

REVERSIBLY SWITCHABLE PHOTOACOUSTIC TOMOGRAPHY USING A BACTERIAL PHYTOCHROME AS A GENETICALLY ENCODED NEAR-INFRARED PHOTOCHROMIC PROBE

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The invention is a novel photoacoustic imaging technique, termed reversibly switchable photoacoustic tomography (RS-PAT). It exhibits a large penetration depth, a high detection sensitivity, and a spatial super-resolution. The most important feature of this technique is that it significantly increases the potential applications of *in vivo* PAI. Previously, PAI had been mainly useful for viewing with inherently high absorption in their native physiological environment (blood from hemoglobin and melanin). The absorption from blood is so strong, that it hinders the study of essentially anything else. This technology combines a bacterial protein that can covalently bind a naturally-occurring molecule in mammals, creating a reversibly switchable chromophore.