TECHNOLOGY

Minimally Invasive Neurosurgical Intracranial Robot

OVERVIEW

Brain tumors, which occur in 20-40% of adult cancer patients, are among the most feared complications of the disease. Despite numerous advances in treatment, the prognosis for these patients is poor, with a median survival of 4-8 months. The primary reasons for the poor survival rate are the lack of good continuous imaging modality for intraoperative intracranial procedures and the inability to remove the complete tumor tissue due to its placement in the brain and the corresponding space constraints to reach it. Intraoperative magnetic resonance imaging (MRI) supplements the surgeon's visual and tactical senses in a way that no other imaging device has achieved, resulting in less trauma to surrounding healthy brain tissue during surgery. To minimize the trauma to surrounding healthy brain tissue, it would be beneficial to operate through a narrow surgical corridor dissected by a neurosurgeon.

Researchers at the University of Maryland, in conjunction with researchers at the University of Maryland School of Medicine, Baltimore, have invented a robot that would allow a neurosurgeon to resect brain tumors and other intracranial masses in human patients in a minimally invasive manner while the patient is actively undergoing brain imaging. This invention comprises a highly dexterous robot capable of removing intracranial tumors and masses while operating through an extremely narrow corridor in the brain, thus producing minimal disturbance or damage to normal brain tissues. Unique features include:

• Sufficiently small size to allow respective neurosurgery to proceed while the patient's brain is imaged
• Fabrication of materials that are entirely compatible with the imaging modality
• A virtual interface between imaging modality and robot that precludes the neurosurgeon from having to directly visualize the tumor or mass during resection, allowing the direct control of the neurosurgeon guided by imaging modality
• Ability to manipulate instruments required to destroy tissues, including but not limited to monopolar and bipolar electrocautery, laser, radio-frequency ablator and ultrasonic cavitator
• Ability to manipulate instruments required to remove tissue debris, including irrigation and suction

For additional information, please contact the Office of Technology Commercialization, University of Maryland College Park, via e-mail at otc@umd.edu or phone at 301-405-3947.

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Imaging devices
- Surgical devices
- Robotics
- Devices

EXTERNAL RESOURCES

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