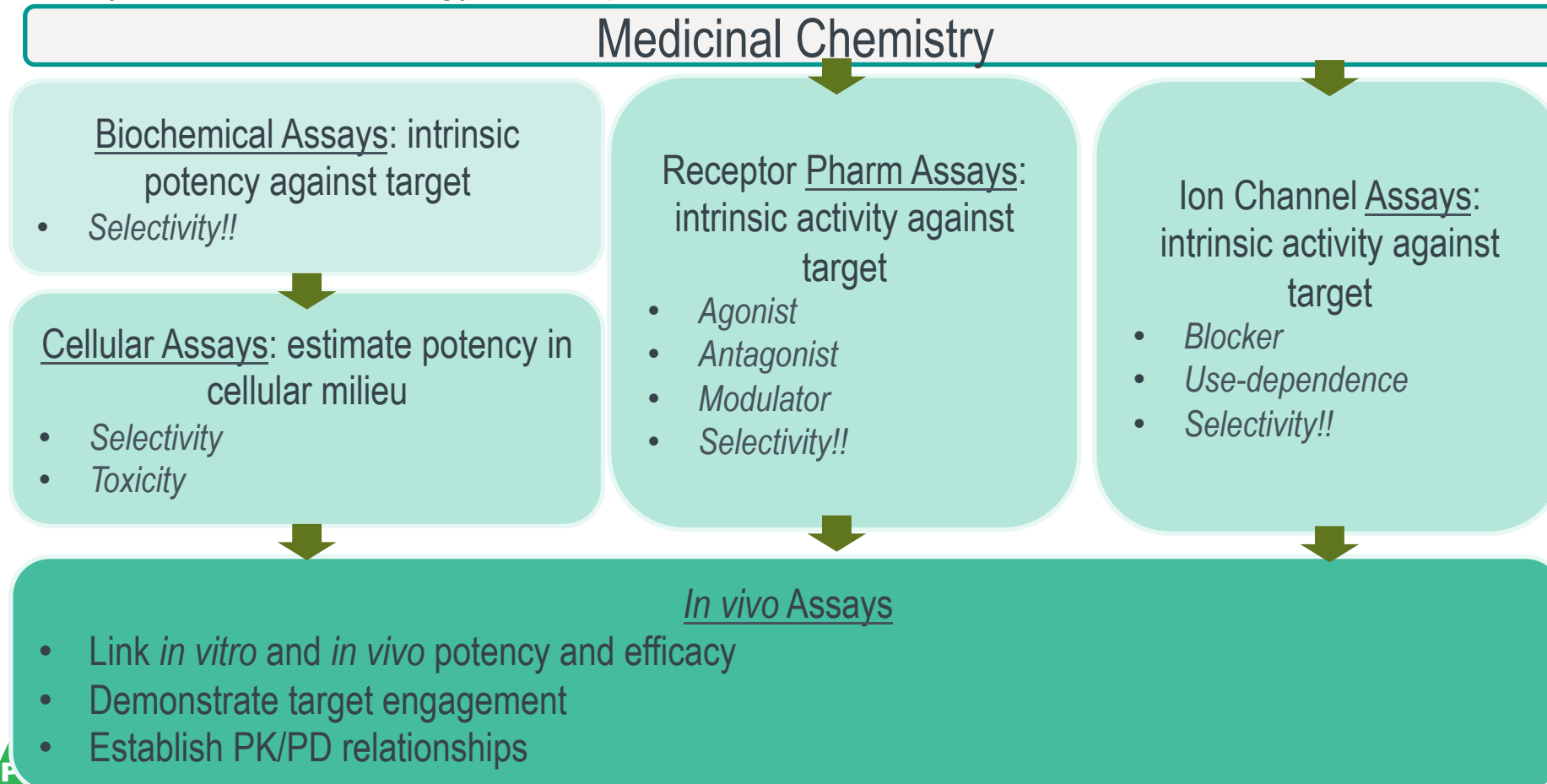


Are there opportunities to expand the drug's indications? Are there new safety signals that emerge post-approval?

# Quantitative Biosciences Goal: Deliver High Quality Preclinical Candidates

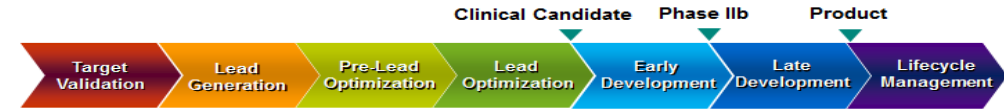
## Research Operating Plan (ROP):

- Drive Structure-Activity Relationships (SAR)
- Fully Characterize Biology of Compounds

