

The exquisite functions of naturally occurring proteins solve the challenges facing biological evolution.

We face challenges now that were not faced during natural evolution.

We aim to design a new world of proteins to address 21st century challenges in medicine, energy, and technology.

# Institute for Protein Design Focus Areas



Therapeutics



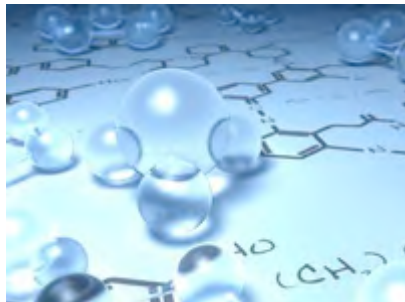
Diagnostics



Vaccines



Clean  
Energy



Targeted Drug  
Delivery



New  
Materials

# Anti-flu protein design

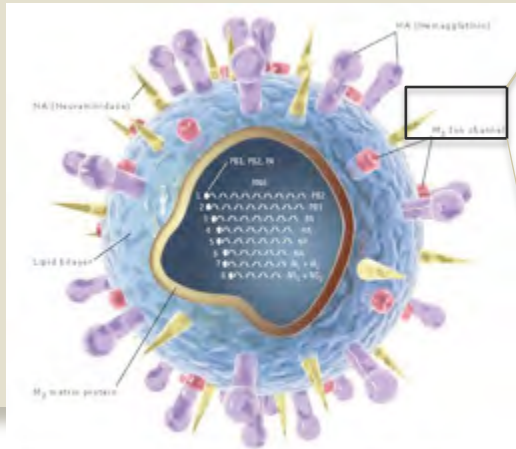
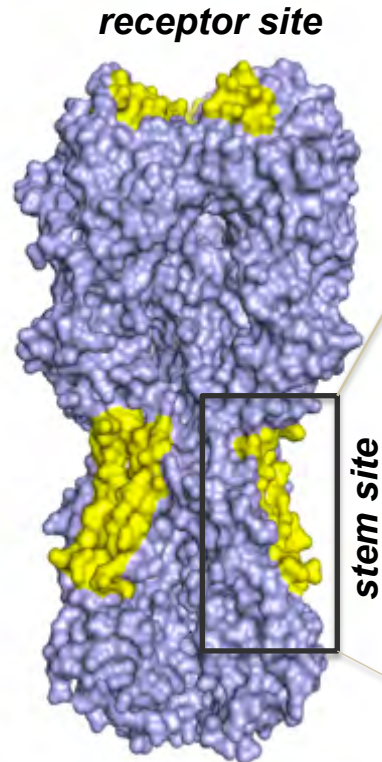
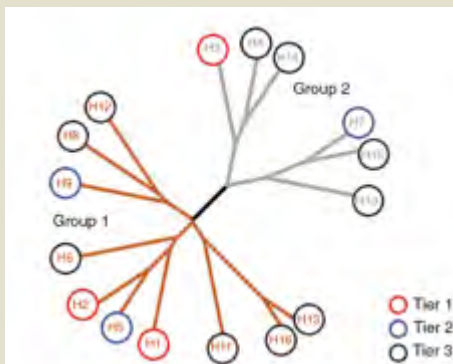
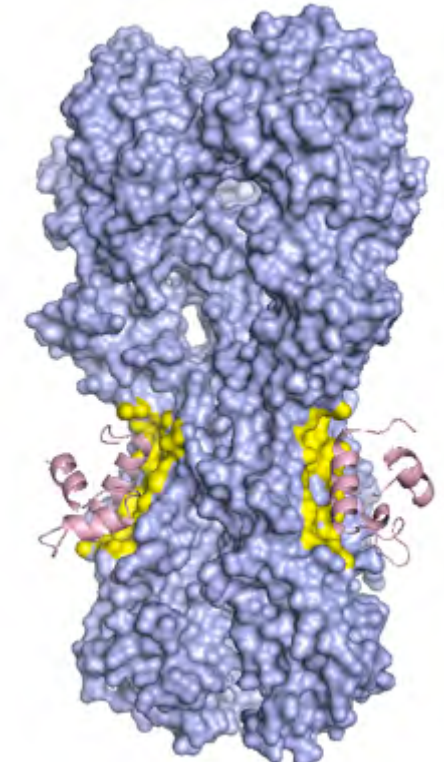


