Passive pressure sensor

Duke File (IDF) Number

IDF #:T-004510

Meet the Inventors

Schmidt, Allison
Bass, Cameron
Muh, Carrie

Contact For More Info

Rasor, Robin
(919) 681-6412
robin.rasor@duke.edu

Department

Biomedical Engineering (BME)

Value proposition

Monitoring Intracranial Pressure (ICP) in patients undergoing neurological conditions is critical in tracking progress and recovery. In conditions such as hydrocephalus, a shunt is used to allow extra cerebrospinal fluid to drain. These shunts fail at a high rate due to clogging. While 40% of shunts fail within the first year of placement, 5% fail per year after the first year. Patients of hydrocephalus need to have their shunts surgically replaced every six years.

Methods for measuring ICP can therefore be essential in predicting such failures. Current methods of measuring ICP however require sensors with external readouts via wires passing through the skull and the skin. A new non-invasive and more convenient method is therefore highly desired for ICP monitoring in such patients.

Technology

Inventors at Duke University have developed a battery-less passive pressure sensor, that can be read wirelessly using microphones or ultrasound sensors. Several embodiments of this sensor allow it to be used in varius ways. It can be implanted into shunts or catheters or be used as a stand-alone sensor in fluid cavities via hooks, statures etc.

Other Applications

The disclosed passive pressure sensor may potentially be used in several other medical applications listed below.

- Blood Pressure monitoring systems
- In embedded devices, such as catheters, pacemakers and stents to predict failure
- Other fluid cavities in the body where frequent pressure monitoring is necessary

Advantages

Existing pressure sensors usually require wires to pass through the skin, so that the sensor may be read via external monitors. The main advantage of the disclosed technology is the passive nature of the readout. The ability to read the sensor wirelessly via external disturbances make it ideal for long term implanted devices such as shunts and pacemakers.