

Strengthening Indigenous Children: Development of a Novel Multi-Component Vaccine for Ear Infection Prevention

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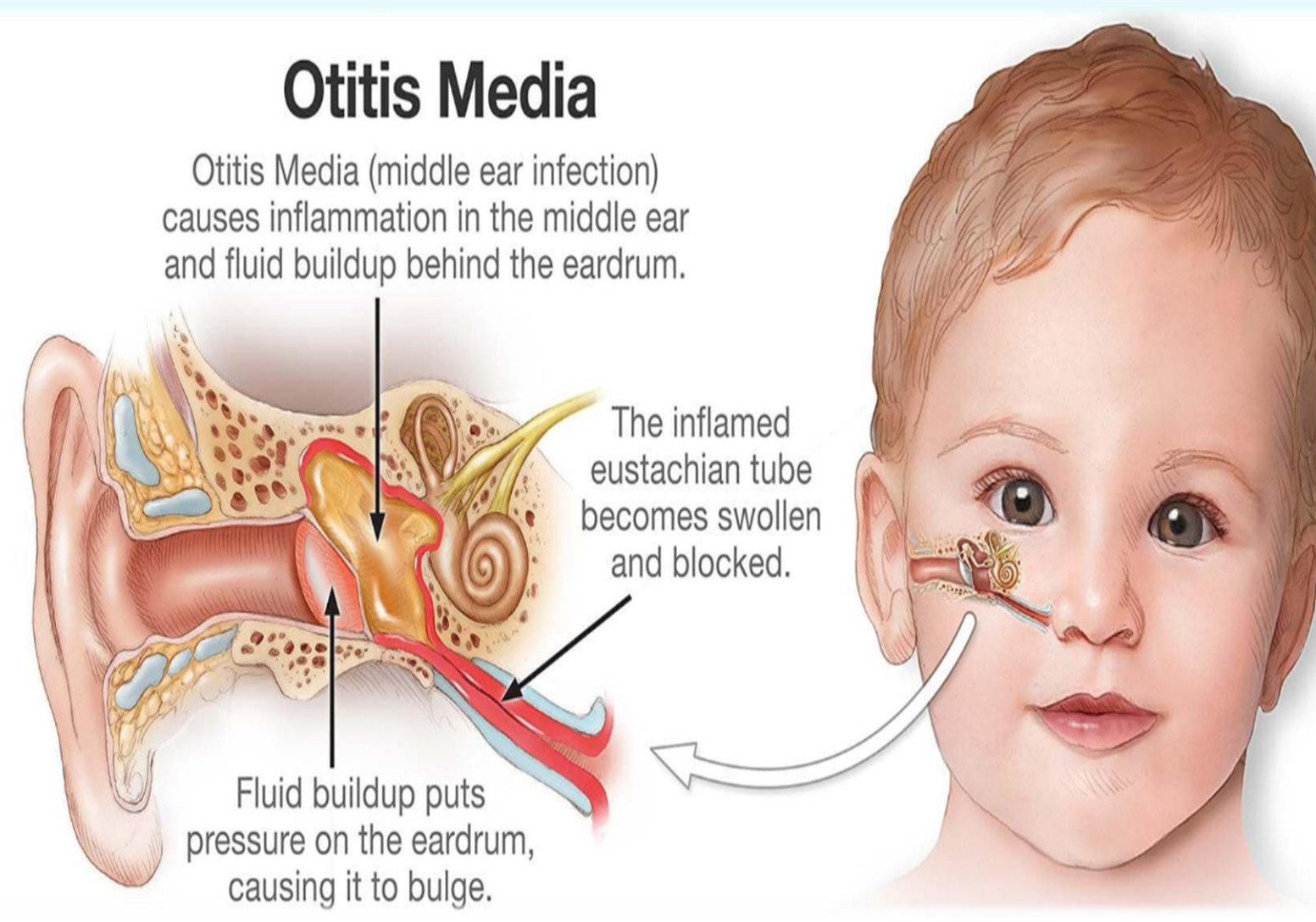
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Introduction

- Otitis media (OM) is an inflammation of the middle ear, often caused by bacterial or viral pathogens, leading to ear pain, fluid buildup, and possible hearing loss.
- Leading cause of antibiotic prescriptions and surgery among children.
- As per WHO, 50% of permanent hearing loss cases are caused by OM.
- Australian Indigenous children suffer chronic middle ear infections at amongst the highest rates in the developed world.



