Application of recombinant lipoprotein platform technology in vaccine development

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Constraint of recombinant protein vaccines

Protein-based vaccines possess very **good safety profile** but their **low immunogenicity** is still a major hurdle for the development of efficient vaccines.

Protein-based vaccines **formulated with an adjuvant** can drive a strong immune response with high immunogenicity, which offer a flexible and simple way to synthesize a vaccine.

Adjuvant-Immunogen

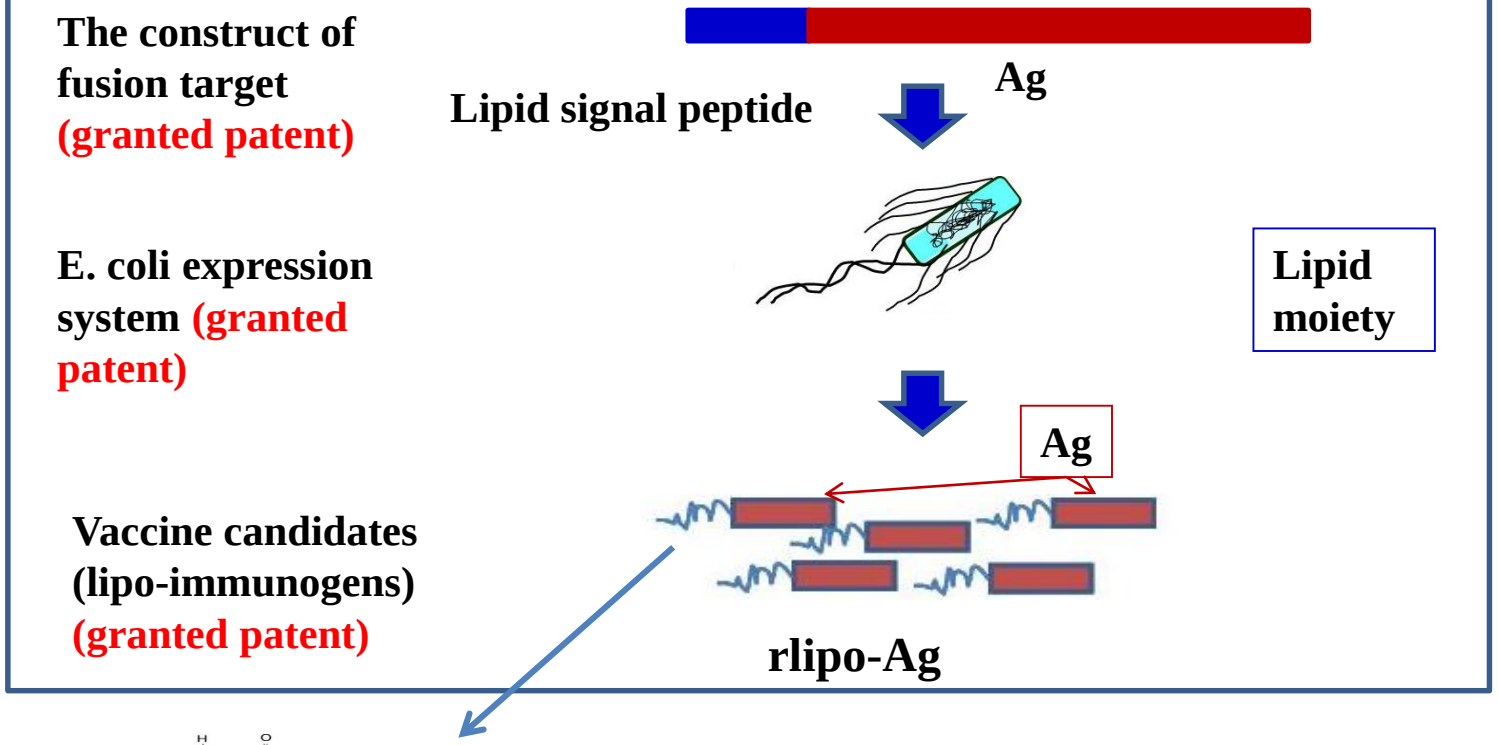
Future Virol. 2012 7(11): 1077–1088

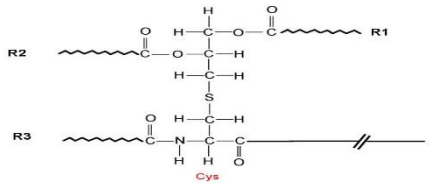
Recombinant lipo-protein technology

The construct of fusion target (granted patent)

E. coli expression system (granted patent)

Vaccine candidates (lipo-immunogens) (granted patent)

