EXAMINATION OF THE FUNCTIONALITY OF REDESIGNED STR PRIMER SETS IN THE ANALYSIS OF DEGRADED DNA FROM HUMAN SKELETAL REMAINS

Kerry L. Opel, B.S. M.A., Denise Chung, B.S., Jiri Drabek, PhD., Nancy Tatarek, PhD., and Bruce McCord, PhD
Ohio University, Chemistry and Biochemistry, Athens, OH

In heavily degraded DNA, poor amplification of the larger sized amplicons in standard multiplex typing kits (300-500 bp), is common. Due to sample decomposition, the DNA template can become highly fragmented, and the yield of template fragments having a complete target sequence is reduced. Thus, a "decay curve" is seen in multiplex kits with a wide range of amplicon sizes, in which the larger loci have much lower intensity, and often fall below the detection threshold. New primer sets, known as miniplexes, have been designed to place the target sequence much closer to the repeat region. This new set produces smaller amplicons, and increases the probability of obtaining a usable profile from degraded DNA. The functionality of these primers was tested on DNA extracted from human skeletal remains. The samples were obtained from the Anthropological Research Facility at the University of Tennessee – Knoxville and from the Franklin County Coroner's Office, Columbus, Ohio. These remains were exposed to a variety of conditions and were used to examine the efficiency of amplification by the miniplex kits using known samples. The miniplex kits were used with some success to amplify DNA from the remains that could not be amplified by traditional larger STR kits. The main problems encountered in dealing with these samples were contamination by extraneous DNA and Taq Polymerase inhibition.