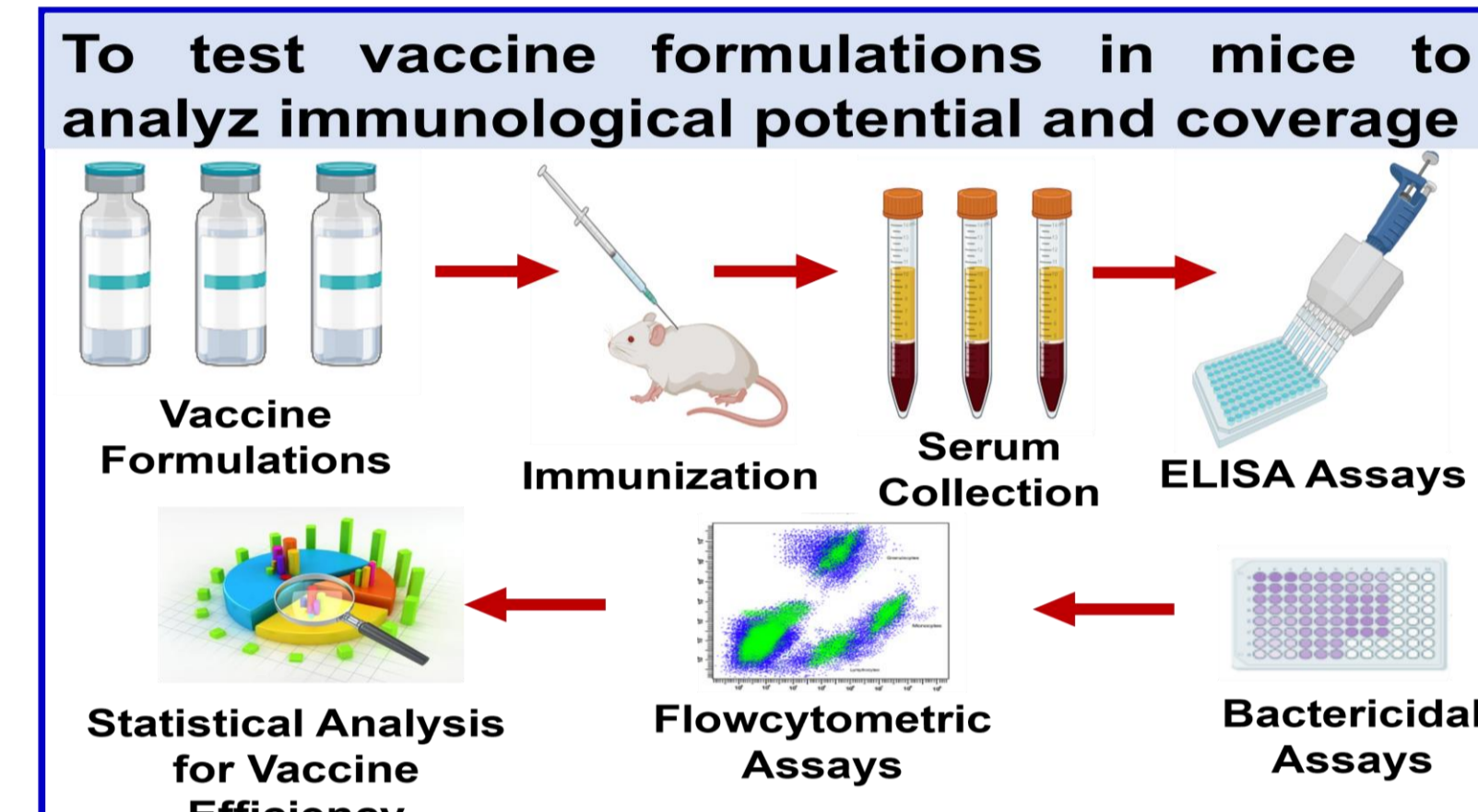
