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NEWS RELEASE

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Launch of a color fluorescent electron microscope system capable of operation in the field of molecular level analysis

Fukuoka, Japan – June 8, 2023- Kyushu Sangyo University (KSU), TCK Incorporated (TCK) and International Science Technology Co. Ltd.(IST) jointly announced today the development and launch of the world's first color fluorescent electron microscope system that can be operated in the field of molecular level analysis. TCK will start sales activity on July 1, 2023 under the name of FST-1000.

FST-1000 is a correlative light and electron microscope system that combines the advantages of an optical microscope that can obtain color images at low magnification and a scanning electron microscope that can capture monochrome images at high magnification, and synchronizes the images taken by each of them.

This is the world's first fully automated fluorescent microscope system that has achieved the acquisition of color images at a high magnification of 7,000x, without the intervention of a specialized engineer, by employing a newly-developed sample transfer system that applies semiconductor manufacturing technology.

Although correlative light and electron microscope systems are commercially available from other companies, their magnification capabilities are less than 1000x, mainly due to the difficulty of alignment of sample transfer between microscopes, and they have yet to meet the needs of the life science and medical fields where color images at the molecular level of 5,000x or more are required.

In 2016, KSU developed a specialized robot for sample transfer and succeeded in capturing a 7,000x color image for the first time in the world using immunostaining fluorescent dyes developed jointly with IST. However, it took more than 30 minutes to transfer and align samples, even by a specialized engineer, and this has been an obstacle to commercialization.

The FST-1000 has overcome this obstacle by using a special mark on the substrate on which the sample is placed instead of on the image of the sample itself for sample alignment, resulting in a system that allows any researcher to easily and quickly obtain a high-magnification color electron microscope image without the support of a specialized engineer.

It also provides a multidimensional, high-definition imaging environment for researchers by making it possible to simultaneously perform both fluorescence observation that visualizes the physiological activity of cells and electron microscopy that identifies the microstructure of cells.

In addition, KSU and IST has developed new fluorescence products that further enhance fluorescent strength and anti-fading against osmium oxide in the current fluorescent dye for immunostaining (trade name Fluolid), which has excellent physical stability such as durability against light and electron beams and can be stored for more than 10 years at room temperature.

The newly developed fluorescence products will also be sold by TCK and IST. They maximize the performance of FST-1000.

In the fields of advanced biotechnology research and medical diagnosis, there has been a need to continuously observe the same sample, such as a portion of a cell, at high magnification over a long period of time in units of several years. However, such continuous observation has been difficult due to the lack of microscopes with sufficient resolution for practical use, and the limitations of conventional fluorescent dyes that are not able to be stored for a long time and whose molecular structure is destroyed by irradiation of laser light or electron beams.

The combination of FST-1000 and Fluolid allows for continuous observation of high-magnification color images and is expected to be used in the field of advanced medical diagnosis. For example, in pathological diagnosis, by staining cells and observing them at the molecular level, cancer can be detected at an ultra-early stage when it would typically remain undiagnosed.

In order to contribute to the advancement of basic research and clinical data analysis, the parties will continue to make efforts on the development of fluorescent electron microscopes and fluorescent dyes, and are aiming to commercialize the correlative light and electron microscope system with 20,000x of magnification within several years.

The launch of FST-1000 is also the result of long-term joint research activities with institutions outside of KSU including Kurume Research Park and the Institute for Materials Chemistry and Engineering of Kyushu University, as well as support from municipal organizations such as Fukuoka Prefecture, Kurume City.

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