Illustration: Chris RickaEidmann. Reprinted with permission from Science (Vol. 312, page 200) (21 April 2004) © 2004 by AAAS



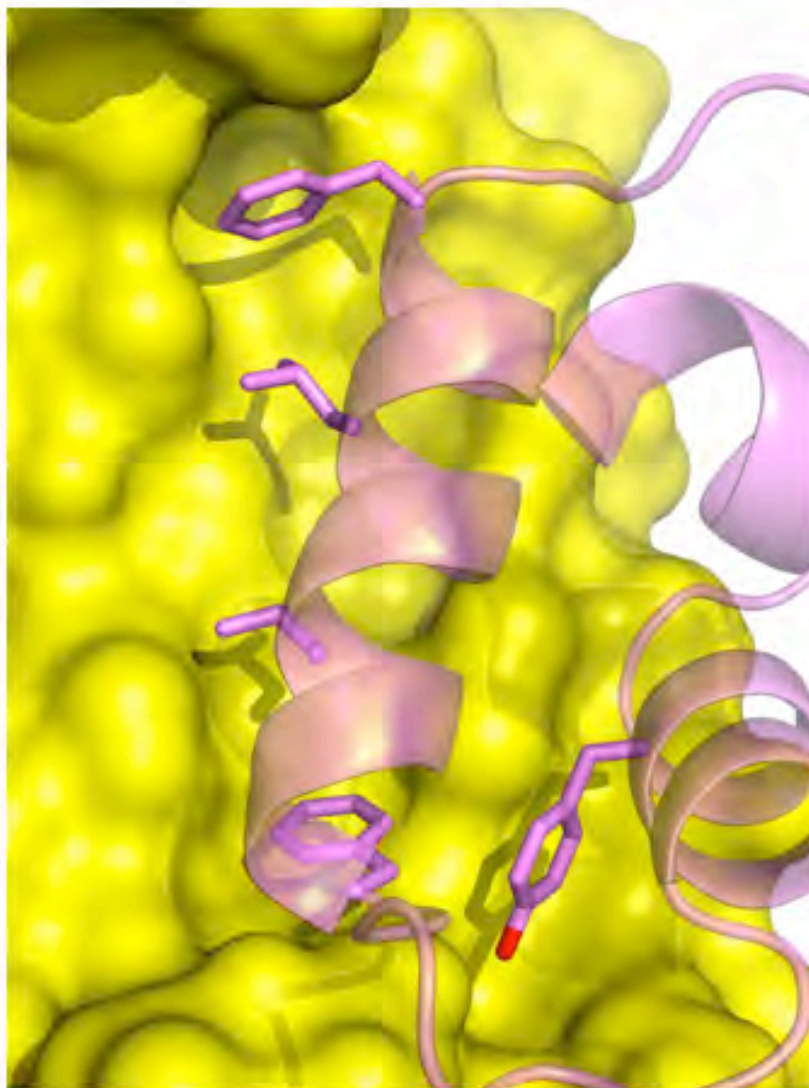
Identify  
neutralization  
sites



Design a  
protein to bind