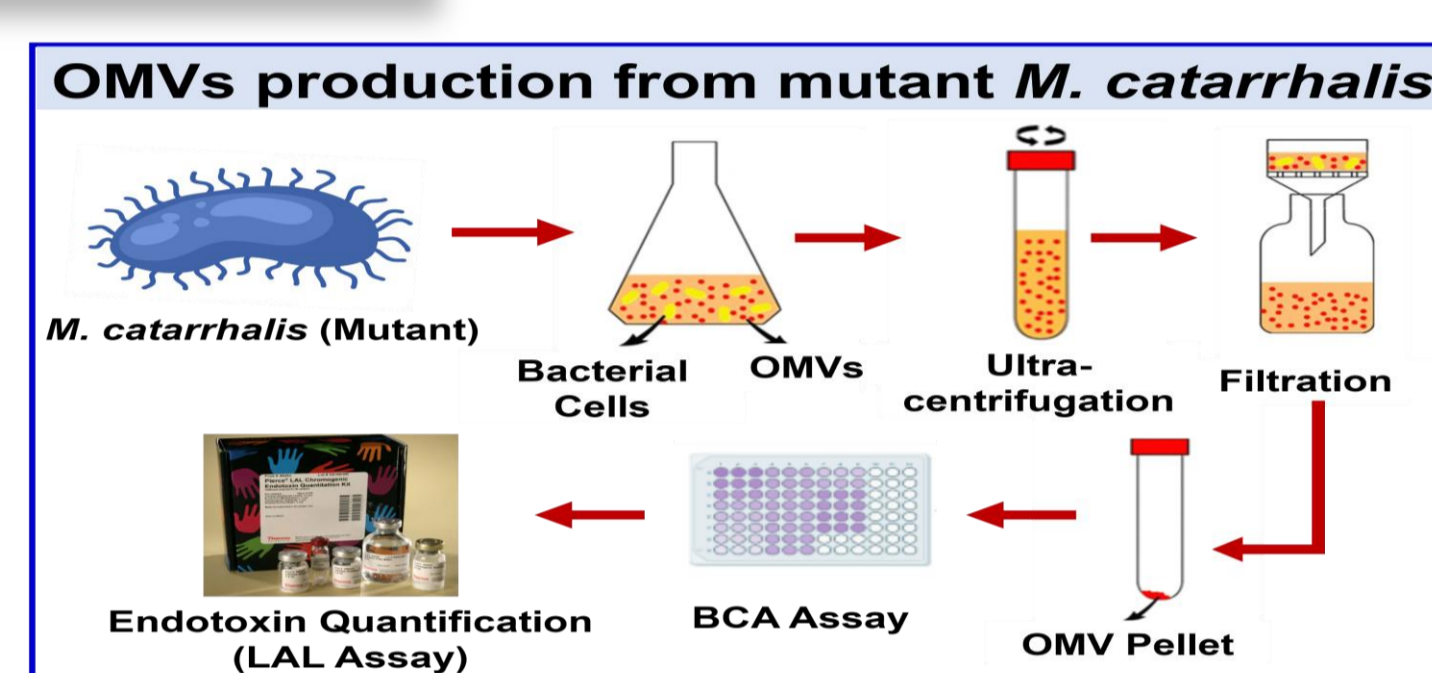
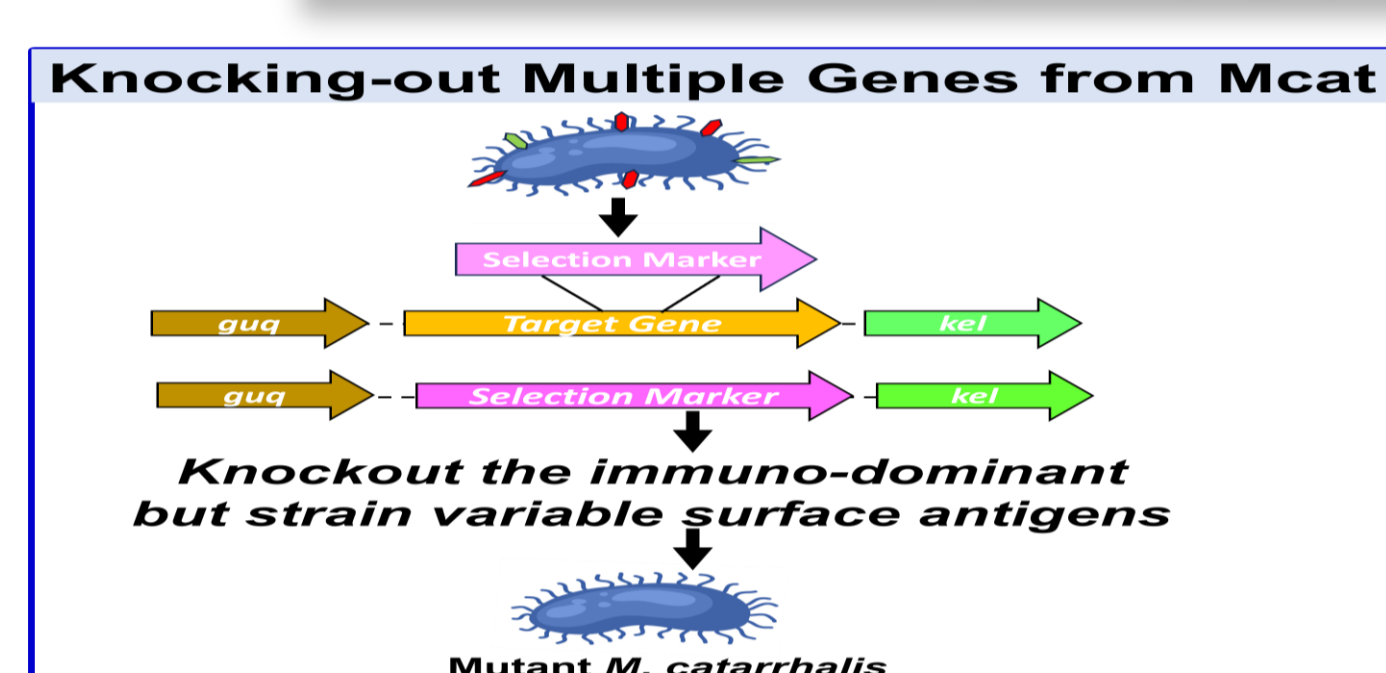
