

Raman spectroscopic tissue detection for minimally-invasive and precise medicine

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Project Outline

Raman spectroscopy allows molecular analysis of cells and tissues simply by irradiating them with laser light and measuring Raman scattering light generated from them. In Raman spectroscopy, samples can be identified according to their state and type without pretreatment. However, Raman scattering light is weak and spatial analysis takes a long time, so its application in the medical field has not progressed. In this research, we will develop a spectroscopic analysis method that enable rapid Raman mapping of biological tissue. Unlike conventional Raman mapping methods, the developed method measures the entire area of interest at once. Since the laser light is applied only to the area to be inspected, it is possible to reduce the risk of tissue damage by laser irradiation. It is also possible to avoid the deterioration in measurement accuracy due to the light coming from non-inspection areas.

Based on the development method, we aim to realize a medical device that can avoid tissue damage that can occur during surgery, avoid leaving diseased tissue behind, and shorten the operation time. This will contribute to resolving medical issues such as improving the postoperative QOL of patients, reducing the mental and physical burden on doctors, and alleviating the burden on medical infrastructure.

The current development stage lies in the range between basic research and non-clinical testing and a patent has been filed in January 2022 for a Raman mapping method and device. Foreign applications are also being prepared.

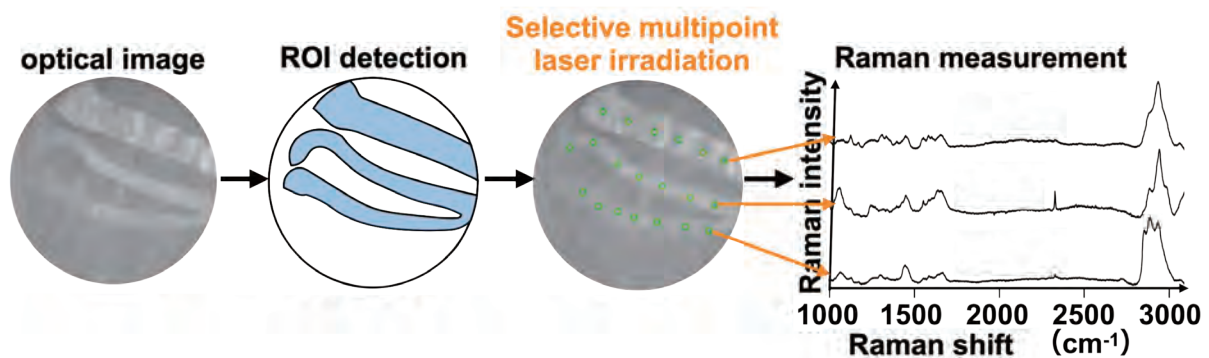


Figure 1 : A schematic representing the developed Raman mapping technique.

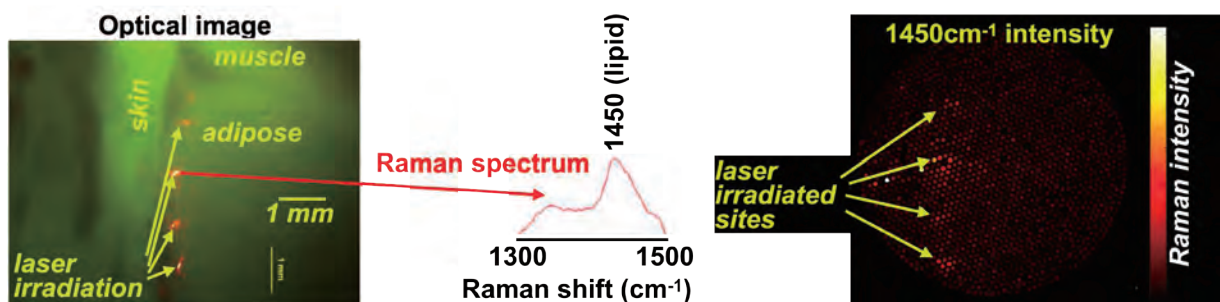


Figure 2 : A tissue measurement result by the developing Raman apparatus