THE INSTITUTE OF MEDICAL SCIENCE
THE UNIVERSITY OF TOKYO

February 13th, 2018

The Institute of Medical Science, The University of Tokyo

The University of Tokyo signs a patent license agreement on its oncology diagnostic technology with Abbott Laboratories

The Institute of Medical Science at the University of Tokyo (Dean: Yoshinori Murakami) has developed a new diagnostic technology that enables the early diagnosis of bladder cancer and liver cancer on the basis of comprehensive strategic collaborative research with Abbott Laboratories, a diagnostic product development company headquartered in Chicago, Illinois, United States (hereinafter referred to as "Abbott"). In order to facilitate early clinical use, the Institute has signed an exclusive license agreement with Abbott on the use of a patent and antibody relevant to the technology. The agreement was concluded through Todai TLO, Ltd., a subsidiary of the University of Tokyo that supports industry-academia collaborations.

Japan Patent Number：5754844
Title of invention: Examination method and examination kit for urological cancer
Right holders: The University of Tokyo, Kochi University
Registration date: June 5, 2015

Publication number: WO2017057778 (A3), US2017089905
Title of invention: METHODS OF DIAGNOSING HEPATOCELLULAR CARCINOMA AND PANCREATIC CANCER
Applicants: The University of Tokyo, Abbott Japan Co., Ltd.
Application date: April 6, 2017

Publication number: WO2014027701 (A1), JP2015527562, US20144045196 (A1), CN104755935
Title of invention: METHODS OF PROGNOSIS AND DIAGNOSIS OF CANCER
Applicants: The University of Tokyo, Abbott Japan Co., Ltd.
Application date: May 20, 2016

Descriptions of the licensed technology, method, and antibody
At the Division of Cancer Cell Research, the Institute of Medical Science, the University of Tokyo, Prof. Motoharu Seiki (present: Professor Emeritus of the University of Tokyo, specially appointed project professor at Kanazawa University) and Dr. Naohiko Koshikawa, Associate Professor, (present: Visiting Professor at the Division of Molecular Pathology, Institute of Medical Science, University of Tokyo, and Director of the Cancer Biology Department at the Kanagawa Cancer Center Research Institute) led a research team to investigate laminin γ2 monomer (Note 1), a substance produced only by cancer cells. The team successfully created an antibody (Note 2) specific to the substance. The team began the development of a diagnostic prototype using this antibody as a project within the comprehensive strategic collaborative research agreement (Note 3) with Abbott. Under support by the Adaptable and Seamless Technology Transfer Program (A-STEP) of the Japan Agency for Medical Research and Development (AMED), the team developed a prototype diagnostic kit using the antibody in an automatic chemiluminescent immunoassay system (note 4). A study using the kit by the team and collaborative medical institutions* revealed that the

levels of laminin γ2 monomer were significantly higher in urine samples from patients with bladder cancer (Note 5) and serum samples from patients with hepatocellular carcinoma (Note 6) than those in healthy individuals, suggesting that laminin γ2 monomer is a useful biomarker that facilitates early diagnosis of these diseases. This study was also supported by the Translational Research Network Program and the Project for the Development of Innovative Research on Cancer Therapeutics (P-DIRECT) of the AMED.
* Kochi University, St. Marianna University School of Medicine, Kanazawa University, Kanagawa Cancer Center

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Glossaries

Note 1) Laminin γ2 monomer

Laminins are trimetric proteins containing α, β, and γ polypeptide chains and are found in the basement membrane. Laminin γ2 chain is a component of laminin-332. Koshikawa et al. have reported that malignant tumor cells secrete laminin gamma γ2 monomer (single chain), rather than trimer, and have suggested that this may be used as a tumor marker (5).

Note 2) Antibody specific to laminin γ2 monomer

As laminin γ2 monomer and laminin 332 γ2 chain are translated from the same gene, commonly-used anti-laminin antibodies cannot distinguish these two chains. Koshikawa and Seiki et al. have established an antibody that reacts only to laminin γ2 monomer using a hybridoma that recognizes it as an antigen. It is difficult to produce antibodies specific to a laminin monomer, and no other researchers have reported the successful production of an anti-laminin monomer antibody.

Note 3) Comprehensive strategic collaborative research agreement between the Institute of Medical Science of the University of Tokyo and Abbott Laboratories

The Institute of Medical Science of the University of Tokyo and Abbott Laboratories concluded a comprehensive strategic collaborative research agreement to collaboratively develop novel diagnostics for cancer and infections.

Note 4) Automatic chemiluminescent immunoassay analyzer

This is a fully-automated clinical laboratory equipment that can detect biomarkers in bodily fluids at a high sensitivity and a high-throughput. ARCHITECT, a fully-automated chemiluminescent immunoassay analyzer manufactured by Abbott Laboratories, has been used widely in major hospitals throughout the world.

Note 5) Bladder cancer

In Japan, where the population is aging rapidly, bladder cancer is steadily becoming more common. However, there have been no biomarkers that can detect the disease effectively. As many patients do not visit the clinic until bloody urine or other signs/symptoms develop, bladder cancer is often diagnosed at an advanced stage. A complete cure of bladder cancer is thus difficult. Cystoscopy, an invasive diagnostic procedure using a catheter inserted into the bladder, is painful. Non-invasive, highly sensitive tests to diagnose the disease are eagerly awaited.

Note 6) Hepatocellular carcinoma

A major cause of hepatocellular carcinoma is hepatic inflammation associated with chronic hepatitis virus infection. In Japan, about 60% and 15% of cases of hepatocellular carcinoma are considered to be caused by chronic infection with hepatitis C virus (HCV) and hepatitis B virus (HBV), respectively. The remaining 25% of cases are caused by chronic alcoholic hepatitis or chronic nonalcoholic steatotic hepatitis. Although AFP and PIVKA-II have been used as blood biomarkers for hepatocellular carcinoma, they are not effective in detecting the disease at an early stage. New tumor markers are needed.