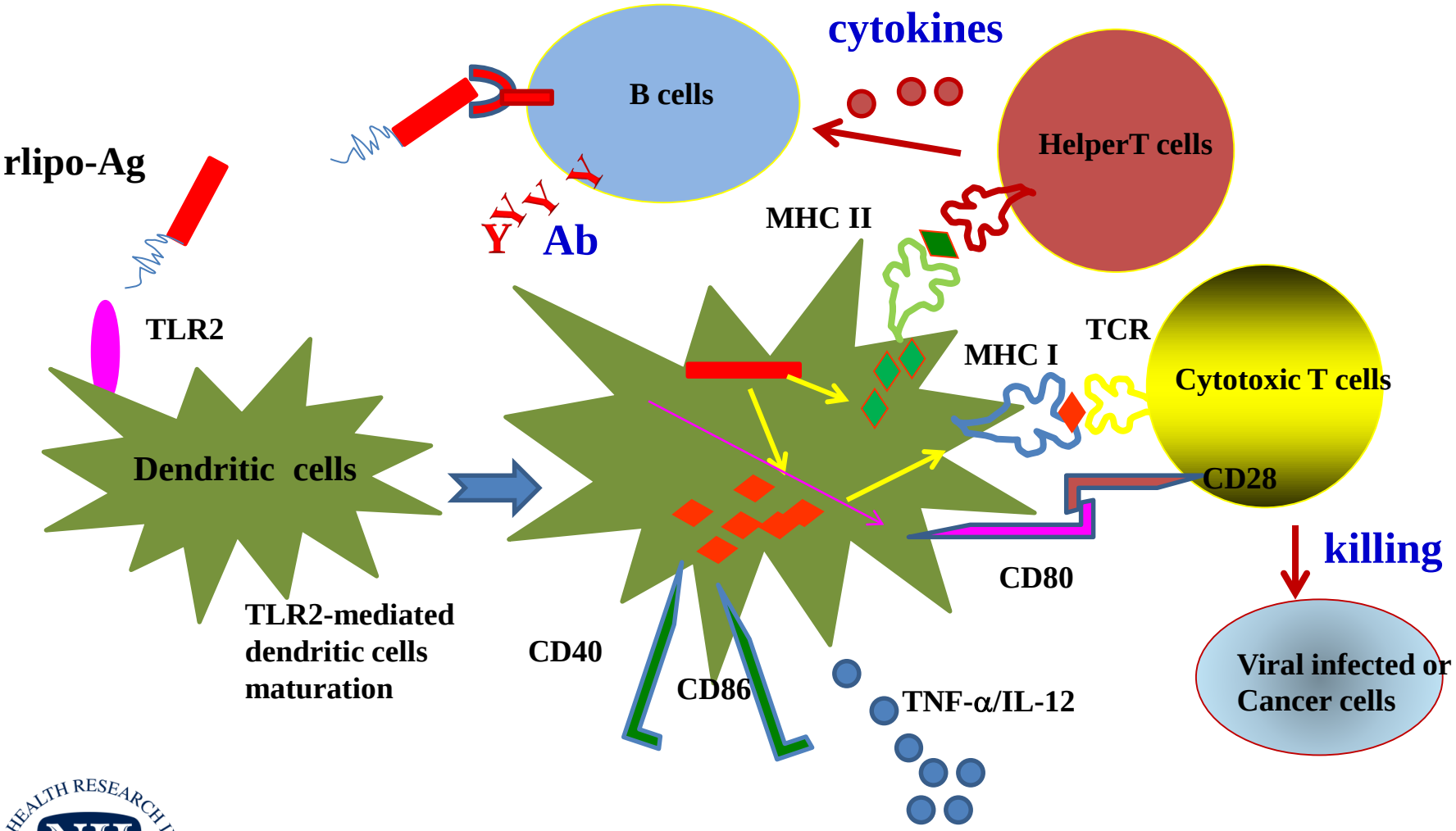




TLR2 ligand

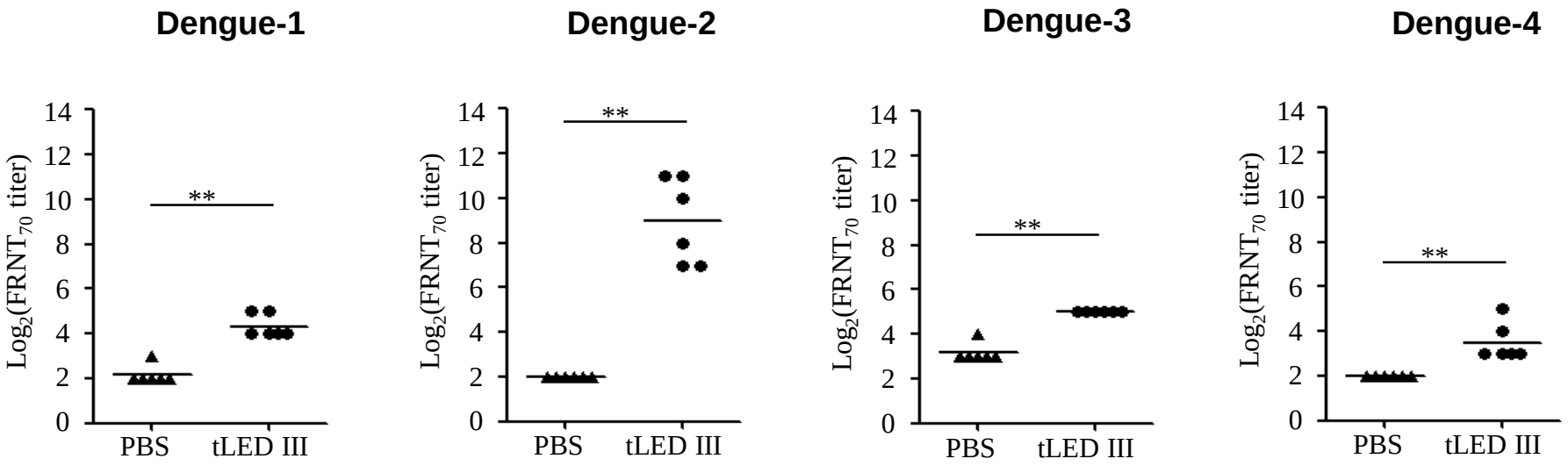
Chen et al. Vaccine, 2009
Leng et al. Mol. Immunol 2010.
Sung et al. Proteomics. 2011

TLR2 agonist-fused antigens increase both humoral and cellular immunity



Application in Dengue vaccine

Neutralizing antibody responses against dengue virus in mice following immunization with tetravalent recombinant lipidated dengue envelope protein domain III

