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The latest advances in optoacoustic diagnostic imaging of cancer and image-guided interventions

Friday, 5 October 2018 16:30 (30 minutes)

This lecture will discuss recent advances in the development and clinical translation of two-dimensional and three-dimensional laser optoacoustic ultrasonic imaging systems with applications in detection of cancer, guiding surgery and monitoring therapeutic interventions. Specific examples will include in vivo molecular and functional images in small animals and the most recent breakthroughs in diagnostic imaging of breast cancer. These systems utilize the most compelling properties of light (high tissue contrast based on spectroscopic capability and molecular specificity) and sound (high spatial resolution enabled by well-defined propagation of ultrasonic waves without scattering). The detection and tomographic projection of the optically generated acoustic signals enable imaging in the depth of tissue with high optical contrast and high ultrasonic resolution, a feature not attainable by either optical or acoustic technologies applied separately. We also present the design features and technical parameters of the optoacoustic imaging systems combined with ultrasound that can uniquely provide coregistered anatomical and functional molecular imaging of live biological tissues, which represents the most comprehensive information for medical diagnostics. A special attention will be given to the application of Laser Optoacoustic Ultrasonic Imaging Systems in diagnostic imaging of breast cancer. Finally, we will present our vision of the future medical imaging modalities based on a combination of light and sound and their clinical applications in diagnostics and image-guided therapy and surgery.

Summary

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Session Classification: Imaging