Docket #: S13-130

Passive Miniature Wireless Pressure Sensor for Bio-monitoring

Stanford researchers have developed a new strategy for designing, making and collecting data from a passive (non-powered), flexible pressure sensor for intra-cranial pressure (ICP) monitoring at the optimal Ghz frequencies for wireless transmission in biological tissues. This approach allows the smallest size scaling of the sensors to 1mm by 1mm and 0.1mm in thickness, with a pressure resolution of 2 mmHg and a range up to 100 mmHg. It is also applicable to other bio-pressure monitoring, such as intra-ocular, cardiovascular or urinary systems.

Figure



Figure description - World's smallest pressure sensor at 1×1×0.1 mm

Stage of Research

- Proof-of-concept *in vivo* testing for real-time intracranial pressure (ICP) monitoring in an acute study in mice.
- Demonstrated that the sensor signal can be detected even above several mm of saline.

NPR "All Tech Considered" Feature
"Just Like Human Skin, This Plastic Sheet Can Sense And Heal", April 11, 2016

Applications

- Intra-cranial pressure monitoring
- Bladder pressure monitoring
- Intra-ocular pressure monitoring

Advantages

- Low cost
- Easy to use
- Simple design and fabrication
- Mechanically flexible
- Passive, non-powered
- Very small form factor, 1x1x0.1 with volume of 0.1mm^3
- Can detect signals in fluid (under several mm of saline)

Publications

- L. Y. Chen, B. C.-K. Tee, A. L. Chortos, G. Schwartz, V. Tse, D. J. Lipomi, H.-S. P. Wong, M. V. McConnell, Z. Bao, "Continuous wireless pressure monitoring and mapping with ultra-small passive sensors for health monitoring and critical care," Nature Comm., 5, Article number: 5028, 2014.
- Abate, Tom. "Stanford team invents sensor that uses radio waves to detect subtle changes in pressure," Stanford Engineering News & Updates (Oct. 10, 2014).

Patents

- Published Application: 20140350348
- Issued: 9,848,775 (USA)

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