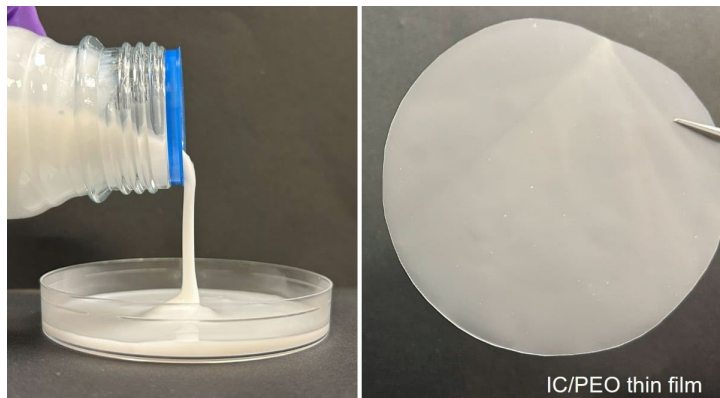


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## Spider-silk-inspired electrode “wraps around heart”

Justinas Vainilavičius



Researchers developed a flexible electrode that could pave the way for biomedical devices capable of monitoring irregular heartbeats, aiding nerve repair, enhancing wound closure, and reducing scars.

The innovation could “shape the future of medical devices,” according to Singapore-based Nanyang Technological University (NTU), where an international team of scientists took inspiration from spider silk to develop the electrode.

Made from a material that contracts upon exposure to moisture, the electrode “securely wraps around muscles, nerves, and hearts, NTU said.

Researchers demonstrated that this electrode can deliver electrical simulation to tissues or record electrical activity with higher sensitivity compared to conventional stretchable electrodes, due to the tight seal formed with the tissue.

Additionally, the team discovered that the electrode is capable of detecting electrical activity from muscle grafts stimulated by a nerve – a common practice in controlling prosthetic limbs or treating phantom limb pain post-amputation.

Dr. Yi Junqi, a lead author of the study, stated, “Our water-responsive material may play an important role in shaping the next generation of biomedical applications at the interface between electronics and the human body.”

Experiments on rat hearts showed that the electrode could detect electrical signals from abnormal rhythms without customizing its size or shape.

The electrode is installed around the heart through a minor incision and is just as easily removable. It can be fitted temporarily or permanently, contracting to wrap around the heart upon contact with water in the chest cavity, researchers said.

“Being minimally invasive, our innovation could make device implantation procedures safer and simpler,” said Prof. Chen Xiaodong, who led the study.

The study was described in a paper entitled “Water-responsive supercontractile polymer films for bioelectronic interfaces” and published in the journal Nature.

Prof. Tsuyoshi Sekitani, who is an expert in flexible electronic devices at Osaka University and was not involved in the study, noted that this innovation could lead to applications ranging from diagnosing brain disorders to “treating neurodegenerative diseases that are difficult to overcome.”

Following further research, clinical trials are planned to ensure the safe use of the electrode, according to NTU.

<https://cybernews.com/tech/spider-silk-electrode-wraps-heart/#comments-reply>