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**Recent advances in medical ultrasound**

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Ultrasound has become one of the most widely used imaging modalities in medicine; yet, before ultrasound-imaging systems became available, high intensity ultrasound was used as early as the 1950s to ablate regions in the brains of human patients. Recently, a variety of novel applications of ultrasound have been developed that include site-specific and ultrasound-mediated drug delivery, acoustocautery, lipoplasty, histotripsy, tissue regeneration, and bloodless surgery, among many others. This lecture will review several new applications of therapeutic ultrasound and address some of the basic scientific questions and future challenges in developing these methods and technologies for general use in our society. We shall particularly emphasize the use of High Intensity Focused Ultrasound (HIFU) in the treatment of benign and malignant tumors.