Casework Context

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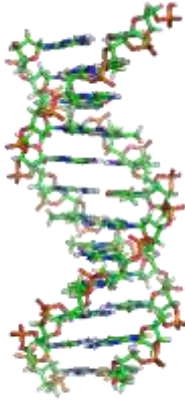
The DNA Forensic Scientist – Setting the Baseline

- If you are employed by an accredited laboratory (i.e., ANAB-ASCLD-LAB) and/or a member of a professional forensic association such as AAFS, ISFG, etc., you are **ethically bound** to apply science to the law/court – Not solely for the prosecution or defence, i.e., unbiased.
- To remind you see an article published in 1989 by Douglas M. Lucas in JFS (**43**: 719-729) – "The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits"
- DNA is **circumstantial** evidence – Does not in of itself "prove" innocence or guilt.
- Again as a reminder re-read the article published in Science & Justice (2006, **46**: 33-44) by Jackson, et. al., – "The nature of forensic science opinion – a possible framework to guide thinking and practice in investigations and in court proceedings"



The Scientific Method

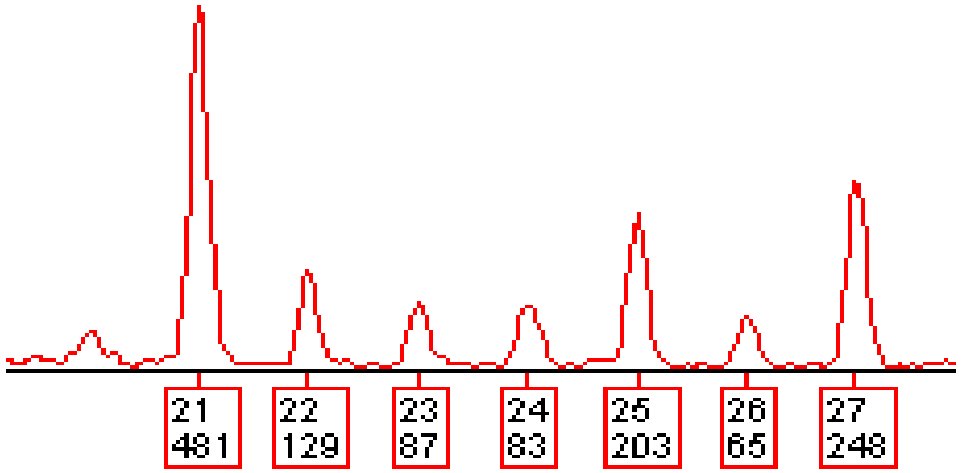
- Observations, information from initial investigation, areas of uncertainty
- Hypothesis formation
- Predictions based on the hypothesis, deductive reasoning
- Experimental Design and Experiment – the plan to generate data that directly address the hypothesis and predictions
- Obtain data
- Evaluate, interpret data
- Re-visit hypothesis
- New experiment, as needed

Considerations for Testing – Case Assessment and Interpretation

- What is the goal of the DNA testing?
  - What question is being asked?
  - Is it the correct question?
  - What answers are needed?
- Which phase of the investigation are you in?
  - Investigative?
  - Evaluative?
- Which sample(s) will most likely provide the answers needed?
  - Which additional samples may provide additional helpful information?
  - Which samples will provide no useful information regardless of the results obtained?

Considerations for Testing – Case Assessment and Interpretation

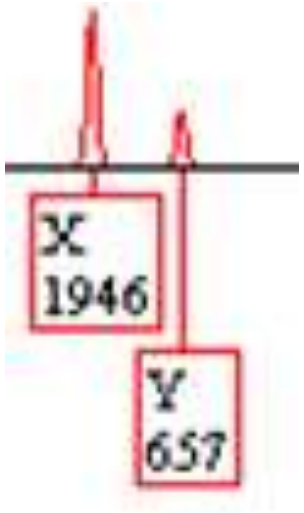
- Will the sample likely need to be consumed?
  - Issues associated with consumption of evidence
- What are likely/possible limitations of using the sample?
  - e.g., Contaminated; likely mixed; too small



Considerations for Testing

- What data are needed to answer the question?
  - Which test is best to use for the sample available and the question being asked?
  - What limitations are expected?
  - Preservation of the sample for future testing an option?

