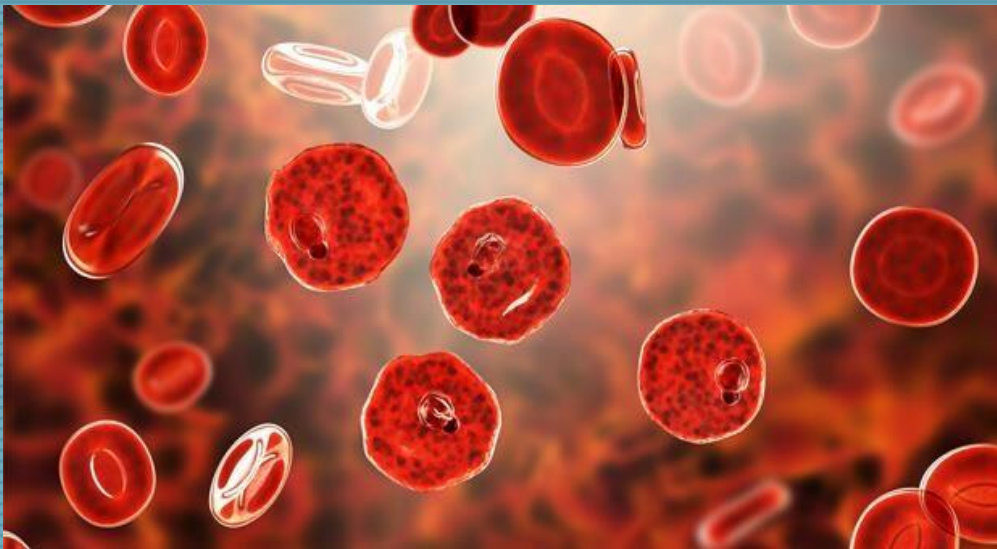


Blood Analysis

Forensic Science
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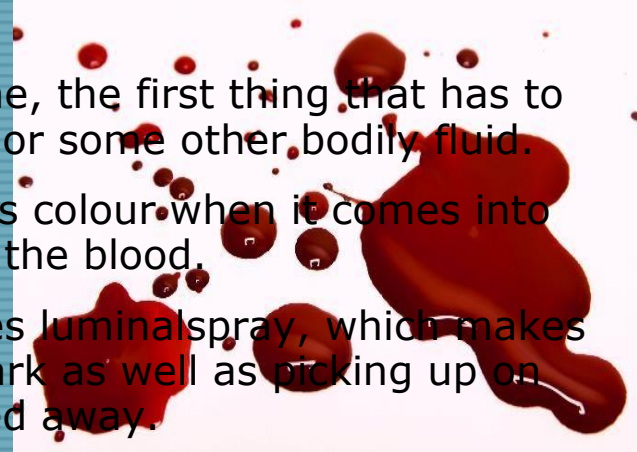
Blood Analysis



- A simple test which can be useful for many cases involving a bloodstained crime scene and in the verification/identification of a unknown victim's identity.
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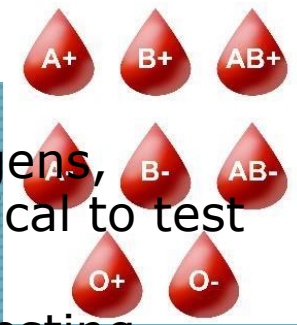
Verification

- ❑ When a stain is found at the scene of a crime, the first thing that has to be determined is whether the stain is blood or some other bodily fluid.
- ❑ Simple test involving a solution that changes colour when it comes into contact with haemoglobins or peroxidase in the blood.
- ❑ Another type of test commonly used involves luminol spray, which makes any residue containing blood, glow in the dark as well as picking up on traces of blood that may have been scrubbed away.
- ❑ Next step: confirm whether the bloodstain belongs to a human. Serologists, people who study blood, place the sample and a testing solution into small wells on a gelcoated glass plate, and the two will diffuse towards each other.
- ❑ If the sample is human blood, it will contain human antigens and where the two solutions meet on the gelcoated plate, a noticeable band forms.



Blood Types

- ❑ Determining which person the bloodstain belongs to involves an investigation of blood types.
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- ❑ The human blood contains over 100 different antigens, therefore it would be time consuming and unpractical to test for every single one.
- ❑ Serologists instead use a number different blood testing techniques, but by far the most common and effective technique is the ABO system. This system is also used to determine compatibility for blood donors and recipients.
- ❑ The ABO blood type system involves checking the surface of the red blood cells for two antigens known as A and B, with blood type being named after the type of antigens it contains - A, B, AB and O.
- ❑ By noting that a blood clump forms when the same type of antigen meets the same type of antibody, an experiment can be done on the solution of blood to determine the blood type.

The Test

- ❑ The test is done using two solutions each containing antibodies to type A and type B antigens.
 - The first solution contains type A antibodies and when mixed with type A blood, will cause it to form clumps.

- The same concept is used to test for B antigens, where a solution of type B antibodies would cause all type B antigens in the blood to clump together.
- If blood clumps under contact with both A and B antibodies, then it is of the blood type AB, since both antigens are present in the blood. O blood does not clump with any other blood type and is therefore identified because it is solitary.



The RH Factor

- For finer results yet, the blood groups can be assigned either a + or a - figure after it to indicate the presence (+) or absence (-) of a blood protein known as the Rh factor (named after the Rhesus Monkey, in which it was first recognized).
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- Using an antibody solution to the Rh protein, the same concept is used, where blood clumping determines the absence/presence of this protein. Thus, the finer blood groups include A+, A-, B+, B-, AB+, AB-, O+ and O-.



Other Bodily Fluids



- Blood is not the only fluid that is excreted from the body and tested by serologists. Substances like saliva, semen, urine and excrement contain DNA, can be compared with a suspect.
- In cases concerning rape, investigators need to be sure that the swab taken or the stain found is semen and this is confirmed using a test that changes colour on contact with SAP (seminal acid phosphatase), spermine and choline.

- Microscopes are also used to see individual sperm, but this technique is not accurate, as a rapist who has had a vasectomy or is sterile will not show sperm under a microscope, even if they committed the rape.
- However, blood, semen and urine samples all contain DNA, which is slightly more accurate (and expensive) in singling out the criminal.

□ ~~Questions or~~
Comments?