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Hong Kong unveils novel microelectrode for use in implantable bioelectronic devices

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Liquid metal microelectrodes can be comfortably worn on human skin, while a specific application in animal brain monitoring has also been demonstrated

Electronic devices that can be attached to the skin or even implanted in the body will become more and more prevalent in near-future technology. Such “implantable bioelectronics” are envisaged as having a wide range of uses from medical technology to the emerging field of augmented reality, and a research team led by The Hong Kong Polytechnic University (PolyU) has developed a type of microelectrode that is uniquely suited to devices of this kind.

An interdisciplinary research team comprising members from PolyU’s School of Fashion and Textiles, Department of Biomedical Engineering, Department of Applied Biology and Chemical Technology, Research Institute for Intelligent Wearable Systems (RI-IWEAR) and Research Institute for Smart Energy (RISE), as well as from City University of Hong Kong and the Hong Kong Centre for Cerebro-Cardiovascular Health Engineering have overcome several technical limitations to advance the field of wearable technology and invented a method of producing unprecedentedly soft, stretchable and permeable electrodes for implantable bioelectronics.

The key step in the fabrication process is the electrospinning of a fibrous polymer onto silver (Ag) micropatterns, resulting in an array of liquid metal microelectrodes (?LMEs) that can be patterned at ultrahigh density. This is a promising property for wearable electronics, for which there is expected to be a huge market with applications in physiological monitoring, medical diagnosis and interactive technology.

Most notably, the softness and stretchability of the ?LMEs also make them ideal for implantation at the neural interface for brain monitoring.

Receiving funding from the Research Grants Council's Senior Research Fellow Scheme, PolyU, City University of Hong Kong, the National Natural Science Foundation of China and InnoHK, the research team intends to build on their accomplishments by increasing the patterning resolution of ?LMEs.