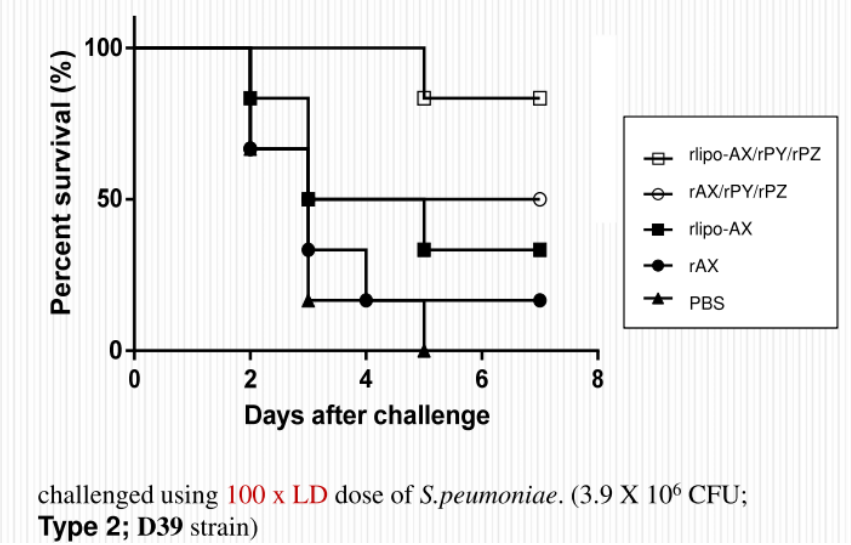


At week 20 after immunization

Chiang et al. Scientific Reports, 2016

Application in bacterial vaccines

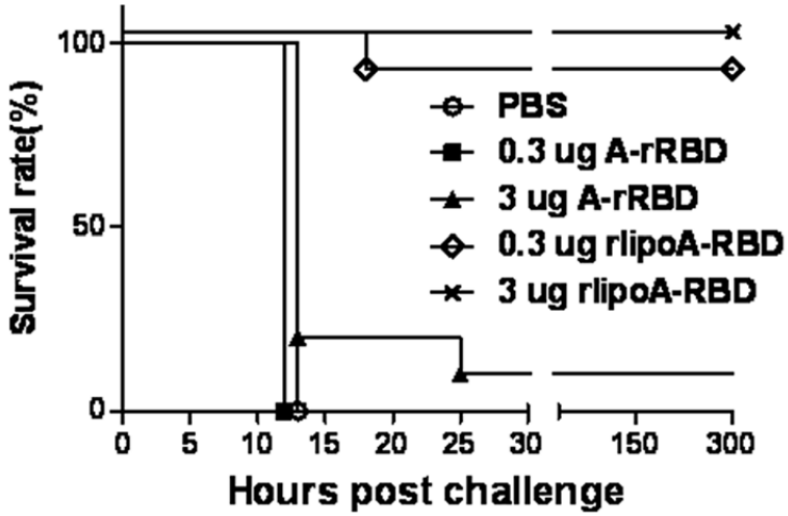
rlipo-AX/rPY/rPZ induced protection against high lethal dose challenge by *S. pneumoniae*



challenged using 100 x LD dose of *S.peumoniae*. (3.9 X 10^6 CFU; **Type 2; D39** strain)