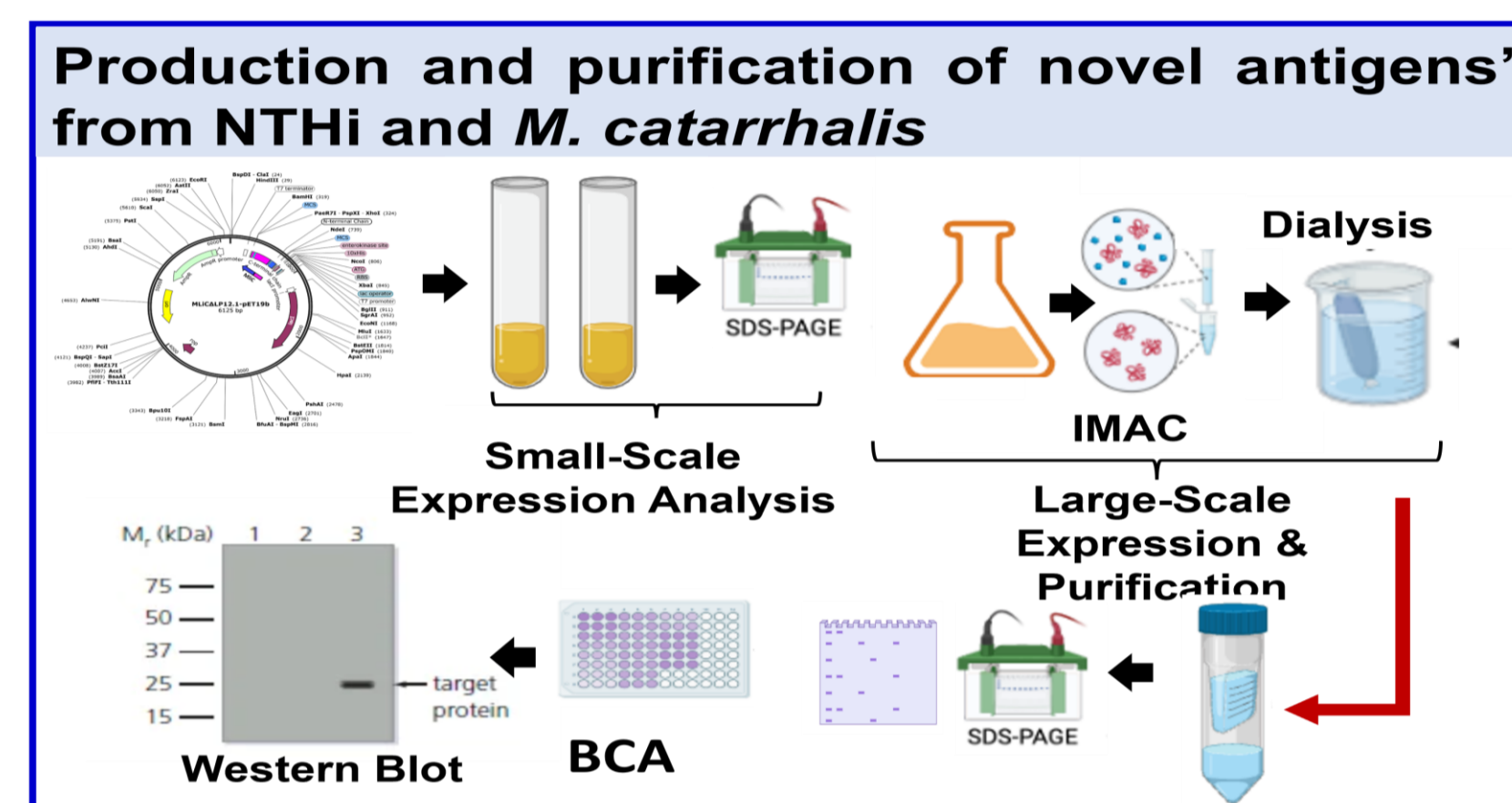
Research Problem