**Goal is to create small protein binders to be used as therapeutics or diagnostics.**

**HB80**

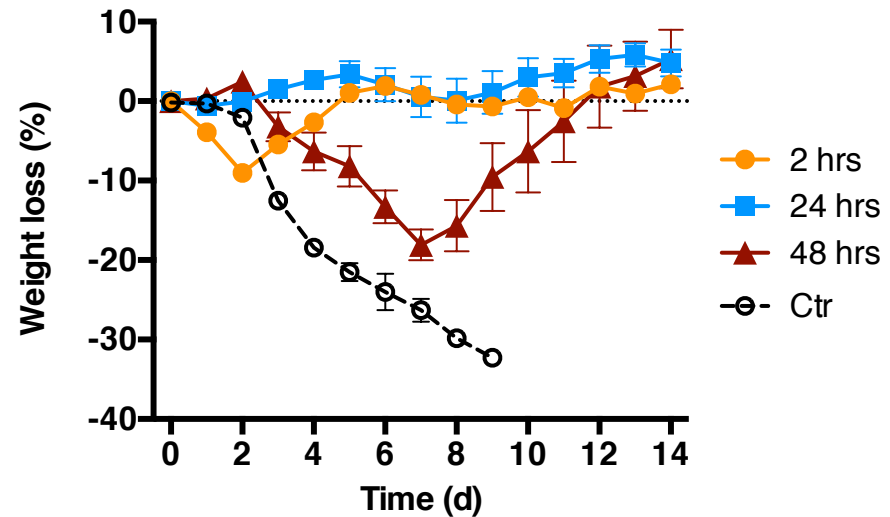
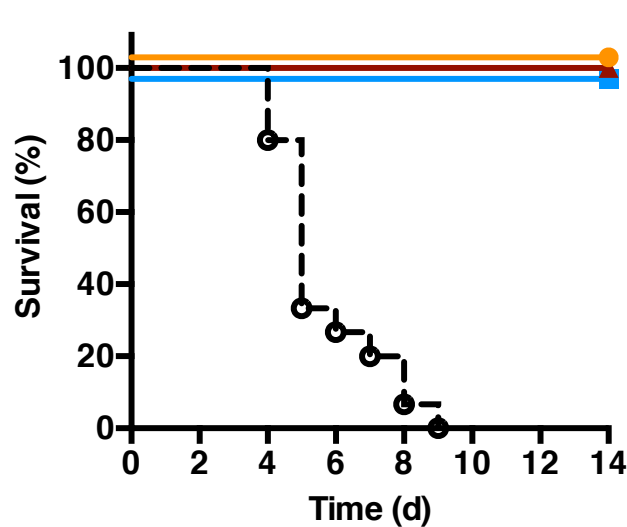
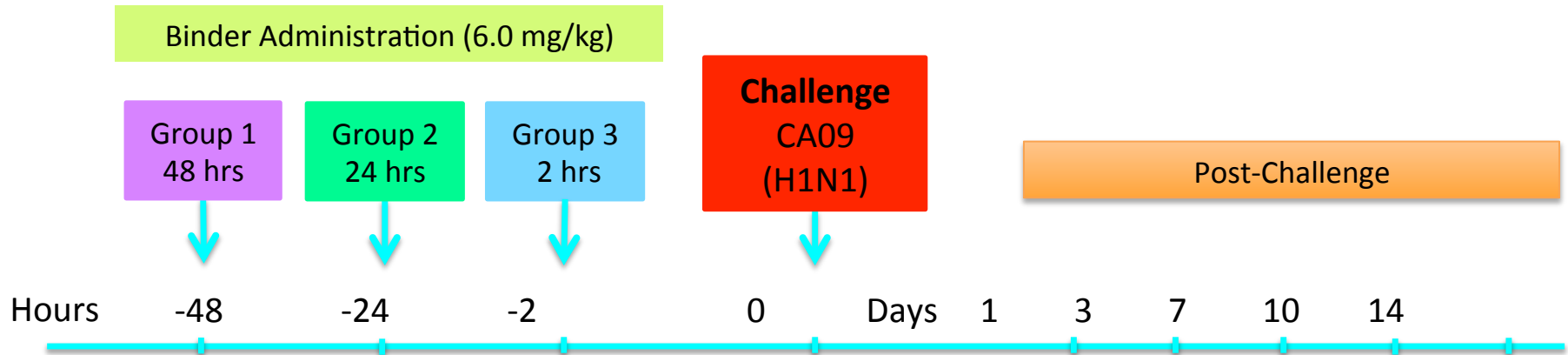


