

NON-INVASIVE TECHNOLOGY ENABLES BRAIN TUMOR BIOPSY WITHOUT SURGERY

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T-017113

Background: The American Brain Tumor Association reports that about 80,000 of the estimated 700,000 Americans that live with a brain tumor have been diagnosed in 2017. The surgery required for a traditional brain tumor biopsy entails making a hole in the skin and skull, placing a needle probe, and removing a piece of tissue for histological and genetic testing. The procedure is invasive and always poses the risk of bleeding or infection; may require general anesthesia, and in some cases a repeat biopsy is needed. Scientists from Washington University developed a method to get comparable brain tumor information without the need for surgery.



Technology Description: For a non-invasive brain tumor biopsy approach, the team led by Drs. Leuthardt and Chen developed a process that uses a combination of established technologies: MRI, focused ultrasound, and blood based genetic testing. The general approach follows the following process. First, after a lesion in the brain is identified that requires pathologic diagnosis, the lesion is imaged with high-resolution MRI to identify the specific region to be biopsied. Secondly, focused ultrasound along with microbubbles is then used to target the region to locally disrupt the blood brain barrier and rupture brain tumor cells to release genetic information. Next, the cell-free genetic material, released from the brain tumor, is captured from the patient's blood or cerebral spine fluid. Finally, comprehensive genetic analysis is used to identify tumor specifics which will inform on the need for- and kind of treatment. This is a most promising new approach enabling brain tumor biopsies without the need for surgery. This non-invasive and affordable method has the potential to be extended to the biopsy of other non-brain tumors.

Key Advantages:

- Non-invasive brain tumor biopsy method avoids surgery
- Method provides similar level of brain tumor information
- Method is faster and more cost-effective
- Possible extension to biopsies of other non-brain tumors
- Method provides great opportunity in a large market

Publications: Zhu, L. et al. *Sci. Rep.* 2018, 8, 6553: *Focused Ultrasound-enabled Brain Tumor Liquid Biopsy*.