

## **DNA evidence in the trial of Amanda Knox and Raffaele Sollecito, Perugia, Italy**

### **Background**

This case involves the murder of Meredith Kercher, a British exchange student living in Perugia, Italy. On the night of November 1, 2007 Meredith Kercher was brutally attacked in her residence. She sustained three slash wounds to her throat, one of which was fatal. Her body was found the next day when her housemate, Amanda Knox, called police after noticing blood in their common bathroom, a broken window, and Meredith's locked door. Before the police arrived, Amanda's Italian boyfriend, Raffaele Sollecito, unsuccessfully attempted to force open Meredith's door. The police were able to open the door and found Meredith's partially disrobed body under a duvet cover.

Police initially theorized that Amanda, Raffaele and Amanda's boss, Patrick Lumumba, were involved with Meredith in a group sex tryst gone awry. However, during the ensuing forensic investigation, a drifter named Rudy Guede was conclusively linked to the scene by DNA found within the victim's body, DNA from a bowel movement left unflushed in one bathroom, a bloody handprint under the victim's body, and other items at the scene. After Lumumba was released based on an airtight alibi, the police theorized that Guede was the fourth participant in an alleged lethal sex game, although the only foreign DNA found on and within Meredith's body matched Guede.

Rudy Guede fled to Germany but was arrested and returned to Italy. He initially told police that he had consensual sex with Meredith and that while he was in the bathroom a stranger came into the room and attacked her. Some months after his arrest he changed his story to identify the stranger as Raffaele and said that Amanda was present outside of the room. Although Rudy Guede has been tried and convicted of Meredith's murder, the prosecution continues to believe that Amanda and Raffaele are complicit in this crime.

As the trial of Amanda Knox and Raffaele Sollecito draws to a close, two pieces of DNA evidence presented by the prosecution to link the defendants to the crime stand as most significant. One is a kitchen knife recovered from the kitchen drawer at Raffaele's apartment. The other is a portion of a bra clasp that was cut away from the bra that Meredith was wearing. This piece of cloth and metal was collected from the bedroom floor 47 days after her murder. The following paragraphs outline the facts and our conclusions about this evidence.

### **The kitchen knife:**

The prosecution claims that DNA testing shows the presence of Amanda's DNA on the handle and Meredith's DNA on the blade. The following information pertains to the knife:

- The knife was selected from among several knives in the kitchen drawer of Raffaele's apartment. It was the only knife collected from the kitchen, although it had no visible stains or notable characteristics.

- Testimony has been given in court that this knife could not have made two of the three slash wounds to the victim's neck, but that a smaller knife could have made all three wounds. Furthermore, this knife did not match a bloody knife imprint left on the bed.
- An extremely sensitive chemical test for the presumptive presence of blood, tetramethyl benzidine (TMB, a chemical capable of detecting at least a 1:10,000 dilution of blood), was **negative** for both the handle and blade.
- A swabbing of the handle revealed the presence of Amanda's DNA. This is not unexpected since she had used the kitchen knives to prepare food at Raffaele's apartment.
- A swabbing of the center portion of the flat edge of the blade was taken for further analysis. This sample **tested negative for blood with TMB.**
  - An extremely low level, partial DNA profile was developed for the blade swabbing using the Identifiler kit. The alleles detected were consistent with the DNA of the victim. The highest peak in the electropherogram was approximately 100 relative fluorescence units (rfu), **while 21 of the 29 peaks that were detected and labeled as alleles fell between 20 and 50 rfu.**
  - This DNA does not originate from blood. A highly sensitive chemical test for blood was negative, and it is unlikely that all chemically detectable traces of blood could be removed while retaining sufficient cells to produce a DNA profile consistent with the victim.
  - Numerous samples were collected from the crime scene that were tested and shown to contain high quantities of the victim's DNA. There exists the real possibility that the low level, partial profile attributed to the knife blade is a result of unintended transfer in the laboratory during sample handling. Numerous examples of this have been documented by other laboratories.
  - Electronic (.fsa) files that would allow independent analysis of the data have not been disclosed.
  - Neither the extraction nor amplification of the low template DNA from the kitchen knife blade was duplicated. The test can not be reproduced as the swab and DNA extract were consumed during testing.

**Conclusion about the kitchen knife:**

No credible scientific evidence has been presented to associate this kitchen knife with the murder of Meredith Kercher.

### **The bra clasp:**

The prosecution's DNA testing of a bra clasp that was cut away from the bra that the victim was wearing shows a mixture of DNA from which Raffaele Sollecito was not excluded. The following information pertains to the bra clasp:

- DNA testing of this item using the Identifiler kit showed a mixture of DNA, with the majority of DNA consistent with that of the victim. Raffaele Sollecito could not be excluded as a source of a minor component of DNA with peaks of approximately 200 rfu. Y-STR testing confirmed that the male haplotype detected was consistent with the DNA of Raffaele Sollecito.
- The bra clasp was recovered from the floor of the victim's bedroom, 47 days after the murder, and 46 days after the initial evidence collection at the crime scene. By the time it was collected, it was in a different location than where it was originally documented by video. It had been moved to a mixed pile of clutter beside a disheveled rug.
- Neither Raffaele Sollecito's nor Amanda Knox's DNA was found on: the remainder of the bra that was found with the victim, other items of victim's clothing, objects collected from the room where the victim was found, or in samples from the victim's body. These evidentiary samples were all collected the day the body was discovered.
- Raffaele Sollecito had been at the house shared by Amanda and Meredith several times. Furthermore, Amanda, Meredith and their guests shared a bathroom. Transfer of Raffaele's DNA to the clasp could have occurred through several innocent means as a result of his DNA being in the apartment or via Amanda's clothing or belongings.
- DNA testing cannot determine how biological material was deposited onto an item of evidence: whether by direct deposit, or by secondary transfer through an intermediary. DNA testing cannot determine how long biological material may have been on an item, or whether contamination occurred during collection.

