TECHNOLOGY COMMERCIALIZATION

TEES TEXAS A&M ENGINEERING EXPERIMENT STATION

Estimation of Interstitial Fluid Pressure and Velocity in Cancers

Faculty Inventor

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Research Interests

- Ultrasonic Imaging
- Ultrasound methods for imaging the mechanical behavior of soft tissues
- Medical uses of ultrasound
- Biomedical Imaging

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Overview

Interstitial fluid pressure (IFP) is a mechanical parameter of enormous clinical significance, which affects diagnosis, prognosis, and treatment of cancers. IFP is an influential component of the cancer microenvironment that plays a crucial role in cancer initiation, growth, and metastasis. The interstitial fluid velocity (IFV) is another parameter, which is related to the gradient of the IFP, that significantly affects the metastatic nature of cancer and the effectiveness of drug delivery therapies in cancer. Currently, there are no non-invasive methods to asses and image the IFP/IFV inside a tumor.

Technology

We have designed a new non-invasive technique based on ultrasound imaging and proved that this technique could simultaneously image both IFP and IFV in a cancer tumor (as well as an addition of five mechanical parameters) all from the same set of ultrasound data. Ultrasound data for this technique are acquired in a manner similar to that employed in clinical settings today. The tissue will need to be slightly compressed for a few minutes while the probe is in contact with the tissue. From the acquired ultrasonic data, IFP and IFV inside a cancer can be computed using dedicated software with novel algorithms tailored for this application.

Advantages

- Non-invasive
- No imaging contrast agents required
- No radiation employed
- Suitable for frequent follow-ups from patients
- Portable
- Low cost

Applications

- Cancer clinical research
- Cancer treatment

Stage of Development

Prototype validated on simulators and lab mice

Patent Status

Pending

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