The Office of Technology Management

UNIVERSITY OF TEXAS ARLINGTON

Tech ID: UTA 16-27

Tissue thermometry via multi-color ultrasound-switchable fluorescence (MC-USF)

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TECHNOLOGY NEED

Thermal therapy of benign and malignant diseases is now routinely used in different clinical settings via different heating technologies, such as high intensity focused ultrasound (HIFU). It is crucial to detect and monitor tissue temperature changes to avoid tissue damage during treatment. However, non-invasive imaging of temperature inside living tissue is very challenging. Currently only MRI is considered a reliable technology for noninvasive imaging of HIFU-induced tissue temperature increase. However, MRI is very expensive, bulky, not portable, not compatible with heating devices, usually fails to measure absolute temperature and not suitable for use in certain patients. Therefore, there exists a need for improved systems and methods of thermometry to monitor temperature induced therapies.

INVENTION DESCRIPTION/SOLUTION

UTA researchers have developed a multi-color ultrasound switchable fluorescence (MC-USF) thermometry to non-invasively image and monitor tissue absolute temperature, for guiding HIFU based thermal ablation therapy. Simultaneous adoption of multi-color temperature sensitive USF contrast agents can achieve high temperature sensitive range and can effectively minimize spectral leakage. It is highly compatible with HIFU therapy so that monitoring and treatment are seamlessly integrated. Therefore, MC-USF will address the challenges of imaging absolute temperature inside living tissue and make the temperature measurement reliable, accurate, easy, rapid and cost-efficient. It has no usage limitation and thus is patient compatible. Therefore, it will be valuable to facilitate the wide use of HIFU-based thermal ablation therapy, a non-invasive therapeutic imaging technology.

APPLICATIONS

- Non-invasive tissue imaging
- Used as guidance system in HIFU-based thermal ablation or hyperthermia based therapy

KEY BENEFITS

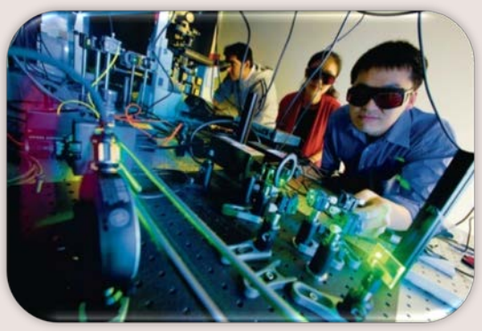
- Alternative to MRI-based thermometry, maintains similar image quality and cost efficient
- Rapid, portable, simplified operation and accurate measurement mechanisms
- Intrinsically co-registered with HIFU thermal treatment
- Accurate spatial, temporal and temperature resolution
- Suitable to use in longitudinal studies

STAGE OF DEVELOPMENT

Prototype

INTELLECTUAL PROPERTY STATUS

PCT Application



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