Секция «Молекулярная биология»

DNA PROFILING IN HUMAN BIODOCUMENTATION

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Explanation: The purpose of our study is to perform a DNA profile using the str analysis method.

Key words : DNA profiling preparation, short tandem repeat (STR), polymerase chain reaction (PCR)

DNA (deoxyribonucleic acid) prophylaxis is a technique that can be identified and compared by individuals using appropriate DNA profiles. With the help of DNA profile can be used in old and unsolved crimes, in the identification of human remains, in parental tests, in the diagnosis of hereditary genetic diseases. This technique was developed in 1984 by British geneticist Alec Jeffreys. **(https://ib.bioninja.com.au/)**

One of the methods of DNA profile is STR (short tandem iteration) analysis. STR analysis is a tool for forensic analysis that evaluates specific STR regions in nuclear DNA. The variable (polymorphic) nature of the STR regions analyzed for forensic testing increases the discrimination between one DNA profile and another. The DNA profile system used today is based on PCR (polymerase chain reaction) using simple sequences or short tandem iterations (STRs). This method uses highly polymorphic regions with a short repetitive DNA sequence. These STR loci (locations on the chromosome) are targeted by sequence-based primers and amplified using PCR. The resulting fragments of DNA separated and determined using electrophoresis . (https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/y-str)

STR analizind Y xromosomunda qısa tandem tkrarları (Y-STRs) istifad olunur. Y-STR'ler tez-tez mhkm, ata v genealoji DNA testlrind istifad olunur. Y-STRs xüsusi olaraq kişi Y xromosomundan alınır. Y xromosomunun genetik testinin vzifsi Y xromosomunda yerlşn polimorf lokusların allelik variantlarını analiz etmkdir. Kişi xttind qohumluq laqsi tyin edilrkn, allelik variantlar iddia ediln qohumlar arasında müqayis edilir v laqli olub olmadığını müyynlşdirir. Bu vziyytd müayin üçün tqdim olunan bioloji material bir neç analiz mrhlsindn keçir:

1. -Isolation of DNA from biological material. The process of isolating DNA from cells is very important and time consuming. At this stage, it is very important that DNA molecules from the environment do not enter the test tube of biological material (for example, house dust contains dead and eroded skin cells and hair particles). For this reason, DNA extraction is performed especially in clean rooms and special laboratory boxes;
2. -In the next stage of analysis, the number of autosomal polymorphic loci studied increases with the simultaneous insertion of a fluorescent label on each copy of the locus. The polymerase chain reaction (PCR) method is used here.
3. -In the final stage, the resulting mixture of DNA molecules is analyzed. To do this, molecules of different lengths are separated in the agarose gel under the influence of an electric field. Fragmented DNA fragments are laser read and the lengths are automatically entered into a computer. The differences are determined by comparing the results with each other, as well as with a standard genetic marker.

The use of this method in Azerbaijan can play an important role in the development of forensic genetics. In addition, I think that the STR on the Y chromosome (for the result of the paternal ancestor) and mitochondrial DNA (for the result of the maternal ancestor) must be combined to find out from which bio-geographical region both parents come. Such a combined genetic approach will allow us to draw conclusions from the bio-geographical ancestors of mixed individuals whose biological ancestors came from very different geographical regions, which is not possible with Y-chromosome DNA or mt DNA alone. STR plays an important role in the regulation of transcription, as well as influences recombination, the formation of nucleosome location signals and the preservation of the spatial structure of chromatin. A broader study of mutations and variability is required to understand the new biological functions of STR.

References

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