ULTRA HIGH-FREQUENCY ULTRASOUND:

It's no secret that scientific research has biology by way of continuous research being conducted in universities, hospitals and research facilities around the world.

Of all the imaging modalities available today for studying the nature of disease, **ultra** high-frequency (UHF) ultrasound is one of the

DID YOU KNOW?

Ultra high-frequency ultrasound technology was developed by Dr. Stuart Foster at Sunnybrook Hospital back in 1999!



In the last 20 years, **FUJIFILM VisualSonics Inc**, technology from a little known innovation to a today than ever before. This is the direct result of modality that is now used worldwide in a multitude clinical applications.

Today, with over 2500 publications citing the use



3-15 MHz

CONVENTIONAL

ULTRASOUND

How does it work?

HF ultrasound works by ransducer at a **much higher** frequency than conventional **ultrasound** into living organisms As the sound waves propagate

With a variety of transducers ranging in frequencies from 15 to 70 MHz, it is possible to detect structures as small as 30µm.



ULTRA HIGH-FREQUENCY ULTRASOUND 30 µm resolution

20 YEARS OF INNOVATION Delivering high-resolution images and robust data to advance research

Seeing More Matters in Preclinical Research



MOLECULAR IMAGING and microdistribution of piomarkers in high resolution

CANCER

onitor tumor developmen

HIGH RESOLUTION

Visualize anatomical function in high resolution: detail like you've never seen before using ultrasound.

IN VIVO, **IN REAL TIME**



Study high speed events such as blood flow and cardiac function as it happens in living organisms.





CARDIOVASCULAR analysis including systolic, diastolic and valvular function

SAFE AND

NON-INVASIVE

No negative side effects.

UHF ultrasound supports

the 3Rs of animal use:

and refinement.

replacement, reduction



NEUROBIOLOGY ualize anatomy and functior processes including stroke nd cancer; conduct delivery o ugs, stem cells or other agent



DEVELOPMENTAL any gestational time point



Monitor the disease in the same subject over time with longitudinal imaging, in vivo.

COST-EFFICIENT



UHF ultrasound is a more cost-effective imaging solution when compared with other modalities like MRI/PET.

Photoacoustics

deliver multi-modal imaging. W FUJIFILM VisualSonics enables researchers to acquire anatomical, functional and molecular data, in vivo.

Contrast agents

ne use of contrast agents allows e visualization of cellular and nolecular processes when using

Microbubbles

evaluating the differences between normal and pathological tissues.

Non-targeted microbubbles improve visualization of blood flow with Targeted microbubbles can bind a more **specific visualization within** the body.

Animals typically used in preclinical imaging

Seeing More Matters in Clinical Research

FUJIFILM VisualSonics was the first to introduce UHF ultrasound imaging of the first 3cm below the skin is extremely useful for a variety of applications.



VASCULAR

SMALL PARTS

nodes thyroid and a

minute anatomy like

WHOLE BODY

lexibility. Image the whole body



NEONATOLOGY

• • •

SEE THE DIFFERENCE age small arteries and vei thickness (IMT) down

Ground-breaking applications

Below are ways UHF ultrasound is impacting research projects around the world today:

- + Diagnosing the response of a healthy temporal artery as compared to an inflamed one in patients. - Sweden
- + Allowing for **crystal clear** visualization of tiny magnetic controlled robots that may someday be used to travel through your body to deliver drugs or repair minor/major organ dysfunctions. - Germany
- + Imaging spinal cord injuries in mice and rats to assist researchers in discovering treatments and therapies to improve outcomes and quality of life for patients. - USA
- + Imaging submillimeter sized **neuro sarcomas** (Elephant Man's Disease) in patients in 3D before and after photodynamic therapy to study the effects as surgery is not an option in most cases. - USA
- + Enhancing the reproductive success of endangered **species** like the olms of Moulis, increasing knowledge of wildlife species to contribute to their conservation. - Germany

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