USAGE OF THE POWERPLEX® S5 MINI-STR SYSTEM IN DNA IDENTIFICATION OF SKELETAL REMAINS FROM SECOND WORLD WAR

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INTRODUCTION: During the last two decades, different methods of forensic DNA testing have been widely established and accepted as the standard procedure for the identification of human remains. The identification of human remains found in mass graves always employs different methods: identification by a living person, fingerprint analysis, dentition analysis, identification of special features, recognition of clothing and belongings, autopsy findings, the analysis by forensic anthropologists to estimate the species of the remains, sex, age, race, reconstruction of facial features from skulls, hair comparisons and DNA analysis. Since 60 years long time period from the end of the WWII, DNA analysis became the only solution in identification of victims' remains from that time. During 2007, the international scientific team was working on the challenging topic: DNA identification of the skeletal remains from the two WWII mass graves from Slovenia. Initially, PowerPlex®16 and PowerPlex®Y kits were successfully used for obtaining this goal. But in some cases both of those kits could not provide us any useful information.

CASE DESCRIPTION: Two brothers were looking for their mother. According to the 60-year-old information, they succeed to locate a gravesite that possibly contained her remains. Samples for DNA analysis (femoral fragments from skeletal remains and buccal swabs from both brothers) were collected, labeled and transported to our laboratory. Initally, PowerPlex®16 kit was used to simultaneously amplify 15 STR loci. Of course both referent DNA profiles were successfully generated, but, unfortunately, we could not obtain any results from the bone sample. The DNA was isolated from bone sample using optimized phenol/chloroform alcohol extraction, following additional DNA purification methods (N-buthanol precipitation and multiple washing through the Centricon-100® centrifugal filter units). After all, DNA quantity, which was determined using Quantifiler Human DNA Quantification Kit and it was carried out in AB 7300 Real-Time PCR System, still was undetectable. Anyway, we have performed amplification step using PowerPlex S5® system. The total volume of each reaction was 10µL. As the result of that, full female profile (over all 5 loci) was obtained and we had positive match with both brothers with LR=295. Of course, that was not enough for the strong, final conclusion about identity of processed human remains, but it was more than enough to give us preliminary information about it and to prove it that the most recent concept of miniSTR kits will certainly upgrade the analysis of DNA from old bones and teeth.