

Wearable sweat sensor reliably monitors illegal drug use, combatting athletic doping

Traditional drug detection process requires a complex method of extracting suspected drug components from biologic specimens including hair, blood, and urine, and then analyzing drugs through gas or liquid chromatography-mass spectrometry (GC/MS or LC/MS). It takes longer testing time and requires a large room for the instrument and skilled technicians. Although rapid kits can detect drugs in urine, they only detect a single component in a single test and have low sensitivity.

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The researchers focused on sweat which is not invasive and relatively free from human rights issues. However, only small amount of substances is discharged in sweat, even though sweat contains various drugs taken so a highly sensitive sensor technology had to be developed for better detection.

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Once the patch absorbs the sweat, the drug substance in the sweat penetrates the wearable sensor and reaches the silver nanowire. By irradiating the Raman laser on the patch, the drug can be detected in real time without removing the sensor.

This technology can help address social problems such as drug distribution and abuse related to celebrities, drug transactions in clubs, and the prohibited substance taken by athletes. Since the production cost is less than 50 cents per piece, it can be used for an anti-doping program as a complete enumeration survey during large sports events such as the Olympics.

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