- High Disease Morbidity
- Frequent use of antibiotics for OM is leading to alarming rise in AMR among causative bacteria
- No Specific Licensed Vaccines for OM
- Lack of good target antigens for *M. catarrhalis*

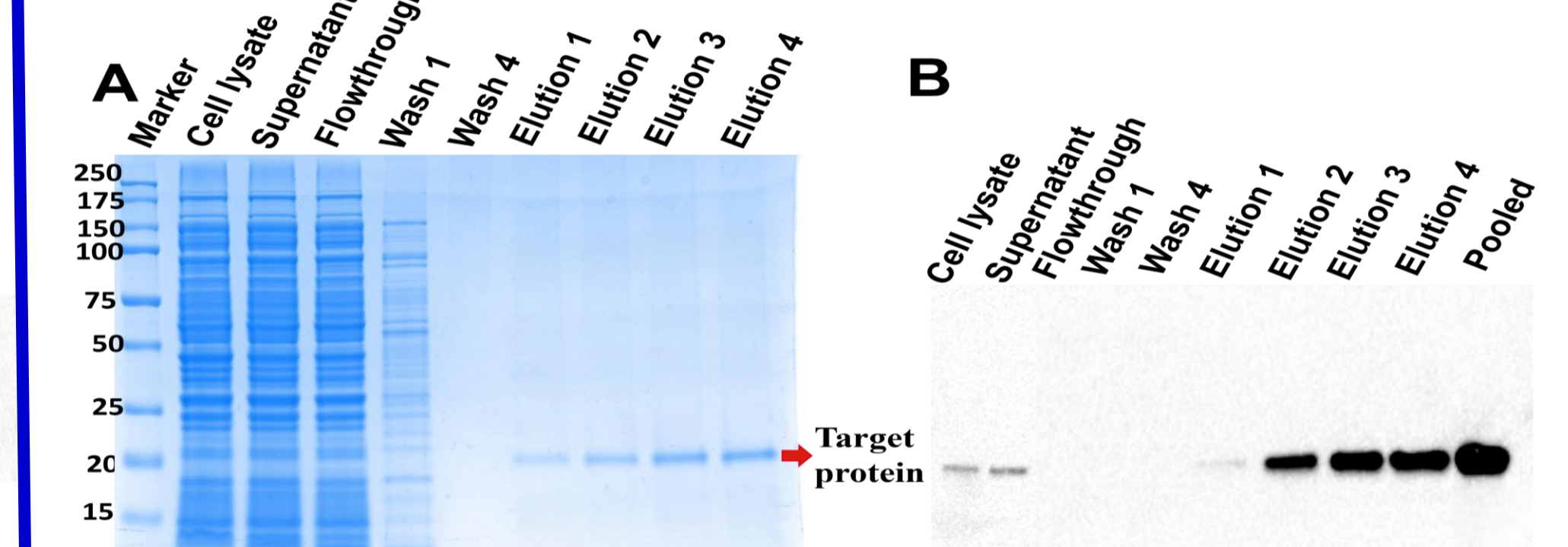
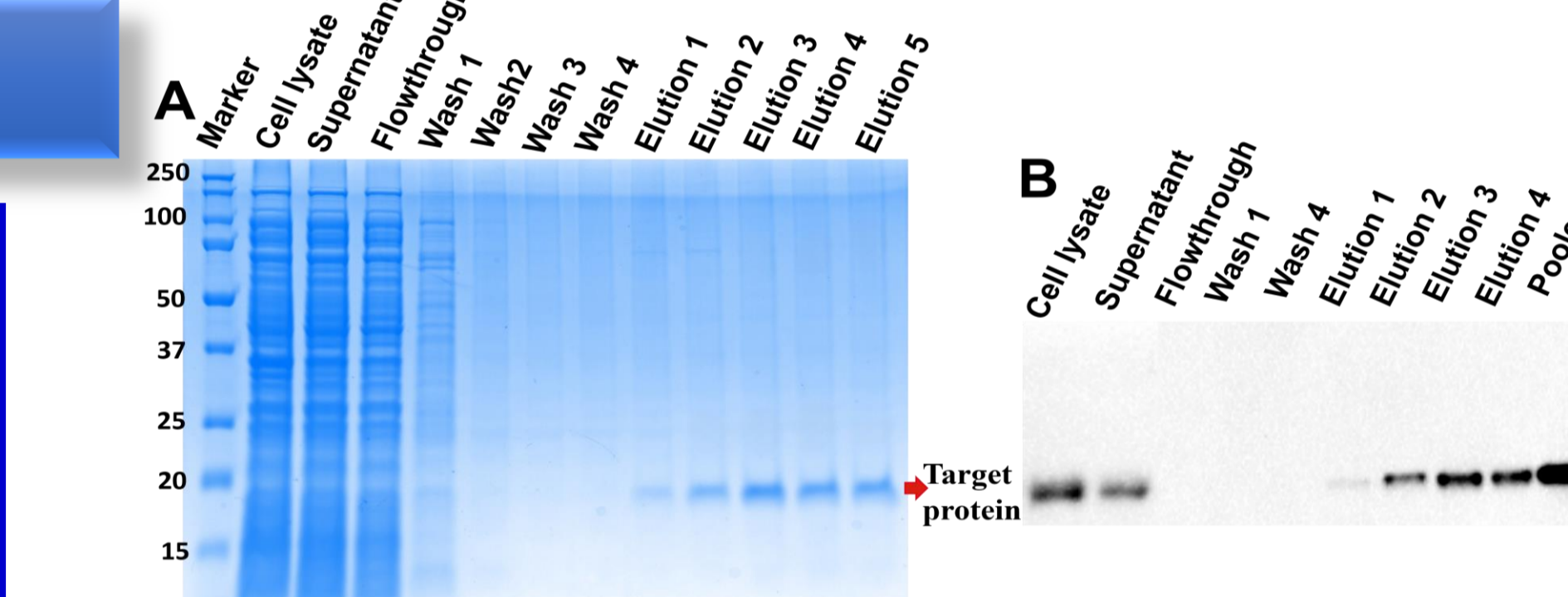
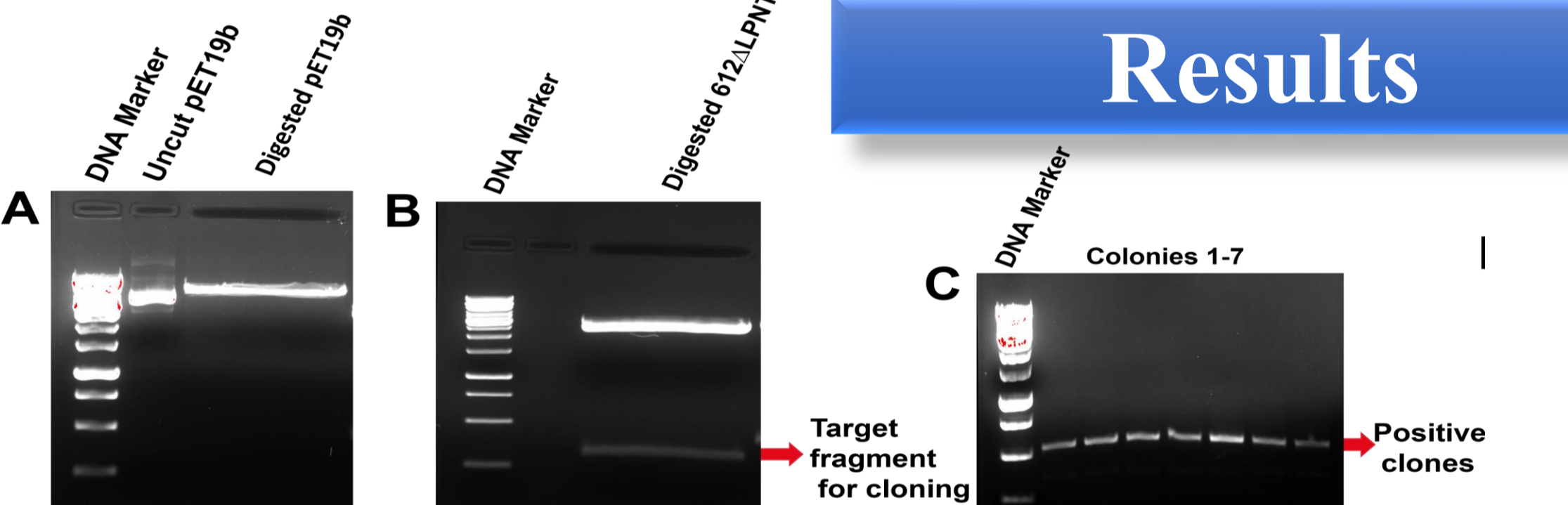
Project Objective