- What reference samples are needed?
  - Known contributor(s)
    - Intimate sample
    - Elimination sample
    - Person of Interest



Considerations for Testing

- What resources are available in the laboratory for testing?
  - How many samples can be reasonably tested?
  - In what time frame?

- If we think ahead to the possible test results (e.g., inclusion/ contributor, exclusion/non-contributor, single source vs. mixture, no data, insufficient for comparison), will any of the test results provide meaning to the case?
  - Answer any of the questions asked? Why or why not?

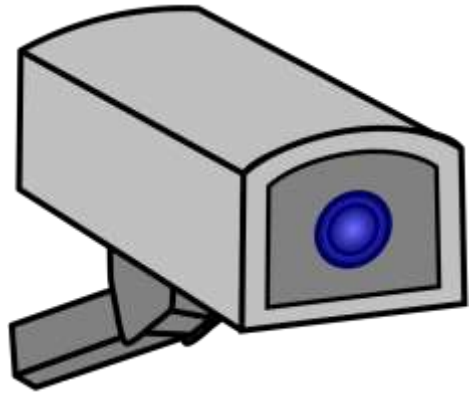
- What bias exists in the test method and analysis planned?

Three Case Assessment Scenarios

- Investigators have recovered a handgun at the scene where an individual has been fatally shot with that weapon.
- The sample of interest is a swab of the grip of the handgun.
- Will DNA analysis in each of the following scenarios address the investigators relevant question?
- Which is – Who was in control of the handgun when the fatal shot occurred?

The First Scenario

- Police are executing an arrest warrant of an individual driving a vehicle in a drive-through lane of a fast food restaurant.
- When arresting the individual, he pulls a handgun from the front of his pants – a struggle between himself and the arresting officer ensues, resulting in the driver being shot once, which is fatal.
- Will DNA analysis of the swab of the grip of the handgun address the question of who had control of the gun?
- Would a mixed DNA profile assist?
- Would a single-source DNA profile assist?
- Should DNA analysis be conducted?



The Second Scenario

- A body is found in an alley.
- Poor quality video cameras capture the shooter wearing gloves, he drops the handgun near the body and leaves the scene.
- A single-source male DNA profile is generated.
- A CODIS match is obtained – is this the shooter?
- If asked to comment on the results by investigators, what would you say?

The Third Scenario

- A body is found in an alley.
- Poor quality video cameras capture the shooter, he drops the handgun near the body and leaves the scene.
- A three-person mixed DNA profile is generated.
- A CODIS match is obtained to one portion of the mixture – is this the shooter?
- If asked to comment on the results by investigators, what would you say?

Meaning of Test Results – Reporting and Testimony

- Critical to accurately report, discuss orally and testify to the results obtained from DNA testing
  - Never sign a report that you do not completely agree with

- REMEMBER – most case results never make it to the trier of fact, so “saving explanations for testimony” is generally not an option
  - If important enough to testify to, then it’s important enough to communicate to investigators and counsel

Meaning of Test Results – Reporting and Testimony

- Provide explanation and limitations
- Consider possible bias
- Careful that the use of the data does not exceed its meaning
  - Requires education, training and effective communication

Meaning of Test Results – Testimony

- Clear explanation of results and their meaning, including limitations
  - Caution to not over-/under-represent the meaning or significance of the data
  - Educate attorneys so they don't either
- Think ahead to other possible scenarios/hypotheses that may be presented – be prepared to address
  - Possible responses include
    - I don't know
    - Don't have the relevant information to address that
    - Based on studies reported in the literature….
- Present limitations, mistakes, errors clearly and honestly
- NEVER testify outside of your expertise