



Drug testing in Hair

Frequently asked questions

- 1. What is specialised hair drug testing?**
Specialised hair drug testing is an analytical process that determines the presence or absence of drugs and /or drug metabolites in hair.
- 2. What drugs can VIFM test for with hair?**
VIFM can test for at least 60 drugs in hair. This includes common illicit drugs such as methylamphetamine, heroin, cocaine and cannabis. VIFM can also test for a number of prescription drugs including an extensive range of stimulants, benzodiazepines (sedatives), opioids, barbiturates, antidepressants, anaesthetics, antipsychotics and new synthetic drugs.
- 3. How sensitive is specialised hair testing?**
VIFM reports drugs detected in hair according to the Society of Hair Testing's guidelines (see www.soht.org). Drugs are reported when the concentration of drugs is greater than the recommended reporting limit. These cut-offs are designed to reduce the risk of reporting low concentrations that cannot be differentiated from personal use and external contamination. Other drugs detected, which are not within the guidelines, are reported at ≥ 0.02 ng/mg.
- 4. What type of hair can be analysed?**
VIFM only analyses hair collected from the back of the head (nape). Growth rates of hair from the head are more consistent than other hair taken from other parts of the body.
- 5. When should hair be collected?**
VIFM recommends a period of 4 weeks after possible ingestion/administration of a drug for it to be reliably detected in hair.
- 6. What is the growth rate of hair?**
Hair follicle cells are among the most rapidly dividing cells in the human body. The growth rate of hair is important in determining timing of exposure to a drug. Under normal circumstances hair growth in each hair follicle occurs in a cycle, although overall hair growth is variable from one strand to another. The

average rate of hair fibre growth is considered 1 cm per month, but can vary from 0.5 cm to over 1.5 cm per month.

7. How are drugs incorporated in hair?
Drugs and drug metabolites are incorporated into the hair during formation of the hair shaft (via diffusion from blood into the actively growing follicle), after formation (via secretions of the apocrine and sebaceous glands), and after hair has emerged from the skin (from the external environment).
8. Can hair be contaminated by drugs through passive exposure?
The potential for external uptake means drugs may enter hair either due to active use of that drug or by passive exposure to it, or both. Washing the hair using decontamination procedures can remove some of the external drug on hair; this is undertaken in every analysis provided by VIFM.
9. Does VIFM offer whole strand or segmental analysis of hair?
VIFM can provide analysis that suits the client's needs. Analysis can be performed on whole strands of hair as well as multiple segments of hair. Since hair does not grow at the same rate, both on and between individuals, it is not possible to calculate a precise time of drug consumption or exposure. However VIFM can provide an approximate time frame of incorporation. This is best accomplished by measuring drug content in small (usually 1 - 3cm) segments of hair and comparing concentrations from one segment to another. Multiple segments are charged as separate analysis e.g. 3 segments is \$750 x 3 = \$2250 + GST.
10. Must consent be obtained prior to analysis?
It is essential that the person from whom the hair is to be collected provides photo identification and that consent is obtained from the subject. In certain cases the application of a court order means a specimen of hair can be collected without consent. Hair collected without consent or without court order cannot be analysed by VIFM.
11. Do persons undertaking hair analysis need to declare medications or drug use?
Ideally patients should declare any legal substance they might be taking from a prescription or from over-the-counter and that the specimen is sealed with their signature and transported using appropriate chain-of-custody procedures. This is all available within the kit provided by VIFM as part of our analytical service.
12. How much hair needs to be collected for a viable analysis?
Typically, it is recommended to collect a loose pencil thickness of hair that approximates to about 100 mg. The minimum amount of hair required for a single analysis is 20 mg.

13. What test methods are used for specialised hair testing?
VIFM directly analyses hair specimens using liquid chromatography/tandem mass spectrometry (LC/MS/MS). This is internationally accepted as the most appropriate analytical method for analysing a wide range of drugs simultaneously.
14. What is the turnaround time for analysis?
Specimens received by VIFM will be analysed and a report issued within 5 working days. Reports can be provided as secure PDF via email or by normal mail.
15. Does VIFM provide hair collection kits?
Yes as part of the testing service VIFM is able to provide hair collection kits, which can be used for all investigations. The collection kit contains all the appropriate instructions, chain of custody paperwork and evidence collection kit. Alternatively patients in Victoria can arrange (for a fee) to have their hair collected by a forensic physician or nurse here at VIFM in Southbank.
16. How long are cases and specimens retained after a report has been issued by VIFM?
Any remaining hair after analysis is retained for a period of 12 months from receipt and destroyed in accordance with laboratory procedures. Reports are retained indefinitely.
17. Is the hair decontaminated/washed prior to analysis?
Since hair may contain surface drugs from environmental contamination, or poor hygiene, hair samples need to undergo a decontamination procedure. This is performed in every analysis conducted at VIFM. These washes are also analysed to determine whether surface contamination has occurred.
18. Can hair be adulterated?
Whatever drug amount is present in hair, washing, colouring, bleaching, excessive use of shampoo and conditioners will reduce the concentration, particularly in the outer layers of the hair shaft. However, current hair analysis is still able to determine the amount of drug extracted from hair and this process can be used to identify and confirm use and/or approximate frequency of drug use from one sample to another or between segments of the same collection.
19. Does the colour of hair affect the analysis?
Drugs (and other substances) bind to structures within hair, and often the melanin and melanin-like pigments as well as proteins found in hair. Drugs that are basic in nature tend to have higher concentrations in hair than neutral or acidic drugs. For example, basic drugs such as methylamphetamine and

other amphetamine-like substances and cocaine tend to have higher concentrations in hair than, for example, more neutral compounds such as Δ^9 -tetrahydrocannabinol (THC) found in users of cannabis.

Heroin and its metabolites such as 6-acetylmorphine and morphine are also found in hair in relatively high concentrations. This means that persons with dark pigmented hair will often have higher concentrations of drug than those with little or no pigment, particularly for basic drugs, such as the amphetamines, opiates and cocaine.

20. What are the limitations of hair testing?

Although hair analysis cannot conclusively prove retrospective drug use to a specific date or a dose, it can provide approximate date ranges of alleged drug use if segmental testing has been conducted. The concentration determined in the hair cannot be used to estimate the dose of a drug.

Any hair analysis has a number of limitations. Ethnicity, gender and age differences; colour of hair, use of hair treatments; physiological differences between persons; as well as variations in the frequency of drug use and their respective doses/purities; and the variable growth rate of hair and variable uptake of drugs into hair; are all important factors that can preclude a precise interpretation of dose or dose range.

21. Does VIFM provide interpretation of hair results and opinions?

Yes VIFM does provide a range of expert service including interpretation and medico-legal opinions. The turnaround time is 5 working days and the cost is \$400+gst per hour.

Please use the enquiry form on our website <http://www.vifm.org/forensics/forensic-science-services/specialist-hair-drug-testing/> for any other question(s) not covered here in this FAQ document.