**HB36**





# Influenza HA head and stem region binding proteins protect mice from the flu



# Therapeutic Sponges and Diagnostics



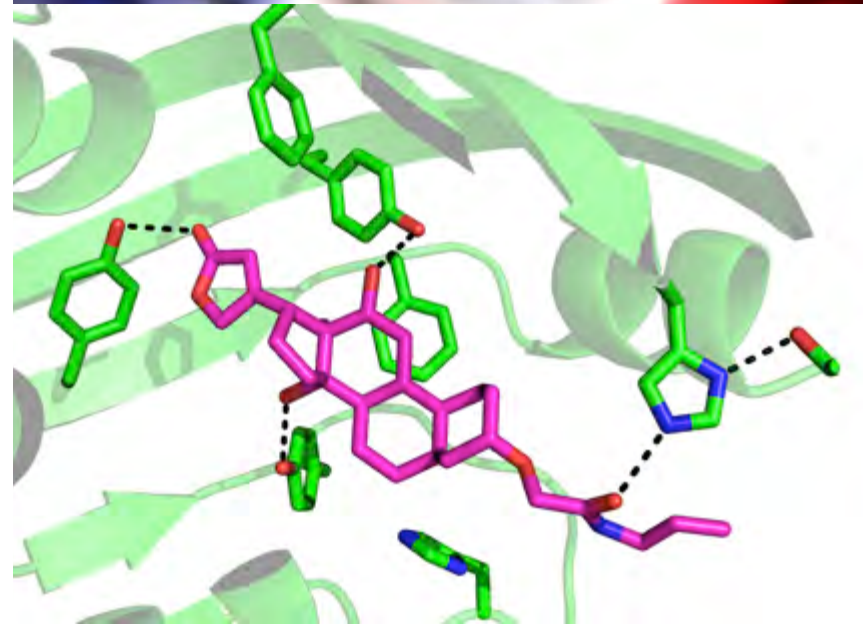
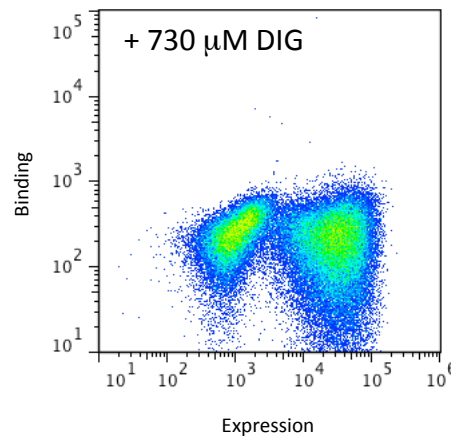
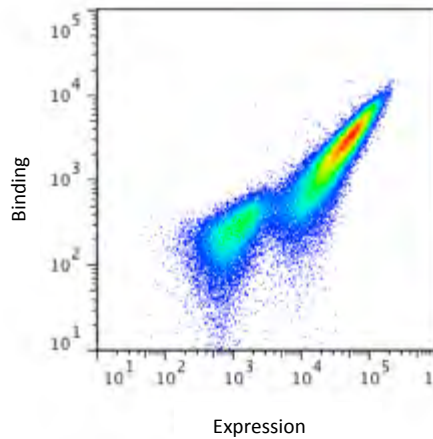
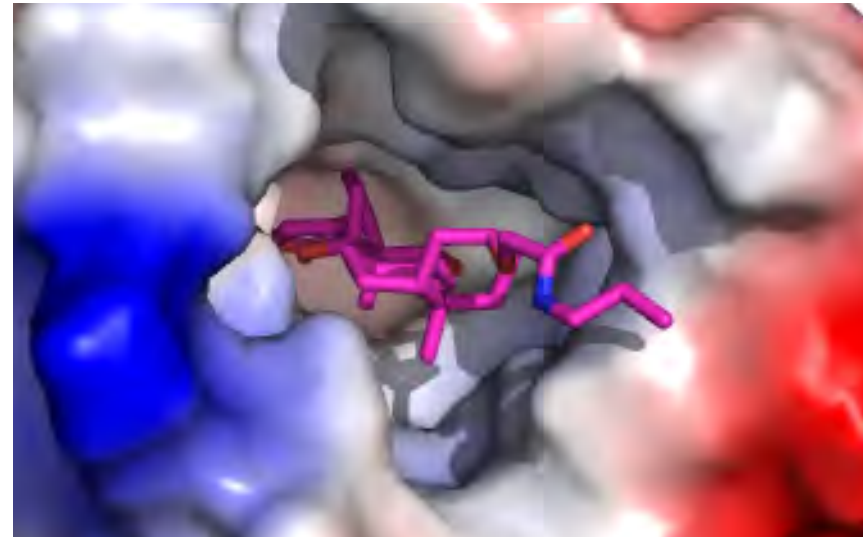
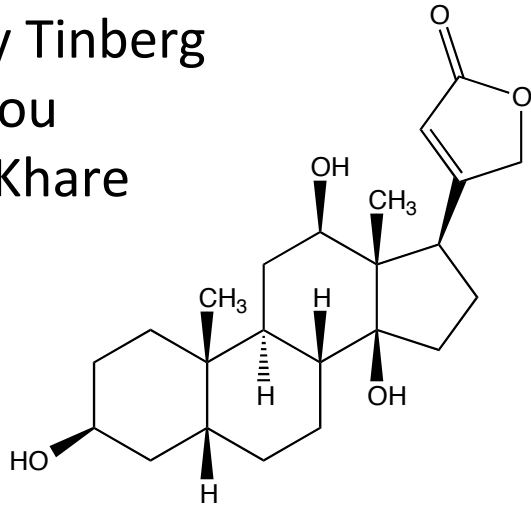
DIG 10.3 - Digoxigenin



