

Recent Advances in Terahertz Biomedical Application

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Terahertz (THz) imaging has emerged as a novel biomedical imaging technique with many strong points such as the high sensitivity of water and harmlessness to human body. THz biomedical studies have been implemented in the various biomedical fields such as dentistry, dermatology, oncology, neurology and physiology, so far. However, the real application cases in the clinics rarely have been reported due the lack of the crucial medical contents for THz wave only as well as cost- and size-effective medical devices. Recently, we have reported several medical contents which THz waves could be applicable and size-effective handheld THz device. The detection study of early gastric cancer was investigated to show the feasibility of THz imaging technique [1]. We demonstrated that brain tumors could be detected utilizing a reflection-type THz imaging system [2]. THz imaging distinguished the brain tumor margin clearly on label-free although the visible and near-infrared imaging barely discriminated. We developed the novel THz otoscope to sense the otitis media [3]. Using the THz otoscope, we showed the feasibility of diagnosing otitis media using mouse skin tissue and a human tympanic membrane specimen. To overcome the penetration depth limit of THz waves in human tissues, bio-comfortable agent has been suggested and the enhancement of penetration depth of THz waves was confirmed using mouse tissues [4].

Reference

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