

Author's Response

I read with great interest the commentary by Sutherland B, Cordiner S, Bright J, and Walsh SJ on my recent trace DNA review article. Within that review article, I discussed the potential of fingerprints to bear sufficient DNA to produce DNA profiles.

As has been our experience, Sutherland, Cordiner, Bright, and Walsh have determined that DNA profiles can be obtained from fingerprints and handprints. Rather than fuming with cyanoacrylate as suggested in the article, they developed fingerprints by dusting directly with fingerprint powder. In testing cited by the commentary authors, 3 of 11 impressions produced partial DNA profiles, which subsequently matched known donors. My theory is that trace DNA bearing cells are held in place through application of a minute layer of acrylic film in the fuming process. In this manner, fingerprints can be evaluated and processed with cells held in place, which can be used for DNA analysis should the fingerprint have insufficient detail for comparison.

The commenting authors express concern over the potential contamination posed by re-use of fingerprinting brushes. In a study they conducted, a full unknown DNA profile was found on a fingerprint brush. I strongly encourage the commenting authors to publish their study as they indicate, or elaborate on the conditions under which the fingerprint brushes were used, the number of brushes tested and the manner in which they were tested. I must concur with their assertion that dusting areas around bloodstains, and then recharging and reusing the brush could lead to secondary transfer to subsequently dusted surfaces. Their findings may demonstrate the need for additional special treatment of surfaces considered for trace DNA, especially if fingerprinting is to be attempted first. It is interesting to note that their previous experiments did not result in any unknown profiles. Was the same brush re-used in this testing? Fuming with cyanoacrylate as suggested in

my article may be a means to prevent contamination, by preventing direct contact between the brush and DNA bearing cells via the applied film of acrylic applied in the fuming process. Additional testing in this area is certainly warranted.

Experience within my laboratory relates an interesting case that confirms the need for careful handling of evidence during the fingerprinting process. A two-year old unsolved homicide was being re-examined for potential using new trace DNA applications. Among the exhibits of renewed interest was a knife left in the kitchen sink, not far from the victim, who lay deceased on a sofa. The knife handle was resubmitted to the Acadiana Criminalistics Laboratory, and swabbed for trace DNA. The resulting DNA profile was from a male, whose profile did not match any of those generated from the numerous individuals whose reference samples were previously submitted in the case. A further review demonstrated a match to a profile from a member of the identification support section, who had previously handled the knife in the fingerprinting process. With any increase in the sensitivity of a technique, as is the case with PCR STR DNA analysis that has enabled the analysis of trace DNA, comes a new group of considerations. As pointed out by the commenting authors, these new considerations may require adjustment of fingerprinting procedures.

With new crime solving potential represented by application of trace DNA comes a number of valid concerns, including those expressed by Sutherland, Cordiner, Bright, and Walsh. Careful handling of exhibit items from scene to court proceedings is required, as contamination prevention is paramount to ensure exhibit integrity.

Ray Wickenheiser, B.Sc., Hons.
Laboratory Director
Acadiana Criminalistics Laboratory
5004 West Admiral Doyle
New Iberia, LA 70560