*Illustration rendered by Vikram Mulligan*

# De novo design of small molecule binding proteins

Christy Tinberg  
Jiayi Dou  
Sagar Khare

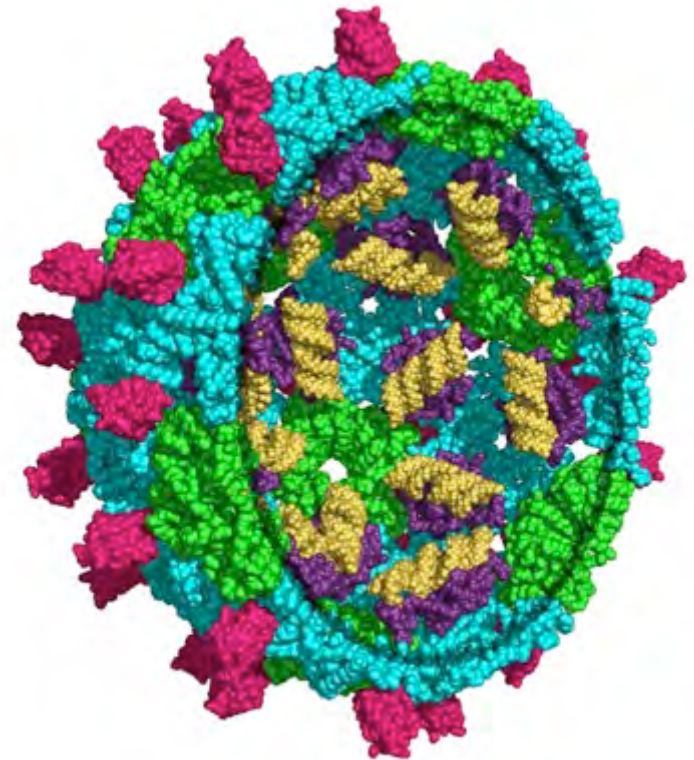




