

Second harmonic generation imaging applications in biology

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Core Facility for Cell biology at Institute of Biochemistry and Cell Biology (SIBCB) is dedicated to providing high quality technical supports and services in the areas of cell morphology analysis, flow cytometry and cell sorting to all research groups. The cell imaging in optical microscopy department has 24 instruments, including fluorescence microscopy, laser scanning confocal microscopy, living cell microscopy, spinning disk confocal microscopy, multi-photo microscopy, light-sheet microscopy, super-resolution microscopy, etc. Recently, the core facility has developed some cell imaging technologies applied in biology.

The second harmonic is a nonlinear optical process, and the second harmonic imaging is a three-dimensional imaging technology using the second harmonic signal generated by the nonlinear optical characteristics of the sample. Because the signal only occurs in the focal plane region, it has high spatial resolution and signal-to-noise ratio, and can effectively avoid the fluorescence bleaching effect in two-photon fluorescence imaging. Secondly, it uses infrared imaging, which has a large penetration depth and imaging depth. The second harmonic signal is the primary signal of the sample, which does not need to be stained. It is a non-marking, non-invasive imaging method, highly sensitive to the symmetrical structure in biological tissue. The second harmonic imaging can be used for non-labeled imaging of collagen (FIG1), muscle and lens in biological tissue samples, and can also be observed simultaneously with other fluorescent markers.

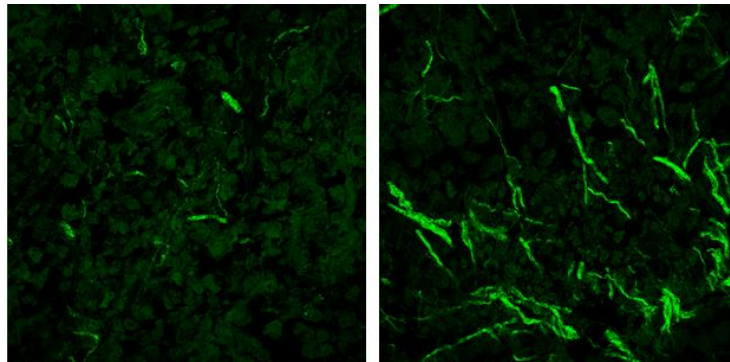


FIG1: SHG images of collagen in tumors. L: control; R: tumor