

President's DNA Initiative

Advancing Justice Through DNA Technology

DNA Analyst Training

02: Forensic Biology

Laboratory Orientation

Testing of Body Fluids & Tissues

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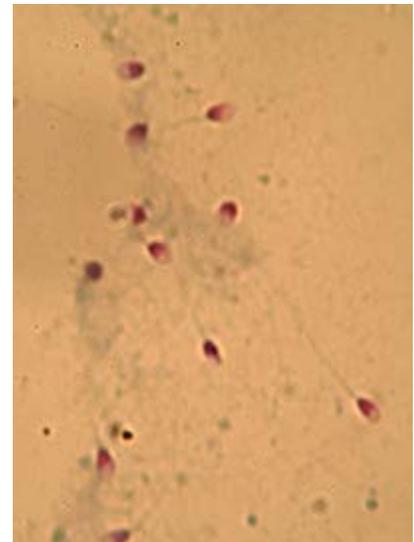
Urine

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Human semen contains unusually high concentrations of acid phosphatase, which can therefore be the basis of a screening test. The reaction is based on the hydrolysis of phosphate esters and detection of the liberated organic moiety by production of a color complex. For example, the reaction of acid phosphatase with sodium alphanaphthylphosphate and fast blue B to produce a purple-blue coloration. As with the screening test for blood, a positive result is the rapid formation of the intensely colored product – less than 20 seconds or so, or 30 seconds at most.

The best identification of semen is from its microscopy. The morphology and dimensions of the human spermatozoon are unique. The small sperm, particularly if they have lost their tails, can be difficult to locate microscopically especially in samples which have bacterial or yeast infection. Detection is simplified by histopathological staining. The most usual stain is popularly known as Christmas tree stain because of the bright colors. It utilizes nuclear fast red that differentially stains the DNA-containing head bright crimson, and a counter-stain of picric acid - indigocarmine (PIC) that stains the tails green-blue-gray. The traditional histological staining of hematoxylin and eosin (H&E) is also used, as is Giemsa stain.



Problems may be encountered if the seminal fluid is from a man who has a low sperm count (oligospermia) or who has no spermatozoa present in his seminal fluid (aspermia). In situations where the presumptive alkaline phosphate test indicates the presence of semen, but the microscopical analysis yields no detectable spermatozoa, tests are carried out to determine the presence of a protein, P30, or prostate specific antigen (PSA), which is only found in high concentration in human semen. Some laboratories even use P30 testing in place of microscopical examination for semen identification. It can be detected by precipitin reaction with a specific antiserum using the Ouchterlony process. There is also a quantitative immunological test utilizing an enzyme-linked reaction (ELISA).

However, the currently accepted method of choice for identification of semen in all circumstances is detection of p30 using the ABACard[®] test strips manufactured by Abacus Diagnostics, Inc. The strips work in the same way as described above for confirmation of blood, except that they use anti-p30 monoclonal and polyclonal antisera, and a pink dye.

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