### **Conclusions about the bra clasp:**

Handling and movement of this sample has compromised its probative value. The laboratory results for this sample cannot reliably be interpreted to show that the DNA of Raffaele Sollecito was actually on the bra clasp at the time of Meredith Kercher's murder, and it does not establish how or when this DNA was deposited or transferred.

### **Summary:**

DNA testing results described above could have been obtained even if no crime had occurred. As such, they do not constitute credible evidence that links Amanda Knox and Raffaele Sollecito to the murder of Meredith Kercher.

Respectfully submitted on November 19, 2009 by:

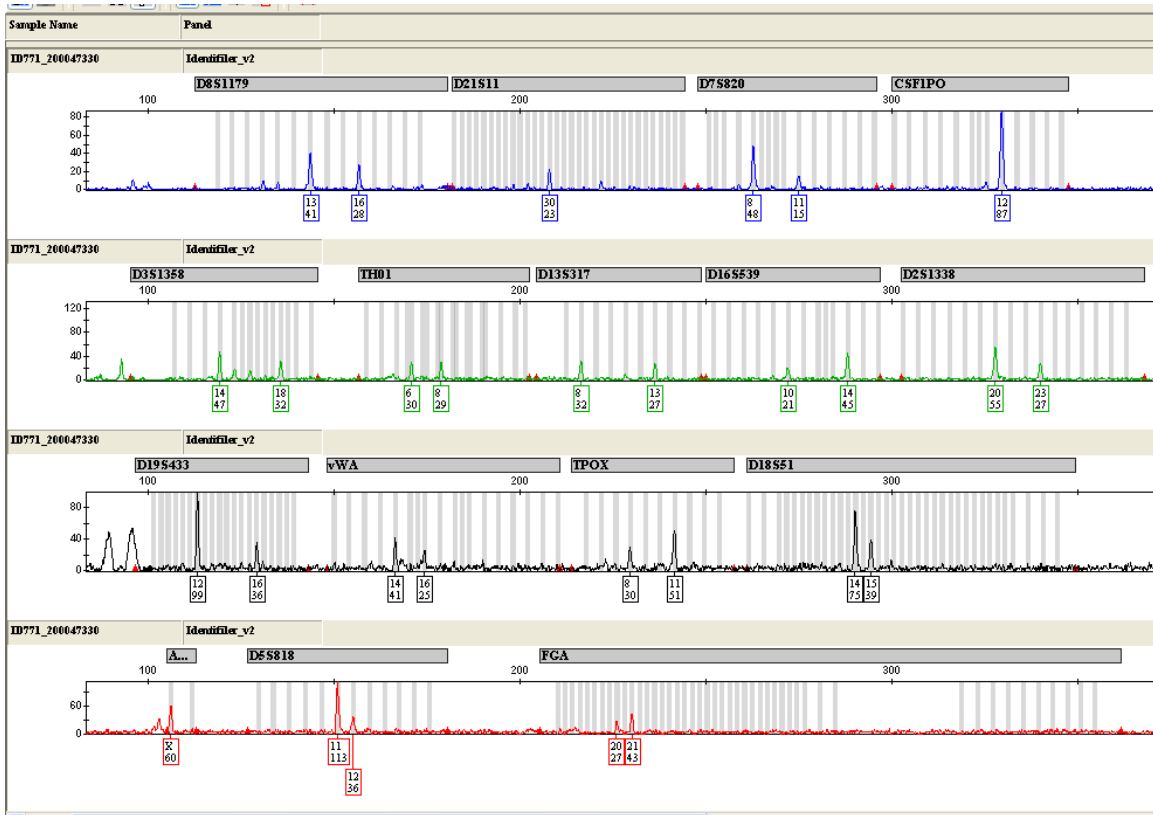


Elizabeth A. Johnson, Ph.D.  
Forensic Biology/DNA expert  
Thousand Oaks, California  
circej@earthlink.net  
805-553-0445



Greg Hampikian, Ph.D.  
Professor and Director of the  
Idaho Innocence Project  
Department of Biology  
Boise State University  
[greghampikian@boisestate.edu](mailto:greghampikian@boisestate.edu)  
208-781-0438

**Figure 1. The low copy DNA electropherogram of the knife described above.** Almost all peaks are below 75 RFUs, and most are below 50 RFUs. Neither duplicate extractions nor duplicate amplifications were performed. Duplicate injections were run. This electropherogram represents the most complete result obtained.



I have read the attached letter dated November 19, 2009 written by Elizabeth A. Johnson, Ph.D. and Greg Hampikian, Ph.D. regarding DNA evidence in the trial of Amanda Knox and Raffaele Sollecito. While I have not had the opportunity to review all of the case-specific data in this matter, I agree that the scientific evidence that they describe does not convincingly associate the kitchen knife with the murder of Meredith Kercher. I also agree that the handling and movement of the bra clasp that they describe would have compromised its probative value, and that the presence of a DNA profile does not speak in any way to the time frame or the circumstances under which DNA became associated with this sample. The DNA testing results that they describe could have been obtained even if no crime had occurred. As such, they do not constitute credible evidence that links Amanda Knox and Raffaele Sollecito to the murder of Meredith Kercher.