



## Research and development of phage vaccine system that enables rapid provision of vaccines for infectious diseases

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The rapid development of effective vaccines is crucial for mitigating the impact of emerging infectious diseases on public health. To address this need, we have developed a novel M13 phage-based antigen-display vaccine platform specifically engineered to efficiently induce early, antigen-specific IgG antibody responses. Our previous studies have also shown that immune responses can be induced without notable adverse reactions, underscoring the potential of the M13 phage as a promising vaccine platform.

This study aims to validate the ability of the M13 phage-based antigen-display vaccine as a prototype to induce pathogen-specific neutralizing antibodies through the surface display of target antigens and evaluate their effectiveness in animal models to establish preclinical proof of concept (POC). Furthermore, we will develop scalable methods for production and purification to facilitate future clinical translation. A key feature of the M13 bacteriophage is its ability to propagate in *Escherichia coli* without lysing the host cell, which minimizes bacterial contamination, simplifies the purification process, and enables large-scale production. We will also investigate the immune mechanisms underlying the immune response induced by the M13 phage-based vaccine. Understanding these interactions is essential for optimizing both safety and efficacy in clinical applications.

The successful development of this M13 phage-based antigen-display vaccine platform is expected to accelerate responses to emerging infectious diseases and contribute to the advancement of next-generation vaccine strategies.