INTO THE WILD: TRANSLATING DNA-BASED HUMAN IDENTIFICATION TECHNIQUES TO A WILDLIFE ATTACK

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Since the emergence of DNA-based human identification techniques in the 1980s, DNA technologies have continued to advance, offering the potential to identify a perpetrator from a variety of evidentiary samples. In recent years, a multitude of DNA extraction methods and kits have been developed explicitly for forensic purposes, many of which aim to maximize the amount of DNA that can be recovered from compromised samples collected at a crime scene. In addition to crime scenes involving human perpetrators, forensically relevant methods and technologies can be applied to wildlife cases including identification of nuisance animals or in the case of an animal attack.

On May 10th 2016, a hiker was attacked by an American black bear while sleeping in his tent in the backcountry of the Great Smoky Mountains National Park. While the hiker suffered non-life threatening injuries, National Park Service (NPS) officials wished to positively identify the attacking bear using molecular methods. Items from the destroyed campsite were transported to the Forensic Science laboratory at Western Carolina University (WCU) and samples were taken from items likely to harbor DNA. Bite marks on a cellular phone and plastic bottle were swabbed with a moistened flocked swab and clippings were taken from chewed edges of a torn tent and paperback book. All samples were processed following a trace DNA protocol designed for human identity testing. Genotyping at bear STR markers yielded a complete profile at seven of eight loci. Following the attack, NPS officials captured three suspect bears and collected samples including hair, tissue, oral and fecal swabs. Hairs were processed following a DNA extraction method for human hair shafts developed at WCU; tissue was processed using standard silica-based extraction method and oral and fecal swabs were processed following trace DNA extraction protocol. None of the STR profiles from captured bears matched the profile of the attacker. All samples were processed in less than 24 hours so that suspect bears could quickly be excluded and the search for the attacking bear could ensue.

This particular case illustrates how DNA-based human identification methods are translatable to wildlife cases. Evidence collection devices such as flocked swabs and DNA extraction techniques such as trace and hair protocols developed for human samples are extremely useful in the case of a wildlife attack. We now have the ability to rapidly process wildlife samples using the described techniques in future attacks or to resolve nuisance animal issues.