

Jordan Berezowitz

HA (Gus) Peed Award

Ph.D. Student, Chemical Engineering

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Development and Evaluation of Self-Assembling Protein Nanocage Universal Influenza Vaccine

Current flu vaccines are inadequate, limited by egg-based manufacturing processes and narrow protection against diverse, rapidly mutating strains. My work fuses conserved parts of influenza viruses to proteins that self-assemble into nanoscale cages. The immune system responds more strongly to this repeating multivalent pattern, leading to enhanced immune recognition and broad, long-lasting immunity.

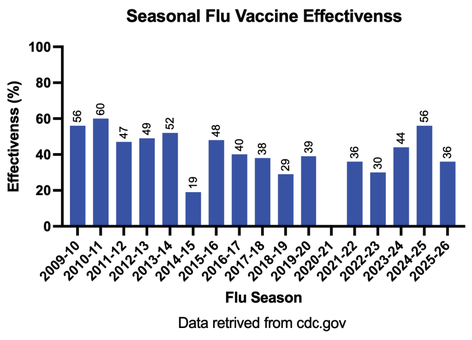
Seasonal influenza vaccines have limited effectiveness, leaving vulnerable populations at risk

Why is effectiveness low?

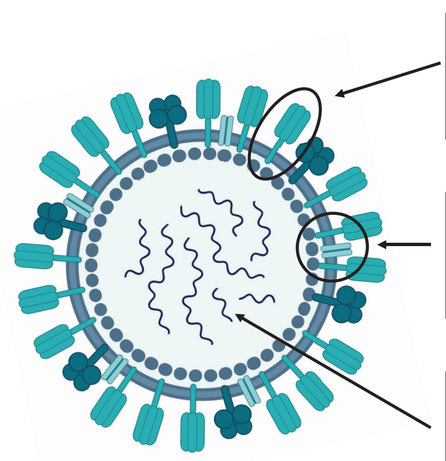
- Incorrect prediction of seasonal strains
- Viruses mutate during manufacturing
- “Escape mutants” evade immune system
- Antigenic drift and shift

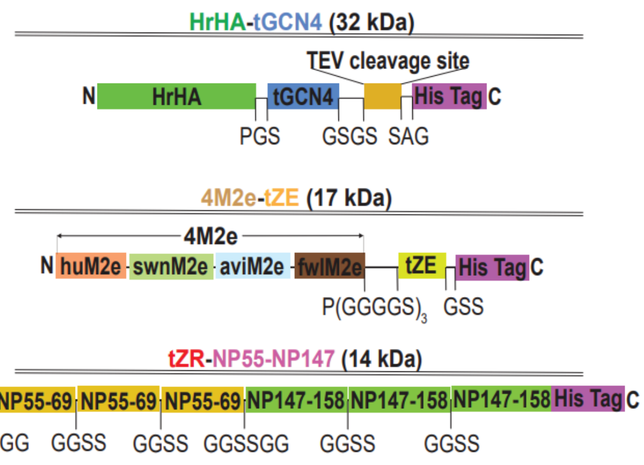
How are flu vaccines made?

- 70+ year-old manufacturing process
- Viruses grown in chicken eggs, harvested, purified, and inactivated before injection

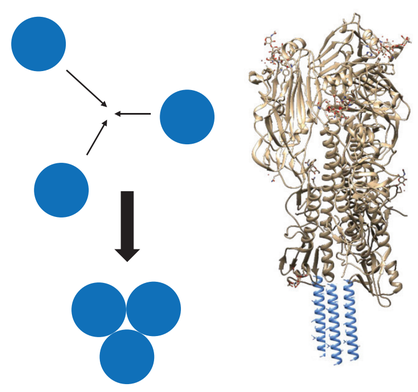


Data retrived from cdc.gov

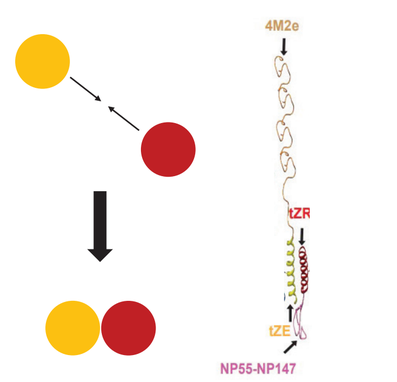




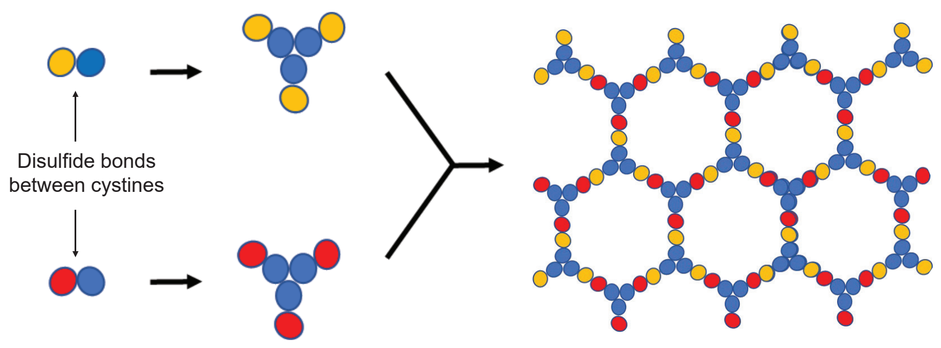
Coiled-coils result in self assembly of fusion proteins



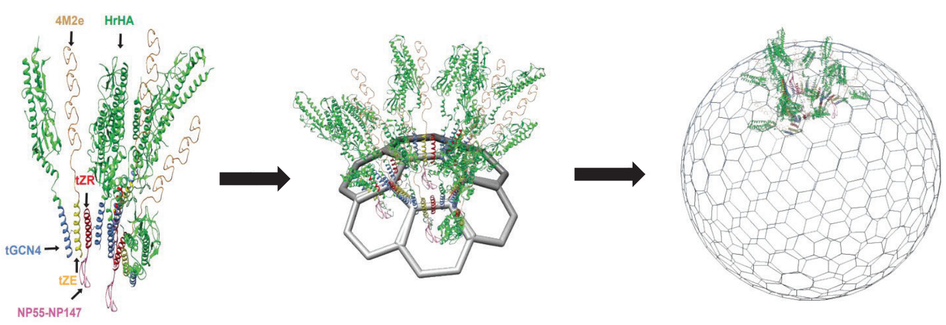
Trimeric HrHA-tGCN4



Heterodimeric 4M2e-tZE/tZR-NP



Antigens are presented in multivalent array for enhanced immune recognition



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