

Announcement of establishment of a new subsidiary company  
in collaboration with Theragen Etex Co., Ltd.

We have been conducting development of cancer immunotherapies and TCR/BCR repertoire analysis. To further extend our activity, we are happy to announce establishment of a new subsidiary company, Cancer Precision Medicine Inc. (CPM), which will conduct the genome analysis of cancer, liquid biopsy (※1), and development of new immunotherapy including the neoantigen (※2) prediction.

Cancer is a genetic disease caused by accumulation of somatic alterations, which lead to malignant transformation/progression of normal cells. Therefore, comprehensive analysis of the genetic alterations in cancer cells is critically essential for precise characterization of individual diseases and selection of the most appropriate anti-cancer drugs. This kind of cancer treatment strategy is called “Cancer Precision Medicine”, which is important for cancer prevention and selection of the most appropriate cancer treatment, and will also lead to development of novel types of cancer immunotherapy.

Since April of 2001, Oncotherapy Science Inc. (OTS) has been collaborating with professor Yusuke Nakamura (Institute of Medical Science at the University of Tokyo, present; the University of Chicago) and has identified potent molecular targets that are exclusively over-expressed in tumor tissues throughout molecular profiles of a wide range of cancers.

As the results, OTS has conducted development of novel anti-cancer drugs, including small molecular compounds, cancer-specific peptide vaccines, and monoclonal antibody drugs, which are under assessment of their therapeutic effects in clinical trials including multiple types of cancer. Particularly, OTS has pioneered a cancer immunotherapy field by development of various oncoantigen (※3)-targeting cancer peptide vaccines. In addition, along with rapid advances in the cancer immunotherapy field, OTS has initiated TCR/BCR repertoire analysis service using the next-generation sequencing technologies.

In order to extend our activity for helping cancer patients, OTS establishes CPM in collaboration with Theragen Etex Co., Ltd. (TE) (※4), which has conducted human genome analysis since 2009 and has provided global genome, transcriptome, and epigenome, services since 2011. The experiences and know-hows brought from TE to OTS will allow us to achieve OTS's main aims in the development of effective anti-cancer therapeutics to cure cancer patients.

Because the cancer immunotherapy is one of effective therapeutics for eradicating cancer cells harboring cancer-specific antigens (such as oncoantigens and neoantigens), OTS

transfers its own Tumor Immunology department to CPM for the accelerated development of personalized immunotherapies, such as cancer peptide vaccines, dendritic cell therapies, and T cell-receptor-engineered T cell therapies. In addition, the TE will support CPM by providing next-generation DNA sequencing technologies and their know-hows in the bioinformatics to establish a high capacity DNA sequencing center, which will provide in-depth genetic analysis services for tumor tissues as well as liquid biopsy services for early detection of cancer cells in peripheral blood.

Based on the close collaboration with OTS and TE, the CPM will obtain synergic effects for comprehensive analysis of cancer genome and tumor immunology, and thereby will be able to accelerate the cancer precision medicine to develop personalized cancer therapies.

- (※1) Liquid biopsy is a non-invasive method to detect cancer cells and cancer-derived DNA in the peripheral blood of cancer patient. CPM will establish a pipeline for precise detection of mutated cell free DNA (cfDNA) derived from cancer cells, which can provide detection of cancer at early stages and very sensitive monitoring of tumor relapse/recurrence.
- (※2) Neoantigens are cancer-specific immunogenic antigens derived from non-synonymous somatic mutations. OTS already established a research pipeline to predict potent neoantigens and is investigating a relationship between the neoantigen load and immune response to cancer immunotherapies, such as immune checkpoint inhibitors.
- (※3) Oncoantigens are immunogenic antigens exclusively overexpressed in cancer cells, but not expressed in normal cells except testis. Since their full-length proteins play indispensable roles in cancer cell progression/survival, oncoantigens are considered one of ideal targets for cancer immunotherapy. OTS has identified more than 100 peptide vaccines targeting these cancer-specific oncoantigens.
- (※4) Theragen Etex Co., Ltd. (TE) is a pharmaceutical company and one of leaders for genomics analysis in South Korea (KOSDAQ# 066700), which initiated human genome analysis in 2009 and has provided global next-generation DNA sequencing services for genome, transcriptome, and epigenome, since 2011.