A lymph node targeted protein subunit vaccine generates strong cellular and cross-reactive humoral immunity against SARS-CoV-2 with potent long-term recall responses

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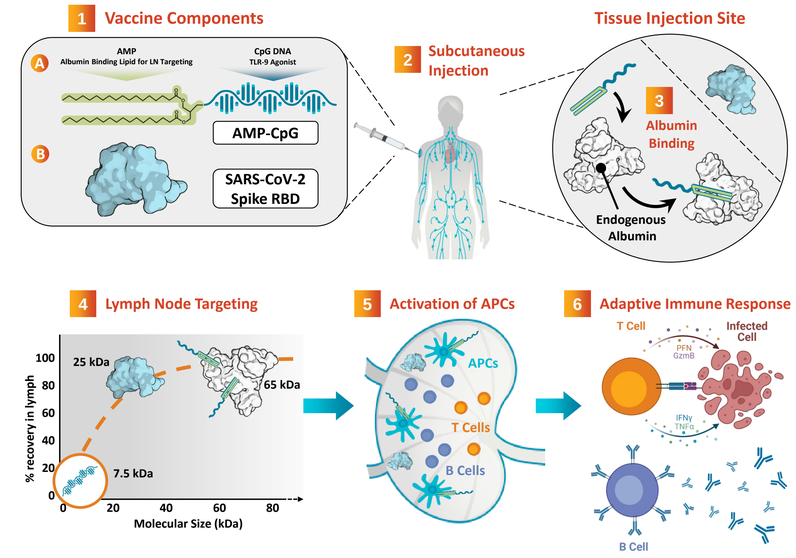
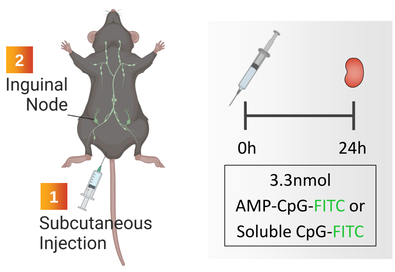
Overview

The coronavirus disease-19 (COVID-19) pandemic, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has – as of June 2022 – resulted in approximately 540 million confirmed cases world-wide and more than 6 million deaths in the span of two years. In response, more than 12 billion vaccine doses have been administered globally. However, it is becoming evident that immune protection generated by the currently available vaccines or natural infection begin to wane after only a few months due to declining neutralizing antibody titers, which may increase susceptibility to re-infection. Further, the ongoing emergence of SARS-CoV-2 variants, which have the potential to evade existing antibody responses, increases the need for safe and more broadly protective SARS-CoV-2 vaccines. Potential candidates must be capable of generating strong and durable immunity that not only elicit protective antibody titers but potently induce acute and memory T cell responses with the capacity to cross-protect against existing or future variants.

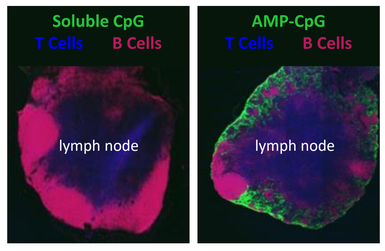
ELI-005 is a lymph node targeted vaccine based on the AMP-platform, comprised of the diacyl lipid-conjugated TLR9-agonist CpG7909 (**AMP-CpG**) admixed with SARS-CoV-2 Spike receptor binding domain (**RBD**) protein. Upon injection, AMP-modification of the adjuvant results in binding to endogenous albumin, which naturally drains from the injection site to the lymph nodes where it accumulates in antigen presenting cells (APCs). Subsequent robust APC stimulation results in strong lymphatic T and B cell activation.

