KDDF
Korea Drug Development Fund

Asset #15
Weill Cornell Medicine

Inflammasome Agonist Proteins for Vaccine and Immunotherapy

Therapeutic Area	Immunology, Oncology	**Indications**	Cancer
Modality	Protein	**Development Stage**	Target Identification/Validation

Overview

Background

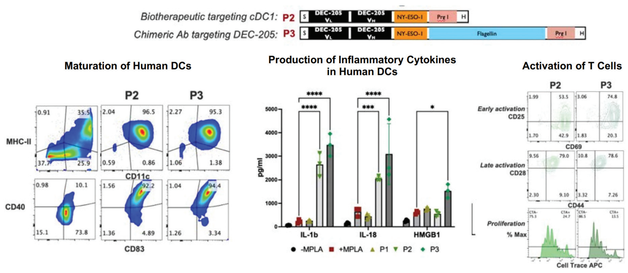
- Immunity is driven by two types of adaptive immune responses: The cell-mediated immune response and the humoral immune response
- The generation of adaptive immunity depends not only on exposure to an antigen, but also the context in which the antigen is encountered
- In cancer, the immunosuppressive tumor bed is a formidable barrier against cancer vaccines and immunotherapy like immune checkpoint blockade
- Adjuvants are used in conjunction with an antigen to enhance antigen-specific immune response
- However, traditional aluminum salt and oil-based adjuvants are often ineffective in boosting the immune response to therapeutic cancer vaccines or in immunocompromised individuals

Technology Advantages

- Protein adjuvants are amenable to multiple delivery systems and to different cell types including tumors
- Protein adjuvants may be delivered in vaccine formulations or as chimeric antibodies in- or ex-vivo
- Adjuvants target inflammasome for stronger immunogenic effect than current adjuvants
- Controlled activation of inflammation by specifically targeting NLRC4 inflammasome

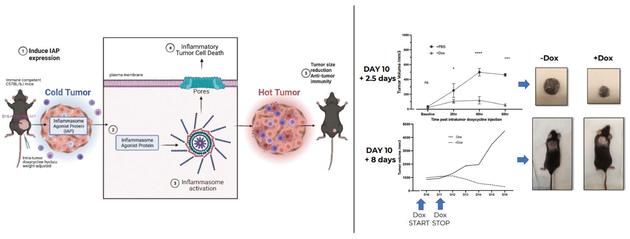
Key Data

Effects of chimeric antibody-based biotherapeutic consisting of Needle Protein on human dendric cells



Top: Schematic of chimeric antibody-based biotherapeutic consisting of Needle Protein PrgI, tumor associated antigen *NY-ESO-1*, with or without Flagellin fused to the single-chain variable fragment. Treatment of DCs with chimeric antibodies induced **Left**: DC maturation, as indicated by increased MHC-II and T-cell costimulatory CD40 and CD86 **Middle**: DC production of inflammatory cytokines IL-1β and IL-18, and HMGB1 **Right**: DC activation of NY-ESO-1 tumor antigen-specific T cells.

Needle proteins reduce tumor volume of melanoma cells in mice



Left: Schematic of inflammasome agonists mediating anti-tumor immunity **Right**: Expression of Needle proteins reduced tumor volume in mice inoculated via subcutaneous injection of melanoma cells. Melanoma cells are transduced with a dox-inducible protein expression system to express Needle proteins. Doxycycline was administered through intratumoral injection.

IP Status & Publication(s)

Intellectual Property

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PCT-US2022-012167 (2022.01.12)

Patent Family
PCT

Publication(s)

- N/A