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Photoacoustic imaging (PAI), also called photoacoustic spectroscopy, is based on the principle of thermal expansion of an object caused by the absorption of light. When the emitted light is pulsed, it induces an oscillating movement in the tissue, resulting in pressure waves that can be interpreted as a sound signal.

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Photoacoustic imaging is a biomedical imaging modality based on the photoacoustic effect. In photoacoustic imaging, non-ionizing laser pulses are delivered into biological tissues. Some of the delivered energy will be absorbed and converted into heat, leading to transient thermoelastic expansion and thus wideband ultrasonic emission. The generated ultrasonic waves are detected by ultrasonic transducers and then analyzed to produce images. It is known that optical absorption is ...

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Photoacoustic spectroscopy has become a powerful technique to study concentrations of gases at the part per billion or even part per trillion levels. Modern photoacoustic detectors still rely on the same principles as Bell's apparatus; however, to increase the sensitivity, several modifications have been made.

Photoacoustic imaging is a non-invasive imaging modality which allows structural, functional, and molecular imaging. The method relies on the photoacoustic effect which describes conversion between light and acoustic waves due to absorption of electromagnetic waves and localized thermal excitation.

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