Our Platform: AMP Targets its Cargo Directly to the Lymph Nodes

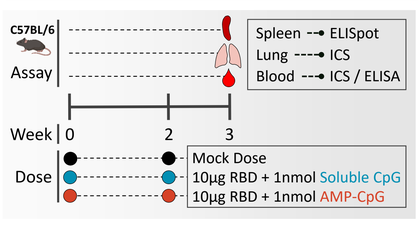


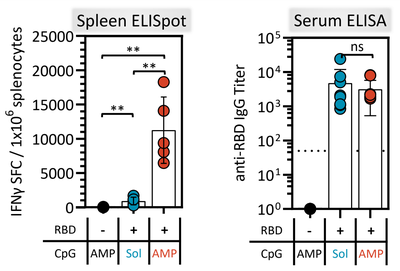


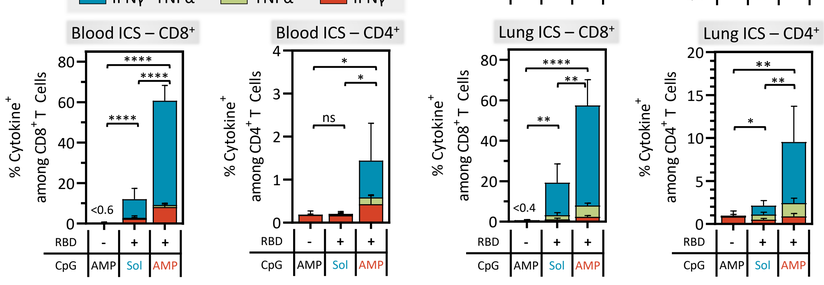
Liu, Irvine, *et al.* **Nature** 2014



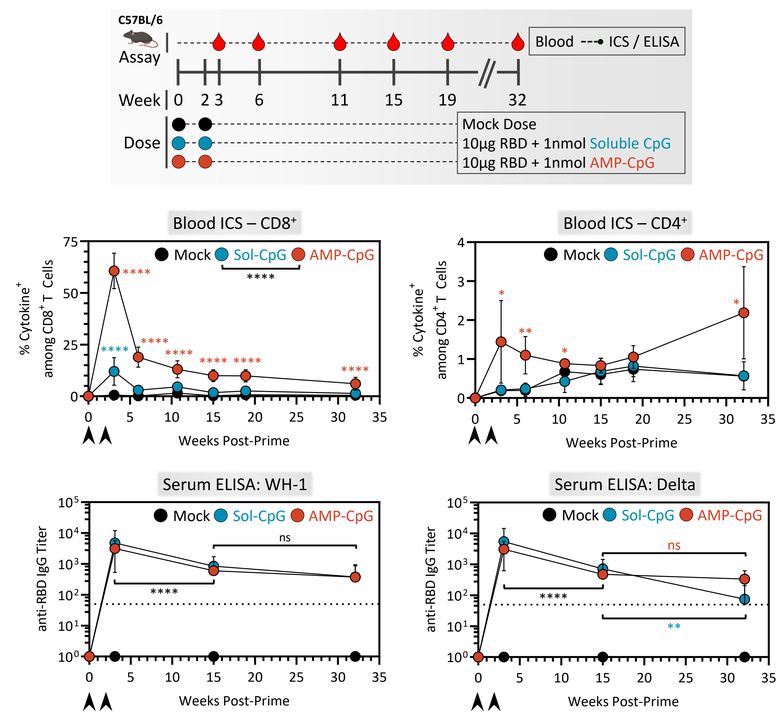
ELI-005 Induces Potent Immune Responses upon Prime-Boost Vaccination



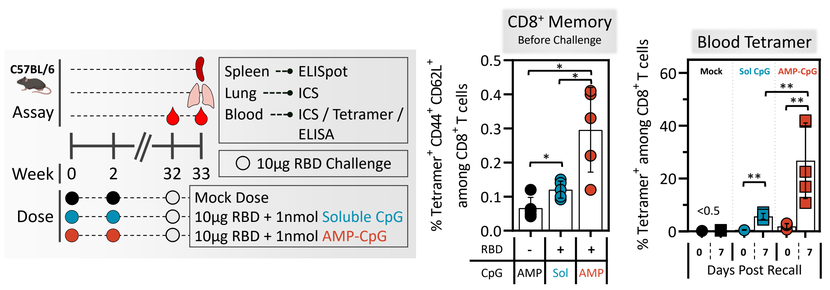


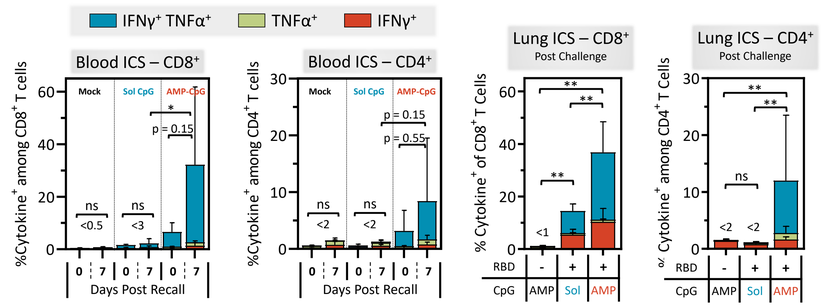


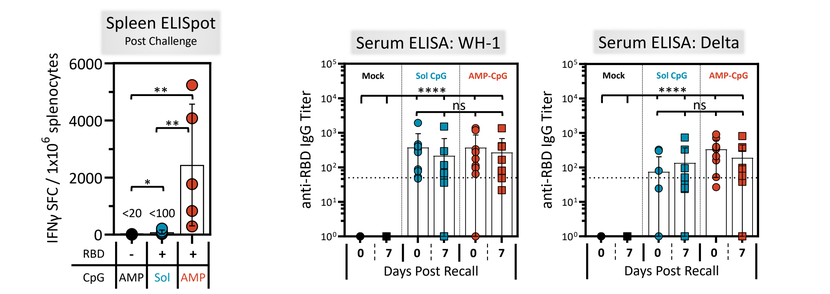
AMP-CpG Generates Long-Lasting Cellular and Humoral Immune Responses