# Designed self assembling nanoparticles

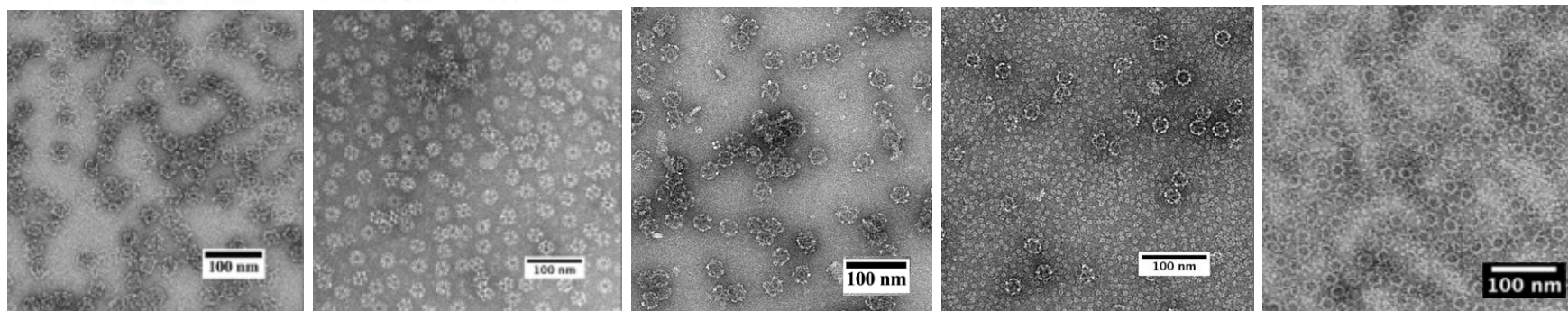
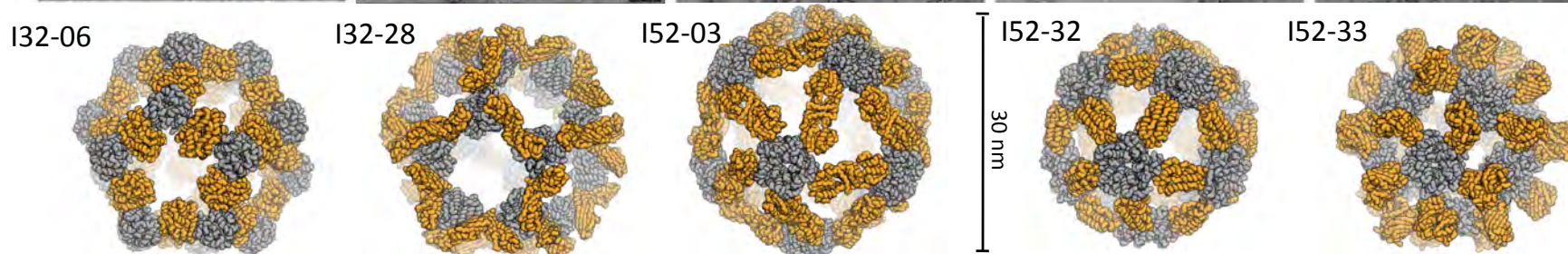
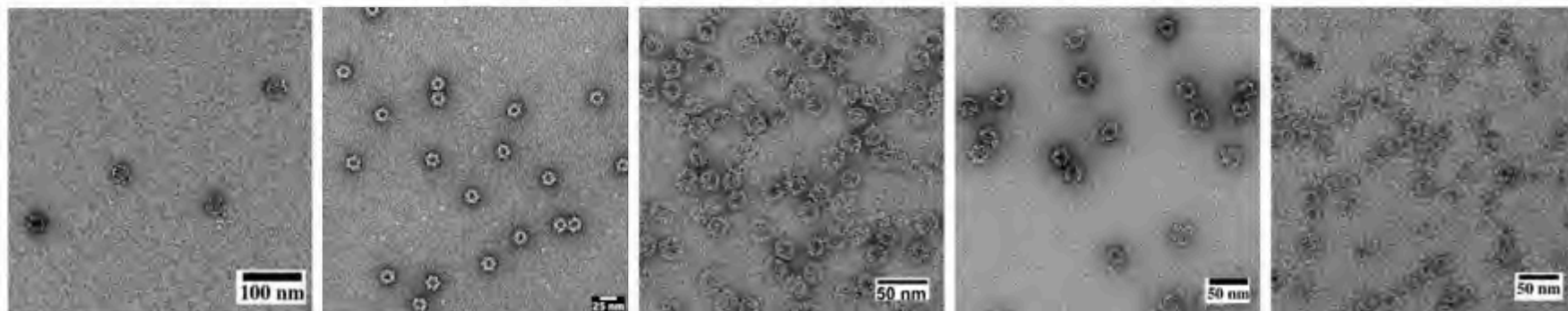
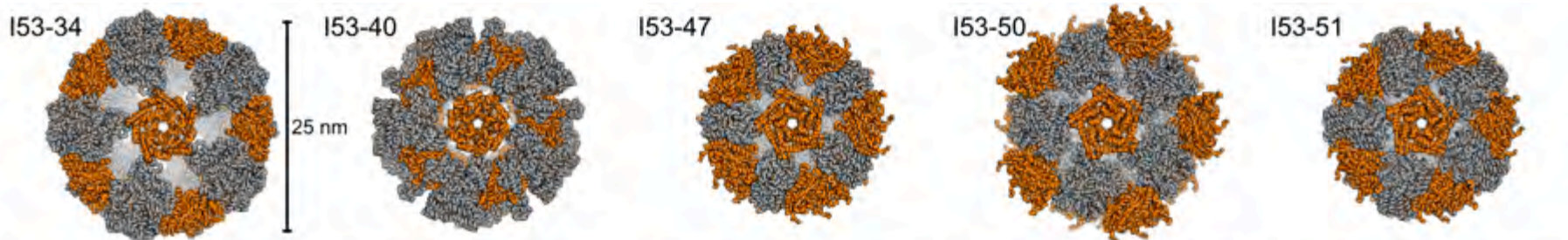


