

When hair is the only biological specimen available: Analysis of a mummified scalp fragment

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Abstract:

Hair testing provides useful and important information in forensic scenarios, as it complements data obtained from other biological specimens. Hair has been used for years to document exposure to drugs in a number of settings, for instance workplace drug testing, drug facilitated crimes and post-mortem toxicology.

The authors present a case of decomposed human remains (unidentified) which appeared in a vacant house.

A handmade pipe, a mouthpiece, cigarettes and syringes, indicating the consumption of drugs of abuse were found near the body. There was information that the deceased was addicted to drugs, but the specific substances were unknown. No pathological history and/or usual medication, were known, and the cause of death was ignored. The only biological sample available for toxicological analysis was mummified scalp with some hairs.

The non-biological samples were analysed by GC-MS, and the following substances were detected: syringe A – cocaine, heroin, phenacetin, paracetamol; syringe B - cocaine, phenacetine, caffeine, nicotine, noscapine; mouthpiece – cocaine; handmade pipe - cocaine and metabolites, phenacetin and metabolites, paracetamol; cigarette A – nicotine and cotinine; cigarette B – nicotine, cotinine, phenacetin, caffeine. These results oriented hair testing to opiates and cocaine, which were analysed by GC-MS after appropriate extraction and clean-up. Hair was positive for cocaine (57 ng/mg), benzoylecgonine (17 ng/mg), norcocaine (2.20 ng/mg), cocaethylene (not quantitated), 6-acetylmorphine (4.65 ng/mg), morphine (4.52 ng/mg), codeine (0.83 ng/mg) and tramadol (0.87 ng/mg).

The findings in hair are compatible with those in the paraphernalia; as such, it could be concluded that those objects belonged to the deceased.

Hair analysis suggested that this death could be related to the consumption of heroin and cocaine.

Keywords: Hair; mummified scalp; drugs of abuse; paraphernalia; GC-MS-EI.