Memory Response is Rapidly Expanded upon Antigen Re-Challenge







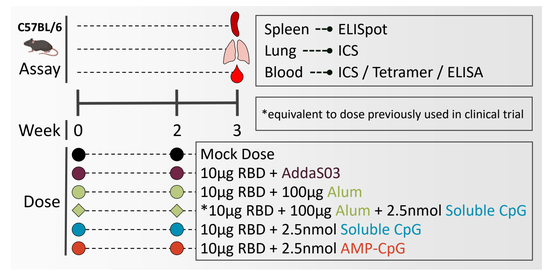
More Information on ELI-005 and the AMP-platform

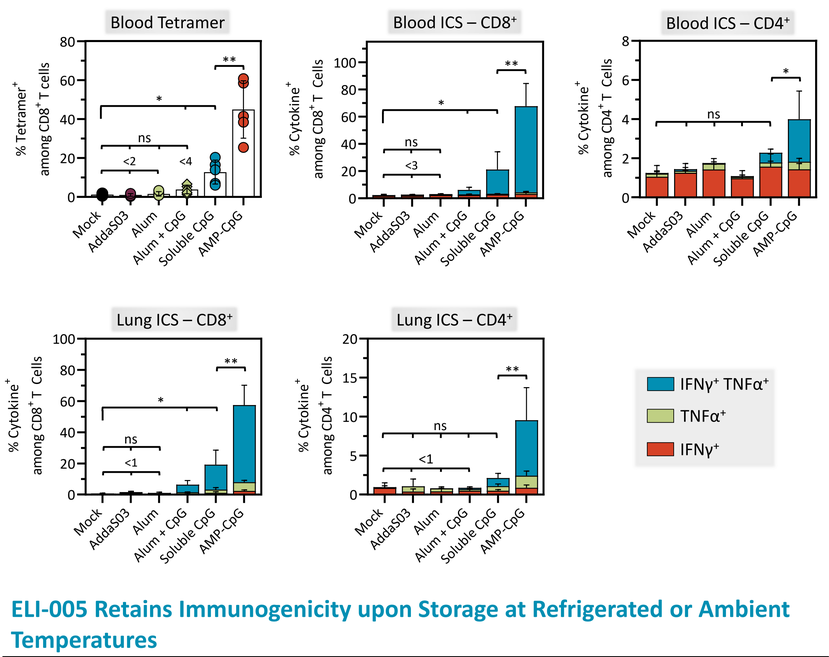
Poster 2047
AMP-CpG Activates the Lymphatic Innate Immune System

Poster 2026
ELI-005 Induces Robust Immune Responses in Non-Human Primates

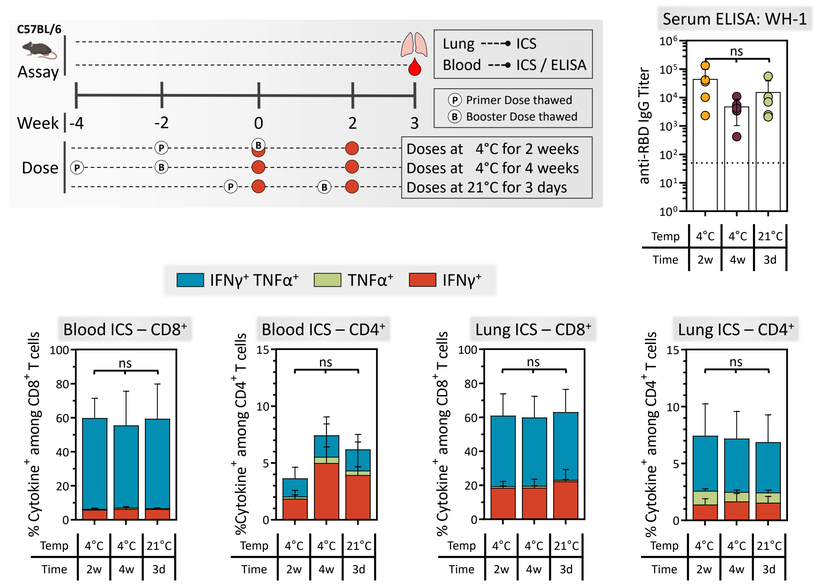
Poster 2005
AMP-CpG Induces Immune Responses to Epstein Barr Virus

ELI-005-Induced T Cell Responses Surpass Those of Other Adjuvants





ELI-005 Retains Immunogenicity upon Storage at Refrigerated or Ambient Temperatures



Summary

1) Prime-Boost vaccination induces potent T cell responses

- CD8+ and CD4+ T cells exhibit **polyfunctional Th1 cytokine secretion**.
- Responsive T cells are detected systemically as well as **in lung (~60% Cytokine+)** which is crucial for SARS-CoV-2 detection and clearance.
- ELI-005 produces unparalleled cellular responses in mice, while maintaining a significant antibody titer that is **cross-reactive to viral variants**.

2) Robust T cell memory rapidly expands cellular immunity upon challenge

- Strong cellular responses are observable for at least 8 months after vaccination.
- ELI-005 induces a substantial memory compartment leading to vigorous recall responses upon antigen challenge.

3) ELI-005 formulation does not rely on ultra-cold storage conditions