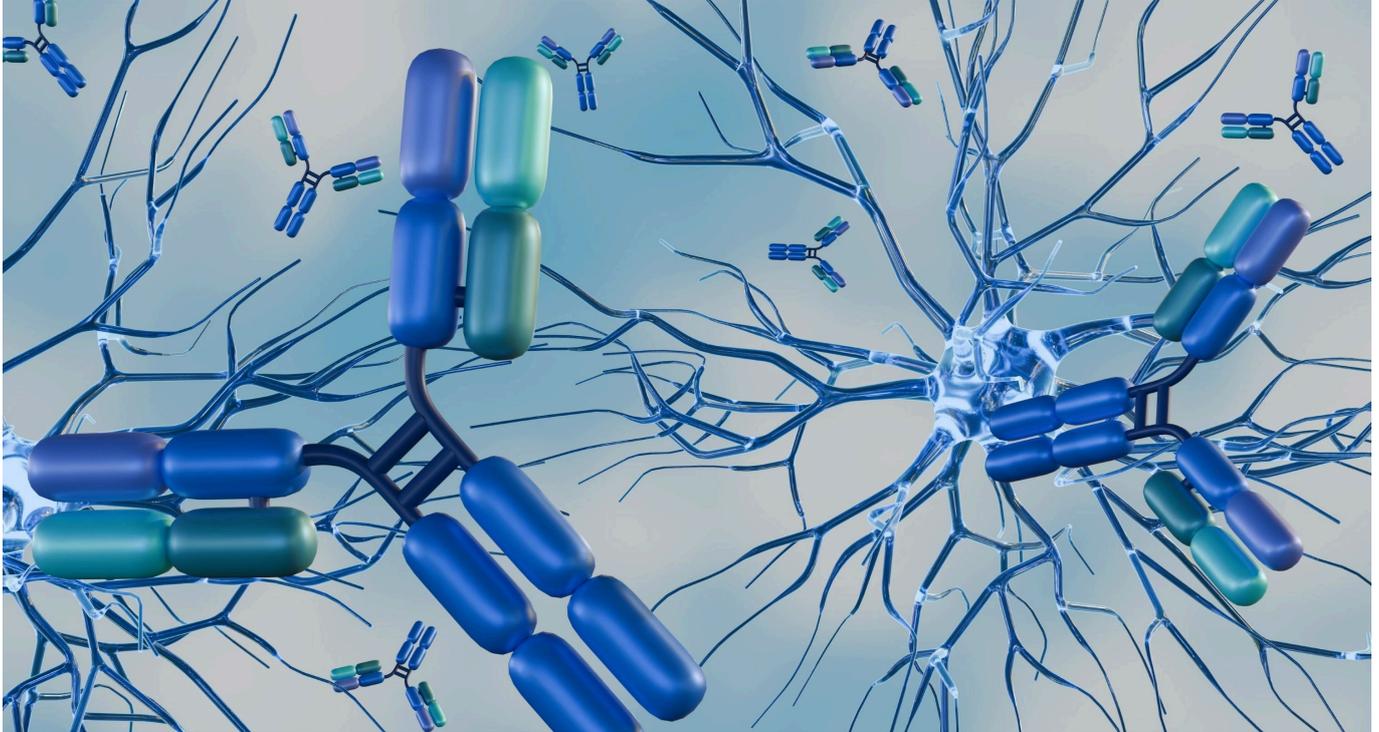**TECH OFFER**

An Antibody Target for Rapid Diagnosis of Liver Fluke Infection

KEY INFORMATION

TECHNOLOGY CATEGORY:

Healthcare - Diagnostics

Healthcare - Medical Devices

Healthcare - Pharmaceuticals & Therapeutics

TECHNOLOGY READINESS LEVEL (TRL): **TRL4**

COUNTRY: **THAILAND**

ID NUMBER: **TO175277**

OVERVIEW

Liver Fluke Infection (*Opisthorchis viverrine*) caused by the ingestion of raw or uncooked fish containing parasitic worms is a significant health problem in several countries, especially Southeast Asia. This infection while not deadly, can cause acute gastro-hepatic inflammation and long-term infection leading to carcinogenesis of an aggressive bile duct cancer (Cholangiocarcinoma-CCA) if left undiagnosed and untreated. The lifespan of the human liver fluke ranges from 9 to 13.5 years. Hence, early diagnosis of *O. viverrini* infection is valuable in preventing the infection from worsening and causing complications. Current diagnostic method uses stool examination (restricted by low parasite egg numbers in the specimen), imaging tests of liver and blood tests for antibodies.

Cysteine protease is a group of protease enzymes characterized in numerous infectious pathogens. This technology has discovered a single-chain variable fragment (scFv) antibody target against cathepsin F of *O. viverrini (OvCatF)* by using phage display technologies. Cathepsin F is an enzyme with a half-life that is highly released during the infection, detecting this protein

could reflect the current infection. This novel scFv antibody holds great potential in the field of parasitology and infectious diseases, and the characterization of their immunological properties could pave the way for the development of an effective rapid diagnostic kit in the future.

The technology owner is seeking for medical device companies to develop this potential target as a practical diagnostic procedure for *O. viverrini* infection in humans in the future.

TECHNOLOGY FEATURES & SPECIFICATIONS

This invention is a mouse single-chain variable fragment (scFv) antibody that specifically recognizes the epitope on the cathepsin F protein of the human liver fluke *Opisthorchis viverrini (OvCatF)* on amino acid residues 11 to 30. This scFv antibody contains variable fragments (Fv) of both heavy chain (VH) and light chain (VL), which are connected by a disulfide bond to form a single chain. This scFv antibody is selected by biopanning from the murine naïve single-chain variable fragments (scFv) library and produced by recombinant protein technologies. The ultimate objective of this invention is to develop an effective diagnostic tool for opisthorchiasis and cholangiocarcinoma in the future.

POTENTIAL APPLICATIONS

- Antibody for development and diagnosis of *Opisthorchis viverrini* infection and cholangiocarcinoma (bile duct cancer).
- Therapeutic antibody for *Opisthorchis viverrini* infection.

UNIQUE VALUE PROPOSITION

The UVP of this developed scFv antibody is such that it recognizes specific epitopes that have never been used, conserves less than the other parasites, and make low cross-reactivities. The evaluation of specific recognition of the particular epitopes and detection limits by both computational and laboratory performances demonstrated that the selected recombinant scFv antibodies against *OvCatF* could bind specifically to *rOvCatF*, and the lowest detection concentration in the study was only 100ng. This target antibody candiate has the potential to be commercialised for early rapid diagnosis of parasitic infectious disease through the development of a rapid test kit.