## Targeted Delivery and Vaccines

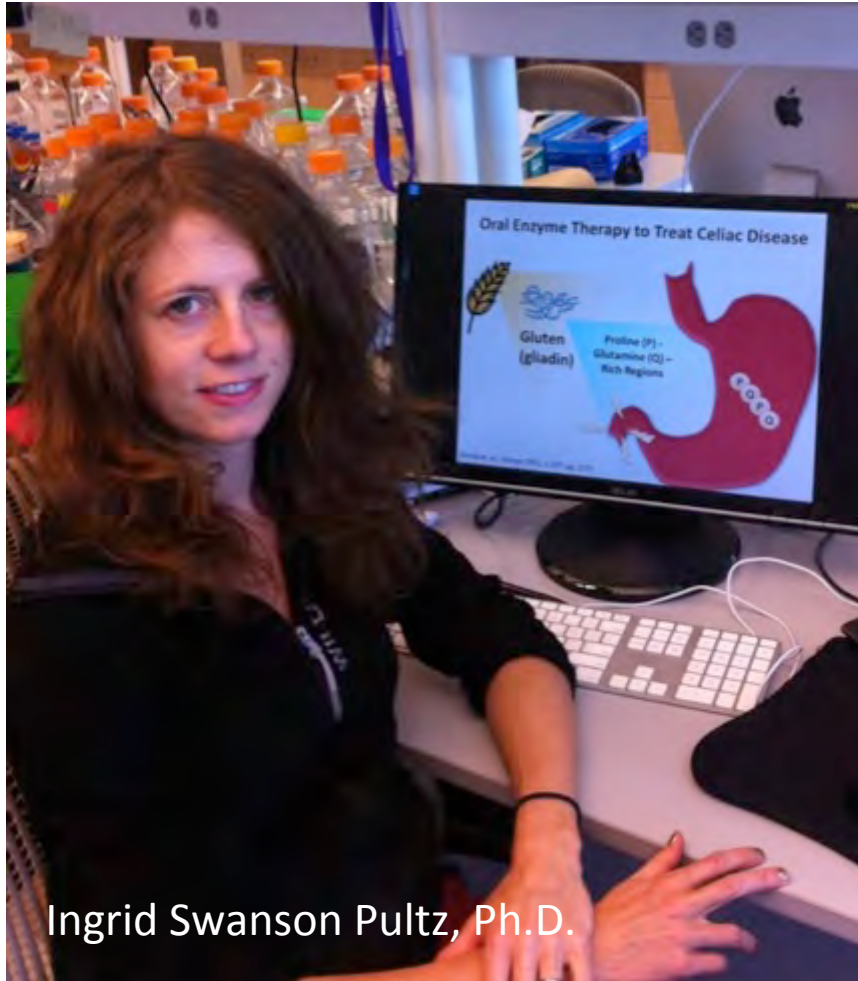




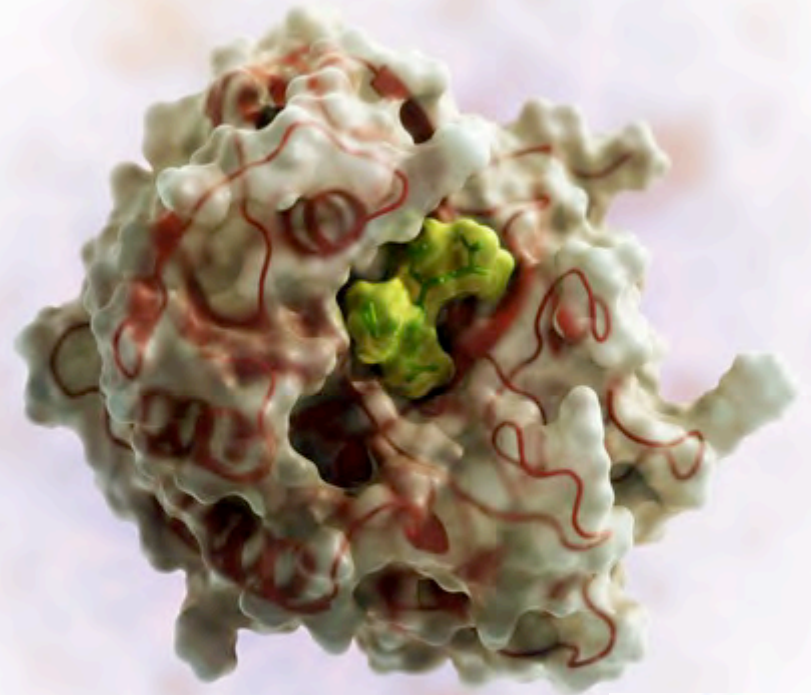
# Designed nanoparticles for drug delivery and vaccines



