B9 The Occurrence of Non-Human Products in PowerPlex® 16 Profiles in Human Bone and Tooth Samples 8-11 Years Old

Lejla Smajlovic, BS, Edina Omerovic, BS, Jon Davoren, MS, Daniel Vanek, PhD, Rijad Konjhodzic, BS, John D. Crews, MS, and Edwin F. Huffine, MS, International Commission on Missing Persons, Alipasina 45a, 71000 Sarajevo, Bosnia-Herzegovina*

Attendees will be given an overview of the non-human product that is observed in some of the STR profiles from bone and tooth samples recovered during identification of missing persons in the former Yugoslavia.

In the region of the former Yugoslavia there are may be up to 40,000 persons still missing as a result of the armed conflicts in the 1990s with an estimated 30,000 located in Bosnia and Herzegovina. The remains of approximately 12,000 persons have been found in mass graves throughout Bosnia and Herzegovina. Due to the magnitude of the losses coupled with the condition of the mortal remains, the majority of cases currently being exhumed can not be accurately identified without DNA testing. Because of this tremendous need, the International Commission on Missing Persons (ICMP) developed a high throughput DNA testing capability that is presently testing around 1,000 bone samples per month.

The decomposition process is still on-going in many of the bodies that have been recovered resulting in a rich environment for bacterial growth and proliferation. During the analysis of bone profiles, it is observed that there are apparently non-human artifacts appearing in the range of the allelic ladder when using the Promega PowerPlex® 16 system. Some of these appear in known allelic positions and are assigned an allele number by the ABI Genotyper® software. In addition, these bacterial peaks may be of such great intensity that true human alleles are masked. These two consequences of co-amplification of bacterial and human DNA have the potential of leading to incorrect STR DNA profiling of the human DNA, thereby interfering with a successful identification process. In order to prevent false exclusions it is occasionally necessary to eliminate questionable STR alleles in the final reported STR profile even though some of these omitted peaks may be genuine.

For the purposes of this study, one-month's output of the ICMP's bone processing laboratory was scanned for the occurrence of nonhuman artifacts. It was observed that approximately 50% of the bone profiles have some detectable artifacts. The artifact peaks are most intense in the green dye (JOE), although, due to their intensity, it is not rare that some of them bleed through into other dyes. There is a wide diversity in the appearance of these artifact peaks and ranges from very intense, high RFU, broad peaks, to ones much like the expected peaks originating from human DNA. Their occurrence can influence analysis twofold: along with the already mentioned possibility of false profiles, their height can interfere with the successful label filtering. In the green color there are non-human peaks that interfere with the calling of alleles at: D5S818, D13S317, D16S539, CSF1PO, and Penta D. The only loci where no artifact peaks have been observed is D7S820.

Thirty-five samples that, in total, included all observed artifact peaks, were further tested to determine which primers trigger the amplification of a given product. Tests were conducted using PowerPlex 16 primer sets that had one green loci deleted. Once primer sets were identified that caused the amplification of these artifact peaks, duplex reactions were performed to further identify the primers involved in the amplification.

STR, DNA, ICMP

 ** Presenting Author*