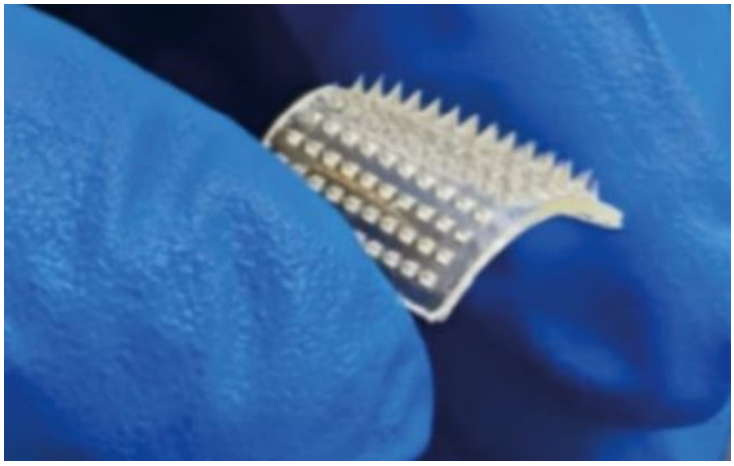
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Hong Kong designs wearable microneedle patch for continuous glucose monitoring

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An enzyme-free, wearable, acoustically readable microneedle patch called ARMPatch



Long-term diabetes management requires continuous blood glucose monitoring to detect abnormalities early and intervene in time. However, conventional fingertip blood sampling is both painful and inconvenient, while most continuous glucose monitoring (CGM) products currently available on the market rely on biological enzymes — requiring regular replacement, incurring higher costs, and demanding stringent storage conditions.

A research team at The Hong Kong Polytechnic University (PolyU) has developed an enzyme-free, wearable, acoustically readable microneedle patch “ARMPatch”. Once applied to the skin, it can be read by a standard ultrasound probe to continuously reflect changes in blood glucose levels.

The patch is made from a glucose-responsive hydrogel based on phenylboronic acid (PBA). Once applied to the skin, its microneedles swell in response to blood glucose fluctuations. The higher the glucose level, the greater the swelling, and ultrasound detects these changes to determine glucose levels. This is precisely what makes the ARMPatch “acoustically readable”.

The team noted that, by adjusting the hydrogel composition, the same platform could in principle be extended to the continuous monitoring of various biomarkers such as pH, proteins, and bacteria. The team hopes to develop microneedle patches that are capable of monitoring multiple indicators simultaneously, turning wearable ultrasound devices into a one-stop tool for home health monitoring.