# Entrepreneur for a Celiac Disease Therapeutic



KumaMax iGEM 2011 World Champion



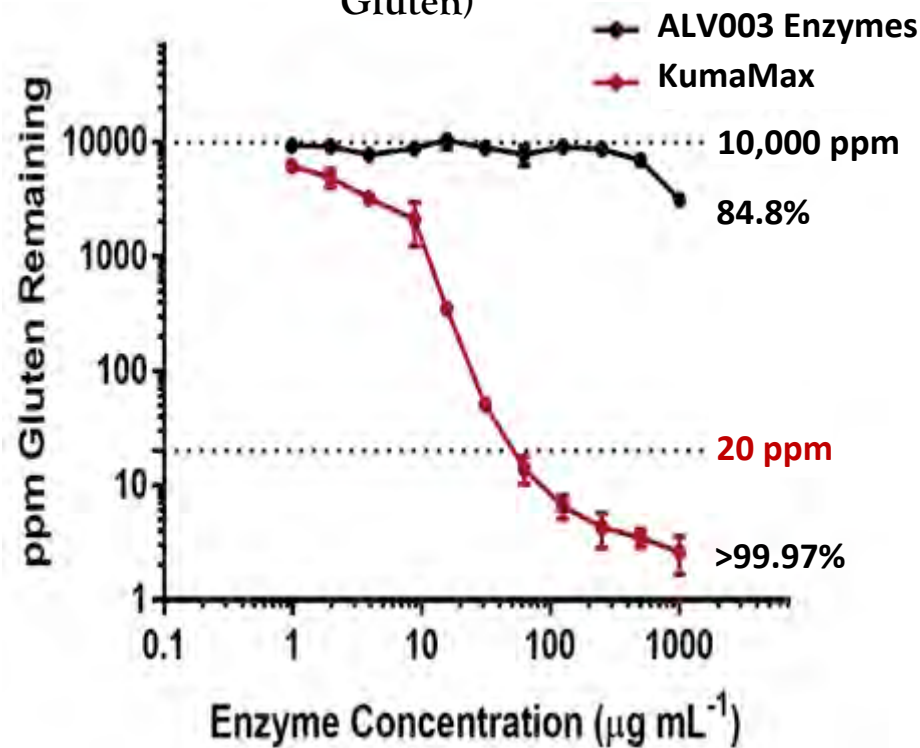
*Illustration rendered by Vikram Mulligan*





# KumaMax Efficiently Reduces Gluten in Whole Wheat Bread in Gastric Conditions

Amount of Gluten Remaining After 30 Minutes of Laboratory-Modeled Gastric Digestion of **2 Slices** of Bread (**8 g** of Gluten)



# IPD Partnership Programs

## *Programs*

### ***Washington Research Foundation Innovation Fellows***

supporting postdocs in research partnerships with  
Seattle area collaborators (~15 WRF Innovation Fellows)



***Translational Research Center*** supporting entrepreneurial  
postdocs and research faculty, fostering new spinout  
company formation (~3 Translational Investigators)



### ***New Faculty Start Up Packages & IPD Administration***

### ***Core Protein Production / Crystallization Facility***

supporting protein production for IPD (~5 PPF Staff)



***WA State Supplement  
Budget to IPD***



# Commercialization / New Company Formation

- Baker Lab Spin-Out Companies:

- Prospect Genomics (Genomics)
- Bioarchitecture Lab (Clean Energy)
- Pregenen (Genome Engineering)
- Arzeda (Metabolic Eng. & Synthetic Biology)



- IPD Spin-out Companies Thus Far:

- Cyrus Biotech 2015 (SaaS Rosetta)
- PvP Biologics ~2016 (Enzyme Therapeutics, Celiac Disease)
- VirVio ~2016 (Anti-Flu Therapy)



PvP Biologics

# Facilitating translation and innovation

- Collaboration and partnerships
- Encourage innovation
- Engage community
- Seek out excellence