Abstract

During the last twenty years, immense progress occurred in the area of analysis of DNA extracted from historical material. Considering the common level of preservation of tissue material, this analysis is usually executed on samples procured from bones and teeth. The analysis of soft mummified tissue is possible only in rare cases. Limiting factor of these analyses is a high degree of degradation and small amount of DNA extractable from this kind of material. First researches concentrated only on short sections of mainly mitochondrial DNA. Today, the analysis of the complete mitochondrial genome of both contemporary and extinct organisms was made possible. In case of analyses conducted on human remains, sections of nuclear DNA are far more valuable, because they can reveal information including not only subject's sex, but also possible kinship between subjects found e.g. in the same grave.

Fundamental component of the whole analysis is the process of extracting DNA from cells. Probably every laboratory working with historical DNA uses a differently modified extract protocol. The main requirement for methods of extraction is to secure enough DNA with such a level of purity that would allow its use for following steps of the analysis. Taking in consideration high fragmentation of DNA, it is necessary to optimize all parts of the analysis to this factor - including its isolation and amplification. Last but not least, while working with (not only) historical DNA, it is important to abide by the precautions preventing contamination of the sample with recent DNA and consequently destroying the result of the analysis.

The objective of this thesis was the analysis of DNA extracted from individuals from several burial-grounds belonging to different historical periods. First, this method was verified on samples, at which previous method of DNA analysis failed. For isolation of aDNA, we chose protocol based on silica extraction. On aDNA procured with the use of this method, we amplified STR locus with primers modified in a way making the resulting product of the synthesis usable for analysis of degraded DNA. Procured STR profiles were thoroughly compared with profiles of people, who might have been the source of external contamination. While working on this thesis, the analysis was successfully rendered in more than 50% of cases.

Key words: historical DNA, silica based extraction, miniSTR, bone, teeth.