AI-Driven Discovery Platform for Immune Protein Inhibitors

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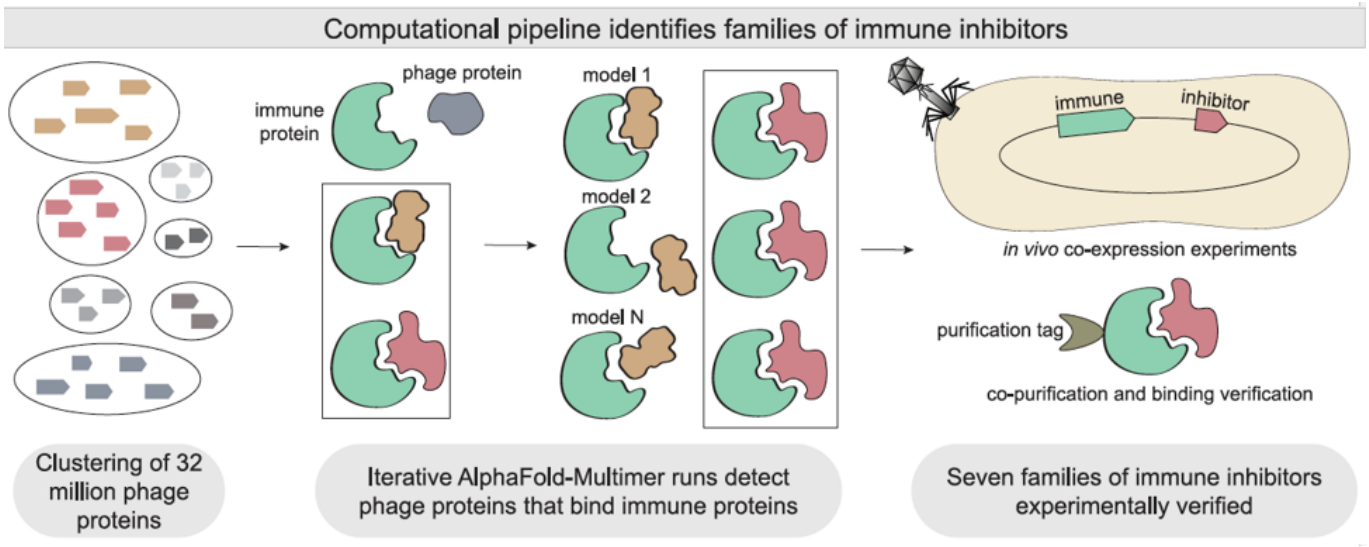
Overview

There is a growing need for innovative strategies to selectively target key drivers of immune-mediated diseases. This technology introduces a novel modality for immune modulation: an AlphaFold-driven platform that sifts through millions of viral proteins to discover short protein inhibitors that selectively bind and block immune proteins. The platform provides a scalable, systematic solution for identifying potent immune modulators in both human and microbial systems, with potential therapeutic applications in autoimmune, inflammatory, and infectious diseases.

Applications

- Discovery of highly specific protein inhibitors targeting key human immune molecules, enabling the development of novel biologics for autoimmune and inflammatory disease treatment
- Therapeutic phages engineered to express anti-bacterial genes, enhancing their efficacy and persistence



Structure-guided in silico pipeline screens >30M viral proteins to identify immune-targeting inhibitors

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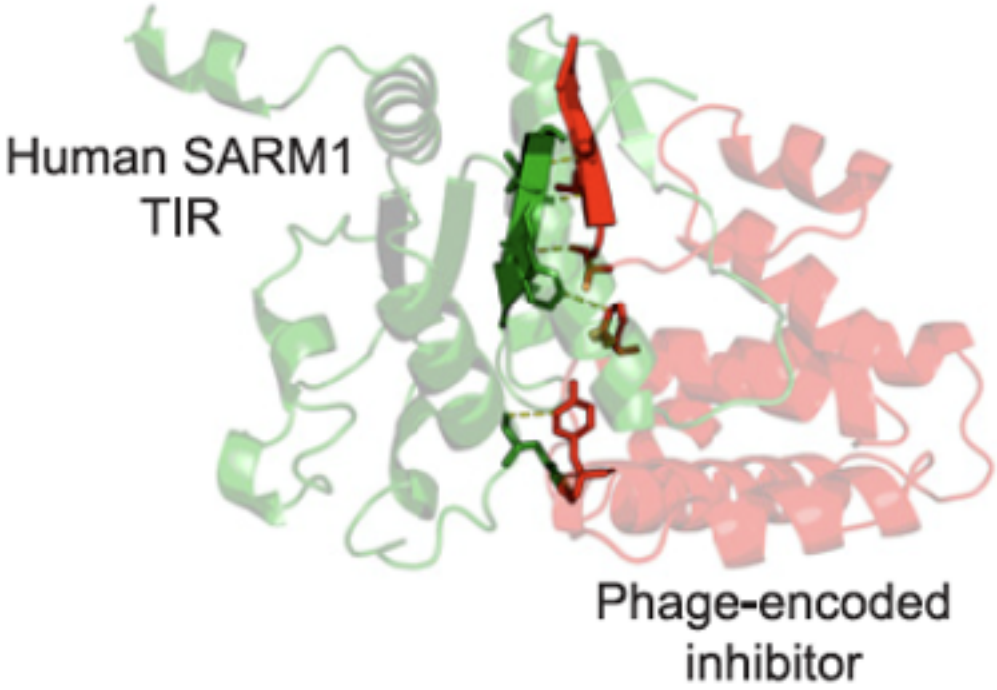

Platform-identified inhibitors effectively target and block human immune proteins (e.g., SARM1)

Differentiation

- Cross-kingdom applicability: Effective against bacterial, plant, and human immune proteins
- Target-specific discovery - Enables selection of inhibitors for any immune protein of interest
- High-throughput screening: AI-driven prediction combined with experimental validation
- Validated functionality *in vitro*

Development Stage

Proof of concept achieved: Inhibitors were computationally discovered, experimentally validated, and shown to restore phage infectivity in immune-protected bacterial systems.

References

Yirmiya et al., Cell 2025 [1]