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# 의료 진단을 위한 편광 기반 광학 이미징
# Polarization-based Optical Imaging for Medical Diagnosis

## Abstract

Polarization refers to the phenomenon where the electric or magnetic field vibrates in a specific direction as an electromagnetic wave propagates. In most biological tissues, the polarization state of light remains largely unchanged after scattering. However, in fibrous collagen-based structures—such as tendons, cardiovascular plaques, and fibrotic organs—it can vary depending on structural organization. Conventional imaging methods like MRI or ultrasound are limited in detecting such changes.

This study introduces polarization-sensitive optical coherence tomography (PS-OCT) and dichroism-sensitive photoacoustic microscopy (DS-PAM) as tools for analyzing polarization alterations in fibrotic tissues. We also compared the two modalities: PS-OCT was more effective in detecting gradual polarization changes along the depth direction, while DS-PAM showed superior sensitivity to strong, surface-localized polarization differences. These findings help guide appropriate modality selection based on tissue characteristics and diagnostic needs

## Brief Biosketch

Yong-Jae Lee received his Ph.D. degree in Physics from Chungnam National University, Daejeon, Republic of Korea, in 2018. After graduation, he worked as a postdoctoral researcher at the Advanced Photonics Research Institute, Gwangju Institute of Science and Technology (GIST), where he focused on laser-based biomedical imaging, in 2022. He is currently a Research Professor at the Engineering Research Center for Color-Modulated Extra-Sensory Perception Technology, Pusan National University, Republic of Korea. His research interests include the development of photoacoustic microscopy and optical coherence tomography with polarization, as well as high-energy, wavelength-tunable lasers for photoacoustic biomedical imaging.