Docket #: S19-243

PD-L1 Antibody Fragments Conjugated to PEG-PLGA Nanoparticles

Researchers in the Felsher Lab at Stanford University have developed PD-L1 antibody fragment-conjugated nanoparticles to improve upon existing cancer immunotherapies and extend the range of indications to solid tumors.

Immunotherapy is currently the leading-edge technology in cancer treatment. The FDA has approved antibody therapies that block the interaction of PD-1 and PD-L1 for several tumor indications. However, this form of cancer immunotherapy has not been highly efficacious against solid tumors. This is largely due to the short half-life of antibodies, poor tumor targeting, and off-target toxicities. To improve upon this existing therapeutic, researchers at Stanford have developed PD-L1 antibody fragment-conjugated PEG-PGLA nanoparticles (NPs) for use against solid tumors.

PEG-PGLA (poly(ethylene glycol)-poly(lactic-co-glycolic acid)) NPs are FDA approved, water-soluble, and biocompatible. By attaching PD-L1 antibody fragments to the PEG-PGLA NPs, researchers were able to improve circulation of the therapeutic in mice. When mice bearing solid tumors were treated with NPs, tumor growth was delayed as compared to standard PD-L1 antibody treatment. Given these results, researchers believe that this treatment could be effective against a variety of solid tumors, including hepatocellular carcinoma.

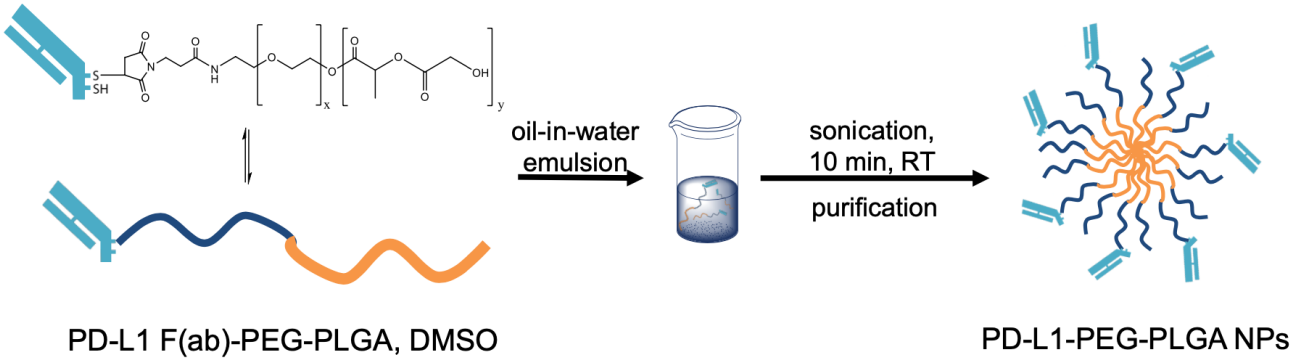

Figure 1. PD-L1-PEG-PGLA nanoparticle formation. PD-L1 antibody fragments are covalently attached to PEG-PGLA monomers. Monomers are then incubated and purified to form PD-L1-PEG-PGLA nanoparticles. Figure courtesy Felsher Lab.

Stage of Development

- Proof of concept – *in vivo* mouse model

Applications

- Hepatocellular carcinoma
- Solid tumors

Advantages

- Improved biodistribution and half-life of therapeutic molecule
- PEG-PLGA nanoparticles are already FDA approved
- Can load multiple therapeutic molecules onto a single nanoparticle
- Can actively target tumors using tumor-specific ligands

Patents

- Published Application: WO2021178949
- Published Application: 20230086800

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