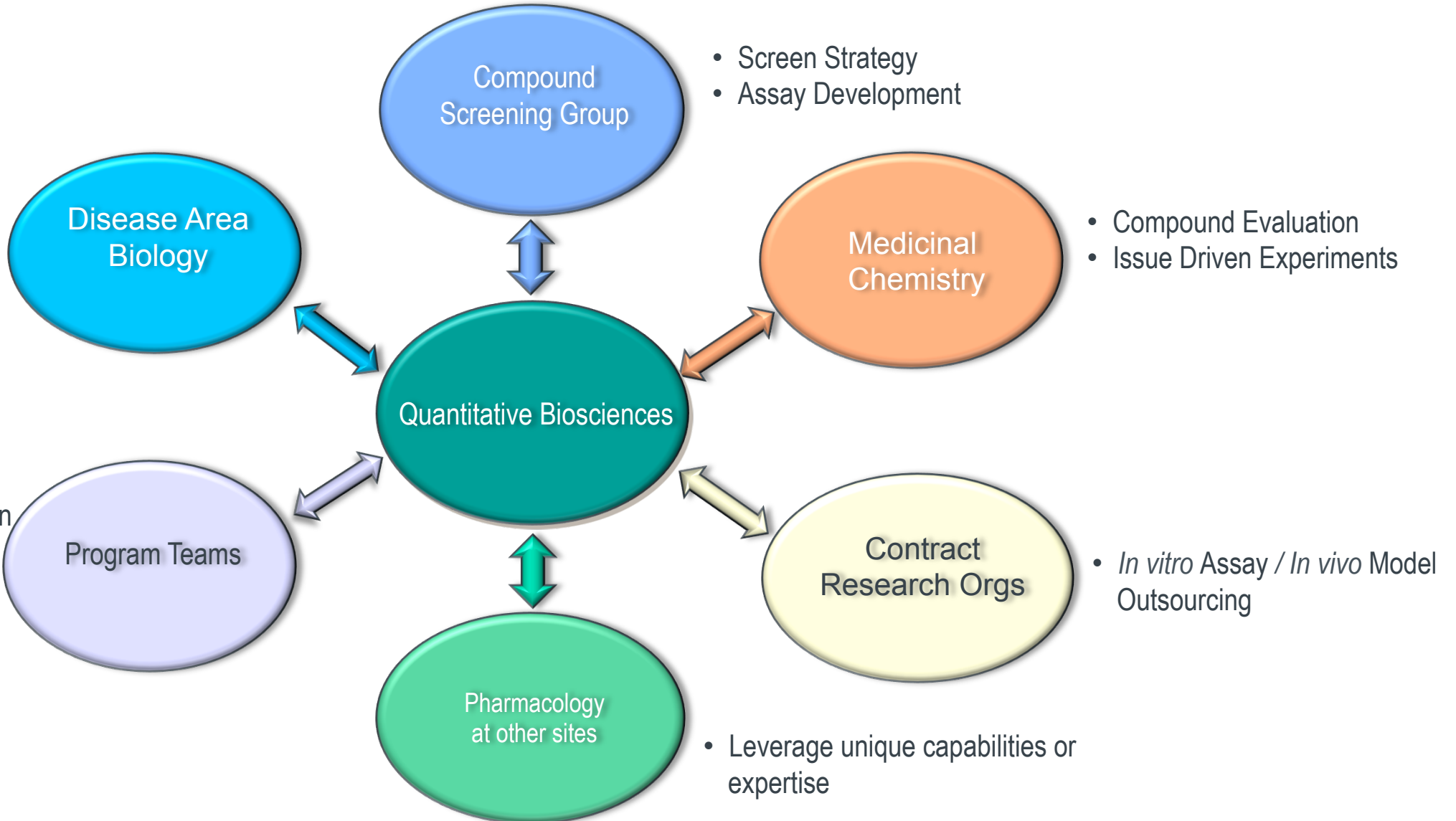




# Our department collaborates with multiple functional areas



- Target ID/ validation
- Assay development
- Tool compounds



# Merck Research Laboratories (MRL) Postdoctoral Research Fellow Program



Learn more at: [www.merck.com/research/fellow](http://www.merck.com/research/fellow)

Provides an academic focus in a commercial environment

Work alongside outstanding researchers and collaborators as part of Merck's industry-leading R&D organization

Postdoctoral Fellows at Merck :

- Work in unique laboratory environments with top capabilities, equipment, expertise and knowledge
- Obtain experience in drug discovery and development
- Generate innovative science resulting in high-quality external publications
- Participate in seminars, lectures and meetings, and interact with the local scientific community
- Receive a competitive salary, and access to the full benefits programs offered by Merck


# Merck Internships and Co-Ops

## The Future Talent Program:


- Internships – 9 to 12 weeks between June and August
- Co-Ops: 4 to 6 month assignments

INTERNSHIPS & CO-OPS


Join a program that provides exemplary students with the opportunity to work on meaningful assignments and gain real world experiences in the following fields.




Human and Animal Research & Development




Communications




Supply Chain




Engineering & Manufacturing



Finance



Marketing



Information Technology

**Internships:** 9 to 12 weeks between June and August.  
**Co-Ops:** 4 to 6 month assignments.



Name:  
Jessica McAnulty

School:  
University of Delaware

Major:  
Biological Sciences

Business Unit:  
Merck Research Labs (MRL)

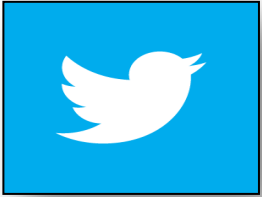
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“ During my twelve weeks at Merck, I had high expectations to advance my technical skills in the laboratory, to receive guidance on graduate degrees, and to discover new career aspirations. This internship greatly surpassed my expectations. My assignment in the department of Infectious Diseases and Vaccines focused on exploring Next Generation Sequencing capabilities for targeted viral genome sequencing. Preliminary steps included extracting RNA from virus samples, performing PCR amplification, and running agarose gel electrophoresis. My supervisor quickly awarded me independence in planning and completing sequencing runs. After analyzing gigabytes of data, I proudly presented our findings to the department. However, this program goes beyond teaching technical skills. The Future Talent Program additionally encouraged the development of skills in communication and leadership, but most importantly the creation of a personal brand. The program accomplished this through assigning each intern a personal mentor, as well as hosting various networking events, panels, and seminars. Simply put, this eyeopening experience rewarded me with a clear vision of my career goals in research and helped me establish the skills, as well as the mindset, to achieve them.”

– Jessica McAnulty

[www.merck.com/careers/life-at-merck/prepared-to-launch.html](http://www.merck.com/careers/life-at-merck/prepared-to-launch.html)





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