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Forensic toxicology: An Overview

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Editorial

Toxicology and other fields such as analytical chemistry, pharmacology, and clinical chemistry are used in forensic toxicology to aid medical and legal investigations of death, poisoning, and drug use [1]. The major interest in forensic toxicology is the acquisition and interpretation of results, not the legal conclusion of the toxicological study or the technology used. Toxicological testing can be performed on a variety of substances. Any evidence acquired at a crime scene that may narrow the search, such as pill bottles, powders, trace residue, and any available chemicals, must be considered by a forensic toxicologist [2]. With this knowledge and samples to work with, the forensic toxicologist must assess which toxic substances are present, at what amounts, and what effect those chemicals are likely to have on the person. Postmortem toxicology, human performance toxicology, and forensic drug testing are the three fields of forensic toxicology in the United States (FDT). The study of biological materials acquired from an autopsy to determine the effects of drugs, alcohol, and toxins is known as postmortem toxicology. Blood, urine, gastric contents, oral secretions, hair, tissues, and a variety of other biological materials can all be studied. To ascertain the cause and manner of death, forensic toxicologists collaborate with pathologists, medical examiners, and coroners. A dose-response relationship between a drug(s) present in the body and its effects on the body is investigated in human performance toxicology [3]. This branch of forensic toxicology is in charge of developing and enforcing rules such as those prohibiting driving while under the influence of alcohol or drugs. Finally, forensic drug testing (FDT) involves the identification of drug use in the workplace, as well as sport doping, drug-related probation, and new employee screenings. Because it is rare for a chemical to remain in its original form once within the body, determining the substance ingested is typically confounded by the body's natural activities (see ADME). For example, heroin is rapidly metabolised into another substance and then into morphine, necessitating a thorough examination of characteristics such as injection marks and chemical purity to validate a diagnosis. While a pill or other authorised dose of a medicine may have grammes or milligrammes of the active component, an individual sample under inquiry may only contain micrograms or nanograms. A urine sample is urine from the bladder that can be donated or obtained after death. Urine is less likely than blood samples to be infected with viruses like HIV or Hepatitis B. Many medications have a larger concentration in urine and can stay there for far longer than they can in blood [4]. Urine samples can be collected in a noninvasive manner that does not necessitate the use of professionals. Urine is used for qualitative analysis since drug presence in urine only indicates prior exposure and hence cannot indicate impairment. Most common hazardous chemicals may generally be screened and confirmed with a blood sample of about 10 ml (0.35 imp fl oz; 0.34 US fl oz). A blood sample gives a toxicologist a profile of the substance that influenced the individual at the time of collection; as a result, it is the sample of choice for determining blood alcohol concentration in drunk driving instances. Hair has the ability to record long-term or high-dose substance consumption. Chemicals in the bloodstream can be transmitted to growing hair and stored in the follicle, giving a rough timeframe of drug intake. Because head hair grows at a pace of 1 to 1.5 cm per month, cross sections taken from different areas of the follicle can be used to estimate when a chemical was consumed [5].

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