Nederlands Forensisch Instituut
Ministerie van Justitie en Veiligheid

Collecting information about the origin of DNA traces

Introduction

To answer questions about how or when DNA traces were deposited, a forensic expert needs information about the circumstances of the case. In this document, we explain what information is required. This document is a general guide to gathering information that may be relevant to the scientist. In a criminal case, the scientist will discuss with you exactly what information is needed.

Background

Through the use of increasingly sensitive DNA techniques, a DNA profile can be determined from ever smaller amounts of DNA. The significance of finding such latent DNA traces (or the absence thereof) in relation to a crime is sometimes not clear. It can raise questions about how and when the traces ended up where they were found. The prosecution and the defense may have different views on this. Usually it is about the role the defendant played (what actions the defendant did or did not perform). When these differences of opinion in the form of propositions are presented to a DNA scientist, the scientist may be able to indicate how well or how poorly the DNA traces found fit these propositions (a so-called evaluation of the examination results given propositions at the activity level.

In such an evaluation, the DNA scientist assesses, based on scientific literature and on the basis of knowledge and experience in forensic investigation, the “behavior” of biological traces. In doing so, the scientist assigns probabilities to the transfer of DNA, its persistence, the presence of other (non-crime-related) DNA in the “background” and the ability to recover the traces given the methods used. In order to assign these probabilities, the scientist must have context information regarding the persons and objects involved in the case at hand.

Relevant information for the scientist

On the next page is a list of relevant information. This list of items can be used to guide the tactical and forensic investigation. The list can help with gathering and structuring information. Because the relevant information varies from case to case, it is not always necessary to gather information for all items. Also, in practice, it will not always be possible to collect all the information. The more comprehensive and specific the information is, the better the scientist will be able to formulate a concrete answer to the question on how and when traces were deposited.

1. Details of the event

a. Location of events (outdoor/indoor, weather conditions, cleaning regime)
Where was the crime committed or items found? Are there any circumstances that might have affected the trace evidence?

b. The exact timeline of events and ways in which contact was made
All actions taken and their sequence. Also the nature, duration and intensity of the contact. Think of: preparatory acts by offenders, crime-related acts, acts by offenders, victims and those involved after the offense.

c. Details of all objects involved.
What kind of objects are they, what do they look like, what kind of surfaces do they have, and where did the victim, offender, other involved persons, or other items (possibly) have contact with the object?

d. History of all involved items before the event
What happened to the objects in the period leading up to the crime? Who has been in contact with the items, how often, and with what intensity? Were the objects cleaned and, if so, when?

e. Details about what happened to the objects after the events and before packaging (examinations, sampling, etc.)
Were any actions performed with the objects or traces after the crime, for example, by emergency services? Were the objects sampled, moved or touched prior to packaging?

2. Relationships between

a. The suspect and objects and locations of interest.
The relationship between the suspect and, for example, a weapon or location where the crime was committed. Is the suspect the owner of the weapon? Does he or she visit the location more often, and if so, what has he or she done there?

b. The victim and items and locations of interest
The relationship between the victim and, for example, a weapon or location where the crime was committed. Does the victim own the weapon? Does he or she visit the location more often, and if so, what did he or she do there?

c. The suspect and the victim
What is the relationship between the suspect and the victim? Consider the type of relationship, when the last contact occurred and the nature, duration and intensity of the contact.

d. Others not directly involved in the criminal activity, but still associated with the suspect, victim, location, or items that are of interest
What other persons have had contact with the victim, the suspect, objects and/or locations? What has been the nature, duration and intensity of this contact?

3. Packaging, storage and transportation of objects under investigation

a. Condition of the object or biological material on site.
When found, was the object wet or dry, was the object dried, or was it packed while wet? Are there photographs of the object in its most original condition of encounter?

b. Sampled, transported and stored on site.
Was the object examined prior to packaging (e.g., an indicative examination).What other actions were taken with the object performed between securing and delivery to the laboratory?

c. **Type of packaging, transport and storage conditions**
In what type of packaging was the object packed, has it been unpacked and repackaged (is this in the same package or a new one)? Are there any particularities in the transportation or storage of the object?

If other laboratories have been involved in (parts of) the investigation of biological traces and DNA testing, then the following information is also relevant:

4. Investigation of biological traces and DNA

a. **When was the investigation conducted?**
b. **What examinations were conducted?**
At what site(s) and by what methods was the object sampled? Were tests done to determine the type of cellular material? If so, which tests were these and what were the results?
c. **What methods were used to conduct the forensic DNA examination?**
DNA extraction, profiling and methods used in the interpretation of the DNA profiles (including statistical calculation models).
d. **From which persons and locations was reference material involved in the DNA comparison?**