

# SEROLOGY: BODY FLUID IDENTIFICATION

A forensic serologist conducts examinations on exhibit material to confirm the presence of stains caused by body fluids. Where body fluids have been found, further tests are conducted in an attempt to identify blood group factors. The blood group factors identified are then compared with those factors identified on other exhibit material and with known standards to indicate that these are from the same origin.

The three most common body fluids examined are blood, semen and saliva. Evidence from blood typing factors may be used to:-

(a) corroborate or disprove statements;

(b) assist in the reconstruction of the chain of events; and

(c) positively exclude a particular person as the source of the blood, semen or saliva.

Blood group evidence cannot be used as a fingerprint to identify a person to the exclusion of all other people, however, all other people with different blood types can be excluded as possible sources of the body fluid.

Some confusion exists with blood typing systems. Each blood typing system categorizes certain variation in a particular substance found in the blood or other body fluid. The terms 'group', 'type', 'factor', 'genetic marker' and 'phenotype' all mean essentially the same and are expressions of the various forms of a substance in a population. The particular 'type', 'group' or 'factor' within each system is genetically controlled (a contribution from each parent) and retained throughout life.

More research has been done on identifying genetic markers in blood than in other body fluids. As a result, more is known about the existence of genetic markers in blood than about such markers in semen or saliva. Thus the number of systems where factors are identified is usually greater for blood than for semen or saliva.

## □ TYPES OF EXAMINATION

1) Exhibits are examined for blood which could have come from the victim.

2) Exhibit material is examined for blood which could have originated from the accused. The accused may have bled as a result of injury or accident incurred during the incident in question.

3) Sexual assault investigations involve examinations for semen

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as well as blood. The type of exhibits received usually include swabs taken during medical examination, clothing from the victim and articles from the scene.

4) Examinations are conducted for saliva on such exhibit material as swabs from breasts, masks, gags, bedclothes, and articles of clothing. The results of these examinations can be used to corroborate other testimony.

## □ RESULTS

1) If two samples of blood (semen, saliva) are not the same in all typing systems used, then each sample must have originated from a different person.

2) If two samples have the same factors in all typing systems used, there are two possible explanations:-

(a) the two samples originated from the same person; and

(b) the two samples originated from different people but match by chance.

3) Body fluids are perishable biological substances and some degradation occurs from the time the fluid leaves the body until it is analyzed. Systems break down and become unsuitable for analysis.

Some of the factors that affect degradation are:

## □ (a) DRYING

Bloodstains that are dried retain many more typing factors than those that are not dried. Plastic bags are often used to package exhibits. When an exhibit is placed in a plastic bag while still moist or wet, microorganisms grow quickly and destroy potential evidence. When air

is allowed to pass through the packing material (eg. porous envelopes) the creation of a humid atmosphere is prevented and this will greatly reduce degradation by moulds and other fungi. Important never store blood in plastic bags.

## □ (b) AGE

Even when stored in porous packing, the more delicate enzymes present in blood will have a shorter lifetime. Thus it is imperative that exhibits be correctly stored and forwarded to the investigating Laboratory within the shortest possible time.

## □ (c) FOREIGN SUBSTANCES

Substances may be present on the exhibit material that interferes with testing. A common example is commercially laundered sheets such as found in hotels. They may be very white but due to an excess of bleach and detergent, grouping results are often inferior to those obtained from an old sheet that has never been washed.

4) Three results that often could be of assistance to investigators and prosecutors but cannot be provided are:

(a) the age of the stain: generally, if a number of grouping systems work, the stain is likely recent in terms of months. However, to determine age within a period of a few days is not possible at this time.

(b) time elapsed since sexual intercourse.

(c) the sex of the originator of the bloodstain: a reliable test for determining sex from dried stains is not available at this time.

To conclude, body fluid identification is a long study of what is left at the scene of crime which is later exhibited in court. This study is a very complicated one executed by the Police Forensic Laboratory, which helps to establish evidence and the detection of crime.