Unpublished results

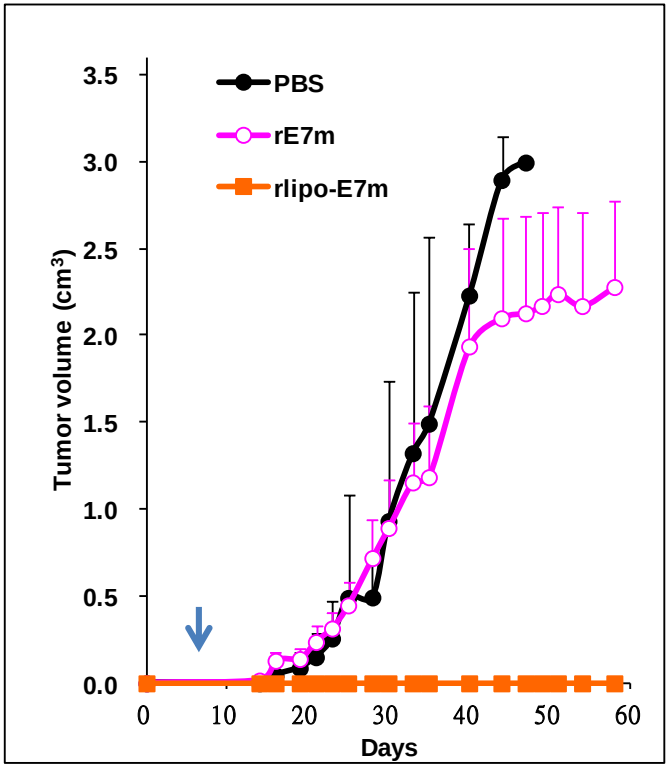
rlipoA-RBD induced protection against lethal TcdA of *C. difficile* challenge



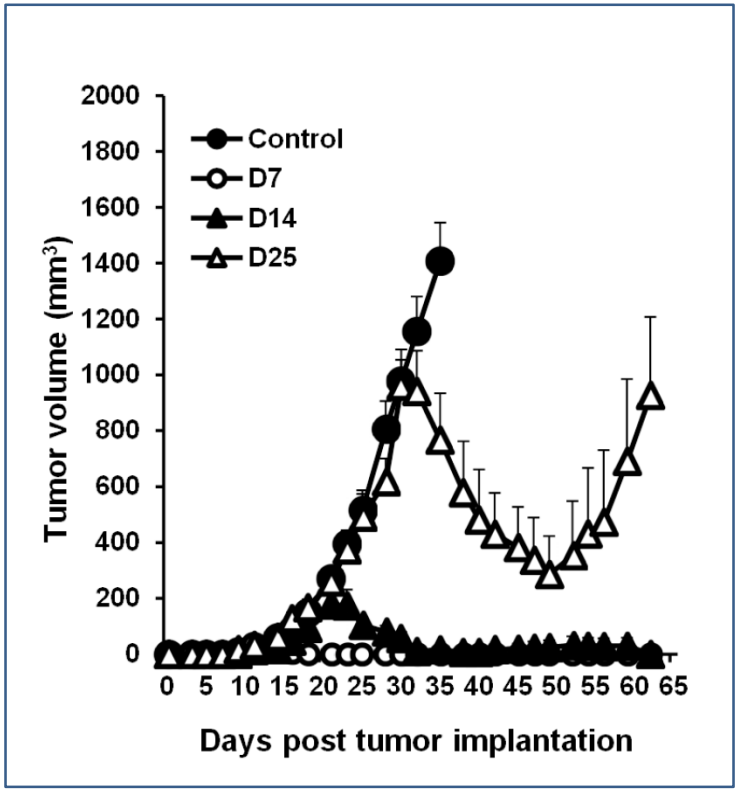
Huang et al. J. BioMed. Sci, 2015

Application in cancer vaccines

Single dose at day 7 inhibited tumor growth



Treatment with rlipo-E7m/CpG at day 7, 14 or 25



Tumor: TC-1 (HPV E7-expressed cells)

Huang CY, et. al. PLoS ONE, 2012

Chang et al. Mol. Cancer. 2014

Advantages

1. **High-immunogenicity with intrinsic adjuvant activity.**
2. **Products contain lipoproteins have been approved by FDA. i.e.LYMErix®; TRUMENBA®**
3. **Complete IP protection.**
4. **Meningococcal Group B vaccine (MGBvac) has been approved by Taiwan FDA for IND.**
5. **High safety profile.**

Potential Application