The overall aim of this project is to develop an effective multi-component vaccine comprising **novel protein antigens** and **genetically modified outer-membrane vesicles** to provide better disease coverage and vaccine efficacy, thereby drastically reducing middle ear infections in Australian Indigenous children and all children in general.

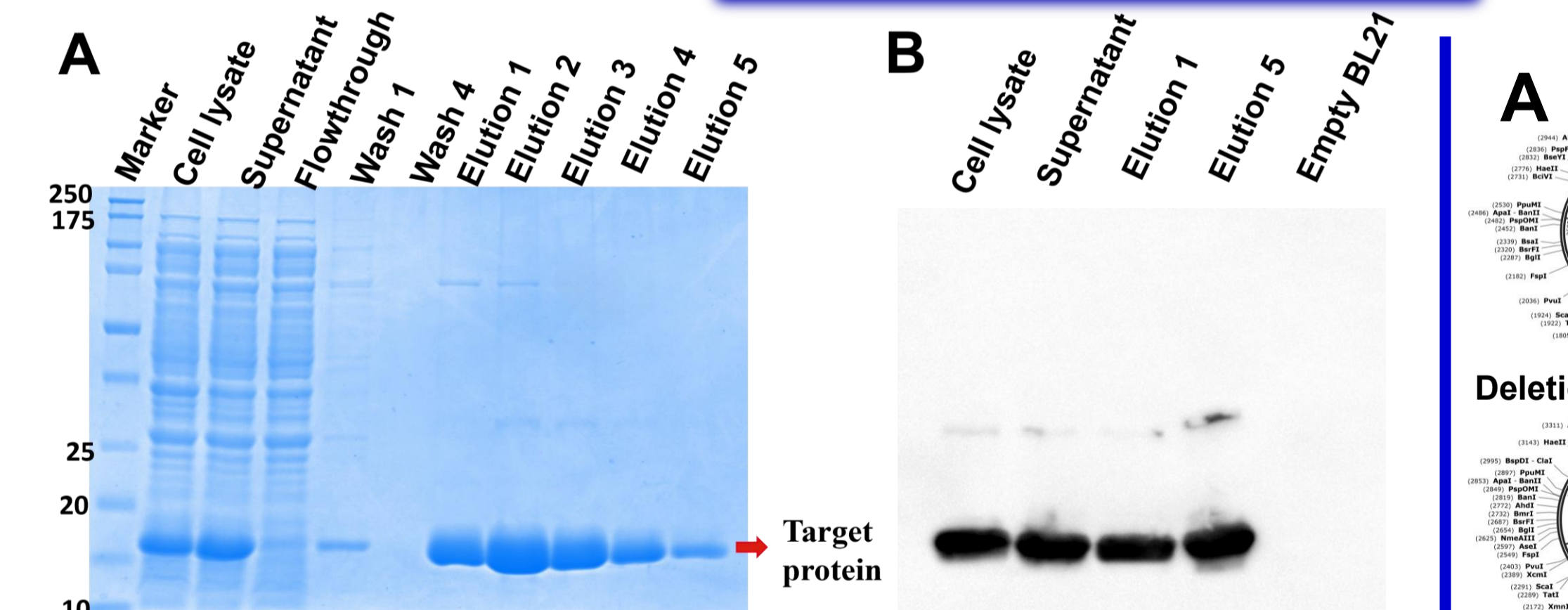
Methods



Results



Constructs Development



Protein Expression and purification of Mcat antigen A

Protein Expression and purification of Mcat antigen B

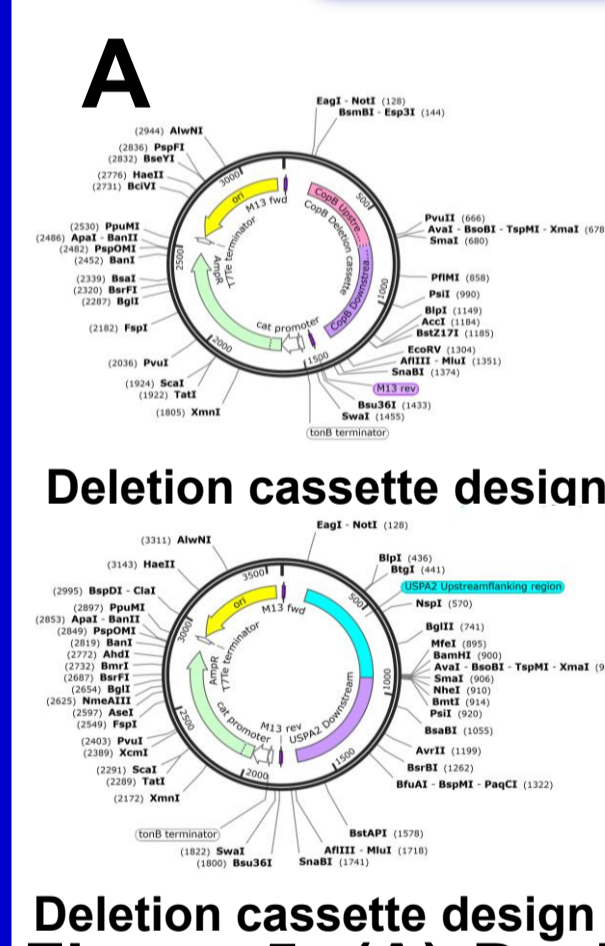
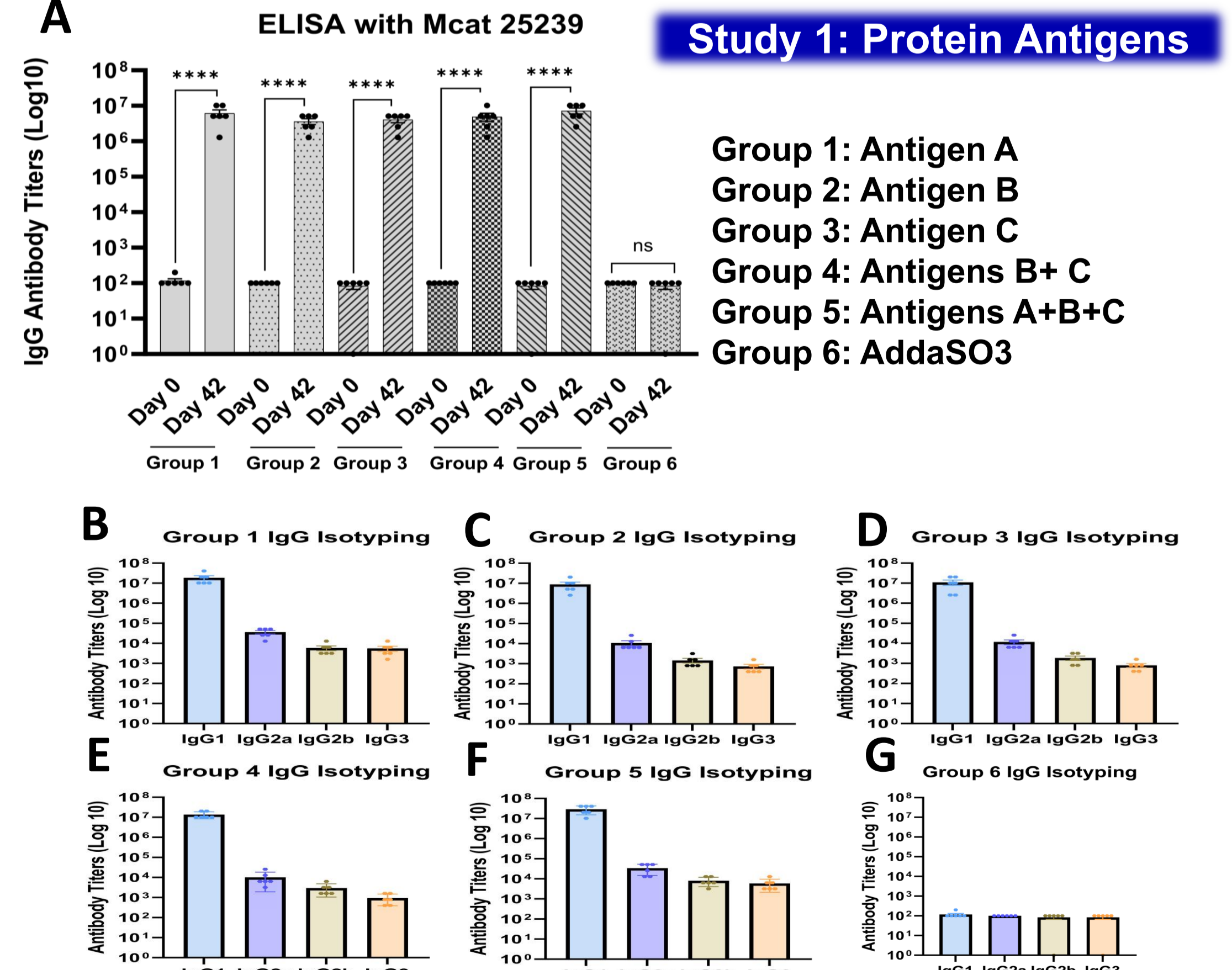


