

Focused Ultrasound Overview

The Technology

Focused ultrasound is an early-stage, noninvasive therapeutic technology with the potential to improve the lives of millions of patients with a variety of serious medical disorders. It offers a disruptive, game changing alternative or complement to surgery, radiation therapy, drug delivery and cancer immunotherapy.

This revolutionary technology has the potential to increase the quality and longevity of life and decrease the cost of care by transforming the treatment of a range of indications including:

- **benign and malignant tumors of the brain, breast, prostate, liver and pancreas**
- **Parkinson's and Alzheimer's disease and epilepsy**
- **depression and obsessive compulsive disorder**
- **arthritis and hypertension**
- **uterine fibroids**

Focused ultrasound treats tissue with multiple intersecting beams of high-frequency sound focused accurately on targets deep in the body without damaging surrounding structures, much like beams of light can be focused on a point with a magnifying glass. At the focal point where the beams converge, the ultrasound energy can act in multiple ways to induce a variety of biological effects enabling the treatment of a wide variety of medical disorders. Currently there are 18 mechanisms of action under study including:

TISSUE DESTRUCTION

- **Thermal Ablation:** coagulative cell death
- **Histotripsy:** mechanical cell disruption
- **Microvascular disruption:** ischemic cell death
- **Sonodynamic therapy:** activation of cell toxic drugs

IMMUNOMODULATION

- **Tumor cell disruption:** increased immune cell trafficking; exposure of tumor antigens and release of cytokines
- **Augmentation of immunotherapy drugs**
- **Enhanced drug delivery**

DRUG DELIVERY

- **Focal delivery of therapeutic agents**
- **Increase vascular permeability and blood-brain barrier opening**
- **Increased cell membrane permeability**

RADIATION

- **Alternative to ionizing radiation**
- **Decreased radiation dose:** tumor preconditioning and sensitization

For a complete description of all 18 mechanisms of action, see the Foundation's website www.fusfoundation.org/the-technology/mechanisms-of-action.

There are currently more than 100 clinical indications or disorders in various stages of development and the number is increasing rapidly. Most are early stage. Worldwide 23 indications have regulatory approval and in the US five have been approved by the FDA. Focused ultrasound is not for every patient or every disorder. Much work remains to be done to determine where this technology provides unique cost effective value. For a list of all clinical indications, see the Foundation's website www.fusfoundation.org/diseases-and-conditions-all/overview.

The Problem

It can take decades for a new therapeutic technology like focused ultrasound to become a mainstream standard of care. Every year that is subtracted from that process could reduce death, disability and suffering for countless people.

The Focused Ultrasound Foundation

SAVING TIME = SAVING LIVES

The Foundation is a unique medical research, education, and advocacy organization created as the catalyst to accelerate the development and adoption of focused ultrasound. To achieve its goals, the Foundation utilizes an approach that is entrepreneurial, high-impact, high performance, market-driven and results oriented.

By identifying opportunities and overcoming barriers, the Foundation is shortening the time from laboratory research to widespread treatment. Major initiatives include:

- Influencing the direction of the field, setting research priorities, and creating an urgent, patient centric culture
- Providing resources, both human and financial capital
- Fostering collaboration and stimulating innovation
- Creating, aggregating and sharing knowledge
- Cultivating the next generation of clinicians and scholars
- Increasing awareness

The Foundation has a robust research program and organizes, conducts, and supports clinical trials and pre-clinical laboratory studies with an emphasis on brain disorders, cancer, and immunotherapy. It is the largest non-governmental source of focused ultrasound research funding.

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Focused Ultrasound Foundation

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Focused Ultrasound

It's all about the patients

Our goal is to...

- ▶ Improve the lives of millions of people with serious medical disorders

By...

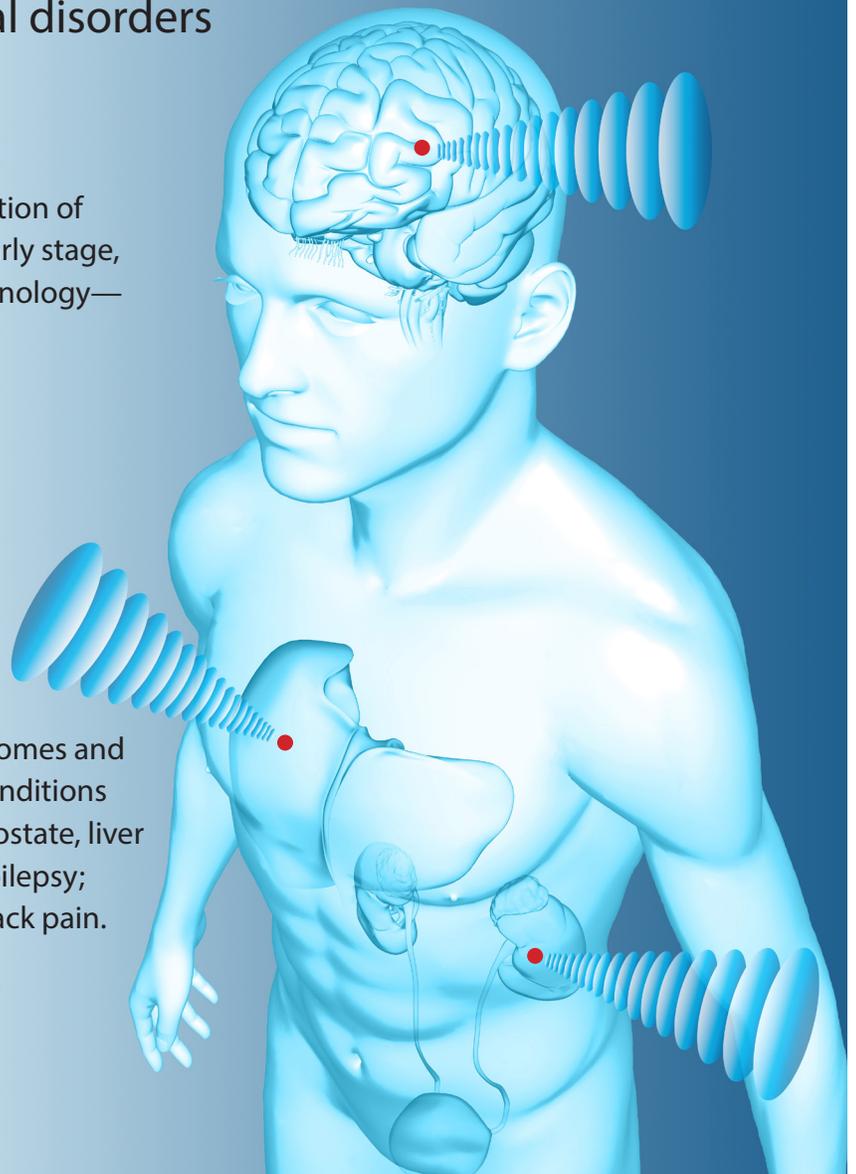
- ▶ Accelerating the development and adoption of Focused Ultrasound—a revolutionary, early stage, disruptive, noninvasive, therapeutic technology—

That provides an...

- ▶ Alternative or adjunct to surgery, radiation therapy, drug delivery and cancer immunotherapy.

Thereby...

- ▶ Transforming treatment, improving outcomes and decreasing cost of care for a variety of conditions including: tumors of the brain, breast, prostate, liver and pancreas; Parkinson's disease and epilepsy; depression and OCD; and arthritis and back pain.



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