

Montana Department of Justice

Sexual Assault Kit Initiative

Video “Crime Lab – Behind the Scenes”

Get a behind the scenes look and see how the Montana State Crime Lab analyzes a sexual assault evidence kit.

Once the kit is received at the laboratory, the evidence tech updates the Kit Track information, as well as the laboratory's information management system, Justice-Trax.

Before the kit is opened by the assigned analyst, the analyst will clean their workspace thoroughly with 10% bleach. All utensils will be cleaned with 10% bleach and methanol.

Then, the condition of the seals and envelope labels are documented, and the contents are inventoried on a worksheet.

Each laboratory sample envelope is opened; the swabs assessed and documented.

If the swabs contain red/brown or brown staining, they are tested for indications of blood.

Just a small sample of the tip of the swab is placed into a labeled tube. Multiple swabs from the same location are sampled together, for example, four vaginal swabs will all be sampled in the same tube. Whereas different swab locations are sampled separately.

Upon completion of the sampling process, the kit is resealed and returned to the serology/DNA vault.

To extract DNA from the sampled swab portions, the lab uses a Hamilton Autolys Robot. One rack inside the robot can hold 24 tubes. Two racks can be run at the same time for a total of 48 tubes.

When the analyst has gathered enough samples to do a y-screening run, the samples are placed on the robot with chemicals, and the robot is started. During this process, the cells break open and release the DNA. The released DNA is quantified to determine how much DNA is present and if any male DNA is present.

Afterwards, the data is reviewed to make sure the process ran correctly, and no problems occurred with the robot or chemicals used.

The collected DNA is compared to predetermined thresholds. Only samples meeting the threshold are forwarded for full DNA analysis.

Samples identified as not moving forward for DNA analysis are permanently sealed and returned to the vault for reporting and eventual return to the law enforcement agency.

The y-screening completion can go one of two ways: No samples of DNA are collected, or samples of DNA are collected.

- 1) If no samples for DNA are collected, the case goes to Serology.
 - a. If no additional items that can be y-screened are found, such as tampons, underwear, condoms, or hair that could have DNA, Serology writes a negative report and returns the kit.
 - b. If additional items that could have DNA are present, serology tests the items, collects samples if present, and issues a report with the findings (either negative or positive).
 - i. If the findings are negative, the negative results are entered into Kit Track and the evidence is returned.
 - ii. If the findings are positive, the collected samples and associated reference standards are moved forward to DNA analysis.

If samples for DNA are collected, reference standards for the involved parties are requested (if not already present). The assigned DNA analyst then extracts the samples and quantifies the DNA. If the quantification of the DNA reaches a certain threshold, the samples are amplified via Polymerase Chain Reaction, or PCR, where millions of copies of the extracted DNA are made. The amplified DNA is placed on a genetic analyzer and the DNA profile is developed. The results will be interpreted and then compared to reference standards. The results are incorporated into a DNA report. The file and report are reviewed, and the results are released to the submitting agency.

Some samples from the case (if eligible) generate DNA profiles that are entered into CODIS and searched against other profiles. These profiles are searched against convicted offender DNA profiles and unknown case profiles. There may not be any additional data generated via the CODIS search. However, if an informative hit is generated, a HIT report will be written and sent to the applicable agencies. If the sample hits with a convicted offender, the hit must be confirmed via additional analysis. After the confirmation, an additional DNA report is written, reviewed, and released. The results of the kit analysis and CODIS hits will then be entered into Kit Track.

Additional serology may be completed, pending DNA results and availability of additional evidence. If additional serology is completed, the process starts over, and any samples collected are shuttled through the same workflow.

The report releases the y-screen results, the serology results, and DNA results.

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