

VALIDATION OF RAPID STAIN IDENTIFICATION (RSID) KITS FOR THE IDENTIFICATION OF HUMAN BLOOD AND SEMEN

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Blood and semen stains are two of the most common fluids recovered from the scenes of violent crimes. Therefore, the forensic scientist must be able to identify these stains reliably, consistently and specifically. Presumptive tests for blood and semen are used widely throughout forensic laboratories to detect these fluids. Previous tests for these fluids were designed to detect hemoglobin in blood and P30 in semen, but they have specific drawbacks. Tests for hemoglobin in human blood have been shown to cross-react with the blood of other species (ferret, skunk, primate) and have a tendency to indicate false negatives due to a pronounced high dose hook effect. P30 tests for the detection of semen have specificity and sensitivity limitations as well. It has been shown that acid phosphatase activity is not confined to semen or prostatic tissue. Rather, it has been found to be present in amniotic fluid, breast milk, female serum, female urine and vaginal fluid. The tests for P30 can also be influenced by high dose hook effect.

Independent Forensics (IFI) has recently released RSID-Blood and RSID-Semen, which are new assays designed to detect blood and semen in a sample, respectively. IFI claims its new tests have higher specificity than older tests and do not give false negatives due to high dose hook effect. RSID-Blood kits are more specific than older tests because they detect for the red blood cell membrane antigen, glycophorine A, rather than hemoglobin. The RSID-Semen kits are also more specific than previous tests since they were designed to detect the presence of semenogelin which is a protein found only in seminal fluid. The purpose of this study was to validate the use of the RSID kits for forensic casework.

RSID-Blood and RSID-Semen kits were tested for specificity and sensitivity in accordance with the data presented by IFI in their developmental validation work. The sensitivity of RSID kits was tested with minimal concentrations of blood and semen as well as high concentrations at which false negative results might be given (due to high dose hook effect). Next, specificity and mixture studies were performed to demonstrate that the presence of blood and/or semen were the only fluids that gave positive readings on the RSID test strips. RSID assays were also studied in order to determine the optimal time for a positive test to be determined, and to see if the recommended time for sample extraction could be shortened.

When the recommended procedure is followed, the RSID kits perform within manufacture specification. No false negatives resulted from high dose hook effect in either RSID-Blood or RSID-Semen assays. This study showed that the kits are specific

to blood and semen when tested in the presence of other human tissue. RSID-Blood kits; however, show slight background signals for samples containing only urine.