



E80 The Smell of DNA: How Genetics and Fear Influence the Human Scent

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Learning Overview: After attending this presentation, attendees will better understand how genetics and fear can modify the human scent.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing an explanation of how genetic characteristics and fear-stressor situations could influence the human scent, creating great difficulties for detection dogs.

Human scent identification is based on a matching-to-sample task in which trained dogs are required to compare a scent sample collected from an object found at a crime scene to that of a suspect. Based on dogs’ greater olfactory ability to detect and process odors, this method has been used in forensic investigations to identify the odor of a suspect at a crime scene. These dogs are also used to search for missing persons.

Many studies have shown that human scent can persist and maintain its main chemical features for a significant period of time in a particular place or/and on an object that was manipulated by a subject. For this reason, search and rescue dogs are trained to follow the scent of each person to be located and finally rescued. The results are very surprising; in previous studies, perfect responses were obtained. But, unfortunately, real cases frequently report non-positive results, especially in the recovery of missing people. One of the causes of the failed findings of the missing persons is the so-named “smell of the fear” that could confound the dog, covering the original scent of the missing person.

In specific situations, the stress management represents an important aspect to releasing the confounding scent. Moreover, several studies have provided strong evidence for an association between a polymorphism in the promoter region of the serotonin transporter gene (SLC6A4 gene) and neuroticism, defined as proneness to negative emotionality, including depression and anxiety.

The goal of this experimental study is to define how genetics influences the release of the confounding scent in the particular stressor events that occur in real forensic cases, such as a homicide or missing person. Several volunteers were tested for the 5-HTTLPR polymorphism. Two groups will be defined: ten in the group’s homozygotes for the long variant (good management of the stress) and ten in the group’s homozygotes for short variant will be enrolled.

A t-shirt was worn for ten minutes under normal circumstances, without a stressor event (T_0). Then another t-shirt was worn after a stressor event (T_1). All t-shirts were concealed in different places. Subsequently, a trained dog was used to find the t-shirts, with the aim of verifying if the stressor event in the subject with the short variant had changed the released scent. Finally, a mass spectrometry analysis was performed to analyze if the characteristics of the released scent were modified between the two tests (T_0 - T_1).

After attending this presentation, attendees will have a better comprehension on a direct implication of the stressor events on the forensic investigation. Moreover, it will be illustrated that genetic characteristics could influence the human scent.

DNA, Smell of Fear, Detection Dogs