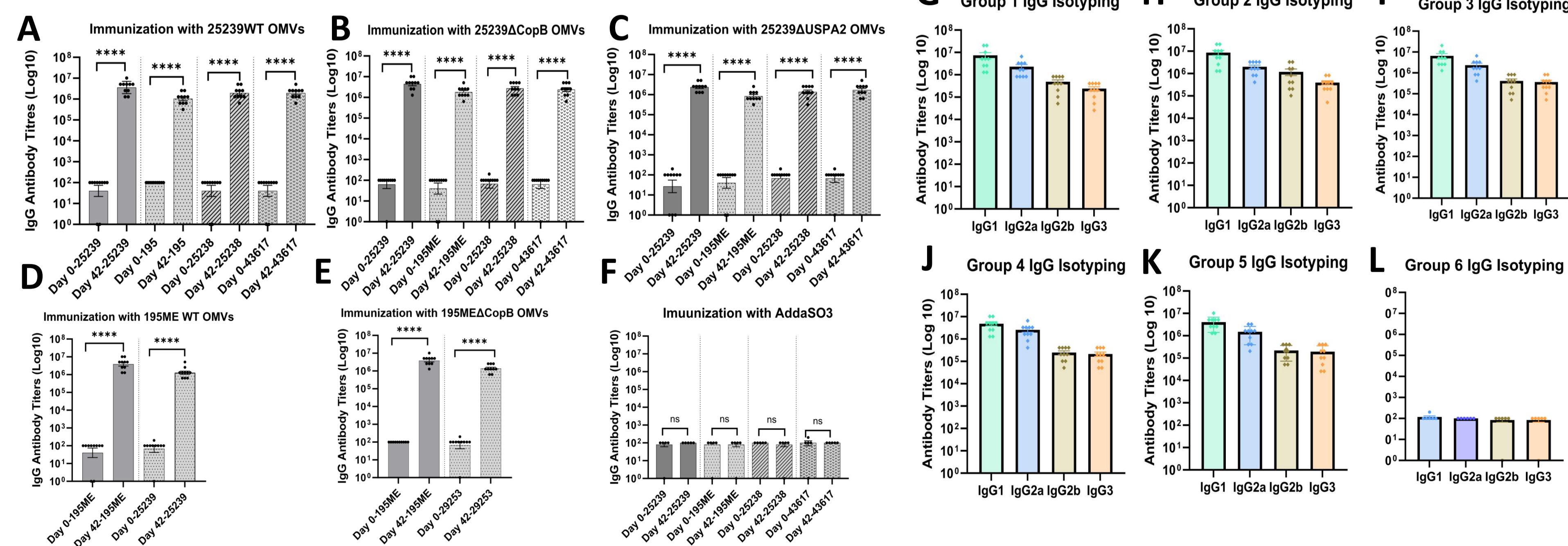
Figure 5: (A) Design of the deletion construct for immuno-dominant genes of *Mcat*. (B, C) Digestion of deletion cassette and vector containing selection marker. (D) The image shows growth of positive clones in the presence of selection marker. (E) The image shows positive colony PCR using specific primer pair. (F) SDS gel shows purified OMVs from wild-type and mutant *Mcat*.

Development of Mcat Mutants and OMV Purification

Study 1: Protein Antigens



Study 2: OMV Antigens



Conclusions

Our multicomponent formulation integrates novel recombinant antigens with engineered OMVs to overcome the pathogen diversity that limits current vaccines. Preliminary data indicate strong antibody responses against OM pathogens.

Acknowledgements

We gratefully acknowledge Griffith University for the GUPIRS scholarship and the Earbus Foundation for supporting this research through the Harvey Coates PhD Fellowship.