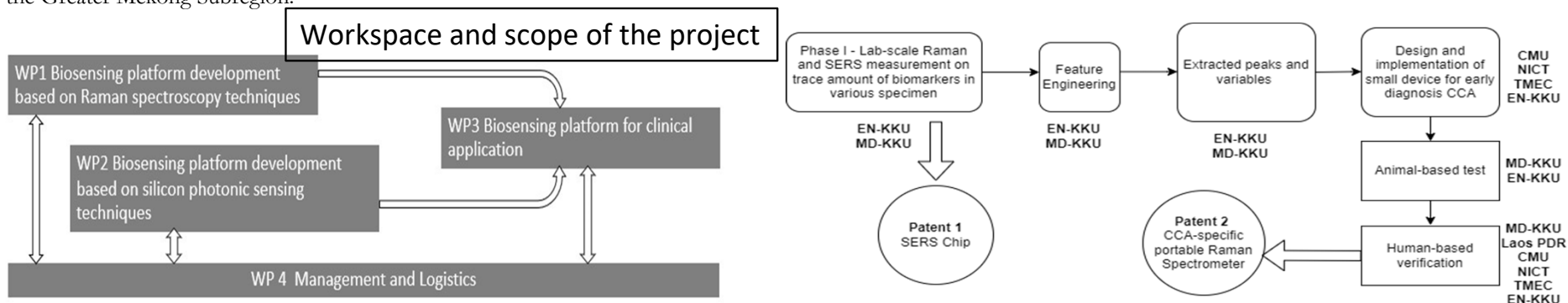


Introduction :

Cholangiocarcinoma (CCA) has high occurrence in Greater Mekong Subregion, especially in the northeastern Thailand and Laos PDR where the human liver fluke, *Opisthorchis viverrini* infection is endemic. CCA patients usually present at the advanced stage and have short survival outcome after surgery **because no biomarker is available.**

The diagnosis of CCA is based on radiology and histopathological confirmation, which is high cost and time-consuming. Several biomarkers of CCA have been discovered in animal models and successfully verified in patients for clinical application. Biosensor platforms using photonic and electrochemical detector technology allows for a high degree of integration that facilitates from the device and sensor research laboratories into the hands of the analytical chemistry and clinical medicine communities for large-scale detection in various samples such as urine, faeces and sera. We hypothesize that using biosensing platforms to discover trace amounts of CCA biomarker in animal models could be translated into clinical application in patients. The Faculty of Medicine, KKU, Thailand (MD-KKU) signed an MOU with The National Institute of Information and Communications Technology, Japan (NICT) in 2019 and agreed to enter into a formal collaborative agreement. In order to sustain this, intends to develop different optical and electrochemical sensing technologies for CCA diagnosis. MD-KKU has existing collaborations with Department of Computer Engineering (EN-KKU), Faculty of Engineering (Chiang Mai University, CMU), Thai Microelectronics Center (TMEC) and NICT, Japan in developing optical and electrochemical sensing technologies. We also have a collaboration with Cancer Center, Lao PDR. The networking between Thailand–Laos, closely supported by NICT, will have high success for the sensing technologies to create wider impact in CCA diagnosis, not only for technical development, but also for societal impact in the Greater Mekong Subregion.



Workspace of project management. The conceptual of project consisting of four workspaces.

Diagram: Scopes and aims of this work. Targets: Develop a portable sensing device for early diagnosis CCA based on animal-based discovery and then will verify in CCA patient.

Project Members :

Project members include of 4 institutes from 3 countries, Thailand, Lao and Japan as following.

KKU (THA): Somchai Pinlaor, Chavis Srichan, Pobporn Danvirutai, Kitti Intuyod, Apisit Chaidee, Sirinapha Klungsaeng

CMU (THA): Ukrit Mankong, Suruk Udomsom

Mittaphab Hospital (LAO): Champadeng Vongdala, Keoudone Thammavong

NICT (JPN): Toshimasa Umezawa, Atsushi Matsumoto, Kouichi Akahane