

Forensic use of tandem mass-spectroscopy detects links between banknotes and drugs

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Research published in this month's edition of the journal *Rapid Communications in Mass Spectrometry*, describes a method that can detect a pattern of contamination on bank notes from drug related crime that is different from the pattern seen in general circulation. The process is significantly faster than other previous methods.

"People involved in drug-trafficking are not always involved in handling illicit drugs, but they may possess cash that has been held by others who come into contact with drugs, so finding traces of drugs on an unusually high proportion of bank notes is another piece of evidence that could help guide a police investigation, or be used in court," says co-author Karl Ebejer.

Work by the same group has shown that traces of cocaine may be found on a majority of bank notes. In the present study Ebejer and his team looked for the chemical diacetylmorphine (DAM), which was found to be present on around 1 in 50 notes. DAM is the major active component of illicit heroin and the most characteristic marker for that drug.

Mass spectrometry determines the chemical nature of a compound even if there is only a minute sample. In Ebejer's process, bank notes recovered during police raids were heated to 285 degrees centigrade causing chemicals to vaporise. The vapours were sucked into the detector and the chemicals smashed into fragments. One of the features of mass spectrometry is that each chemical reliably produces a unique set of fragments. The detector then looked for two particular fragments.

Finding both of these on a bank note showed that the note was contaminated with DAM. Finding lots of contaminated bank notes in a bundle indicates that the money had recently been in contact with heroin and is, therefore, unlikely to have come from general circulation.

"The association doesn't prove guilt, but cries out for an explanation," says Ebejer. "If a defendant can offer no reasonable explanation as to why they possess a large quantity of cash, and why this cash is highly contaminated with heroin a jury must draw its own conclusions."

Publication: Ebejer et al: Rapid Comparison of Diacetylmorphine on Banknotes by Tandem Mass Spectrometry, Rapid Communications in Mass Spectrometry, 2005

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