Docket #: S22-100

Monoclonal Antibodies for Targeting the Cardiac Conduction System

Stanford scientists developed Cardiac Conduction System (CCS) targeting monoclonal antibodies. These antibodies can be used as either optical imaging agents consisting of two monoclonal Fab fragments covalently conjugated to a benign, near-infrared (NIR) dye or effective CCS targeting vehicles for drug delivery.

The cardiac conduction system (CCS) comprises specialized heart cells responsible for the rhythmic contraction of the heart. Intraoperative CCS damage increases morbidity, treatment costs, decreases long-term survival, and often necessitates life-long use of mechanical pacemakers. Intraoperative CCS damage is partly due to an inability to visualize and, thus, avoid damaging the surrounding CCS. Despite this problem, there exists no intraoperative method for surgeons to detect the CCS apart from using anatomical landmarks to guess the approximate location of the CCS.

Stanford scientists, therefore, developed CCS optical imaging agents comprising two monoclonal Fab fragments generated by phage-display panning against human contactin-2 protein and are covalently conjugated to a benign, near-infrared (NIR) dye. The monoclonal Fab also demonstrated efficacy as a CCS targeting vehicle for drug delivery when a cellular toxin saporin was conjugated to the monoclonal Fab for eliminating CCS cells.

Stage of Development

- Proof of Concept

Applications

- Visualization of the CCS in vivo
- Targeting the CCS in vivo

Advantages

- No other existing methods, devices, or materials allow for visualizing or targeting the CCS.
- The technology is noninvasive.
- Monoclonal antibodies can be administered either systemically.

Patents

- Published Application: WO2023183288
- Published Application: 20250332291

Innovators

- Sean Wu
- William Goodyer

Licensing Contact

Kimberly Griffin

Technology Licensing and Strategic Alliances Manager

Email