DNA Fingerprinting for a Variety of Applications

Forensic analyses on animals

If you have suffered from an attack by a dog, problems with your neighbour's cat, an accident – Medigenomix can help you. As a laboratory specialising in DNA analyses, Medigenomix offers a wide variety of methods unequivocally assigning biological traces to individuals. DNA fingerprinting is a state-of-the-art method and Medigenomix' genotyping service includes identity testing and forensic DNA trace analysis. Having proven their experience in this field, Medigenomix provides services to both government and private clients in analysis of traces of animal origin and comparison of these DNA-profiles with those of suspects in order to confirm or to exclude an animal as the origin of a trace. Samples of human origin are mostly processed by police laboratories which are not necessarily familiar with animal testing. For example Medigenomix worked on a case where a bone chewed by a dog and left at a crime scene, convicted the owner of the dog as a thief. With microsatellite markers currently available for many different species, the laboratory can identify dogs, cats, horses, cattle, pigs as well as deer, fox and other wild animals. A similar application includes traceability and authenticity checking of meat.

Ancient DNA

Medigenomix is also expert in handling ancient DNA and has recently expanded cooperation with the American Museum of Natural History (New York). In a first project, supported by the National Science Foundation (NSF), the scientists succeeded in drawing up DNA-fingerprints of 30 000 years old mammoth bones from Alaska and Siberia by microsatellite analysis. The aim was to find out possible relationships among the mammoths, to derive conclusions concerning the migration behaviour of this extinct species. The excellent results of Medigenomix' experts convinced the US-American partner and they expanded the project. The Medigenomix team is now working with samples of extinct musk ox and sections of rat skin which are more than 100 years old

Paternity testing

DNA fingerprinting or genotyping is also the global state-of-the-art method for establishing paternity testing. Amplification of specific genetic markers, so called microsatellites, by PCR (Polymerase Chain Reaction) produces the genetic fingerprint, which is highly specific for each individual, so that one in a trillion individuals can be distinguished. As the genome of every single individual is the combination of the genomes from both parents, the DNA profile of an individual is a combined pattern of parental genetic markers. The comparative analysis of a

specific set of these microsatellite markers permits a reliable assignment of paternity for each individual.

Specimens for paternity testing are usually taken from cells inside the mouth. Biological samples for trace analyses can be selected from blood, sperm, skin and even excrement. In the case of a paternity test, Medigenomix can even assign paternity from examination of bone samples after cremation. Another case involved examination of human bone material from a Second World War grave in Poland.

DNA profile in credit card format

Personal DNA profiling allows identification of victims of plane accidents, explosions, terrorist attacks or fire disasters in tunnels. Two years ago, Medigenomix initiated its **M-Card** which offers the opportunity for individuals to have their unique DNA-Profile in the format of a credit card. Until now, customers have mainly included security services. The M-Card profile is unique, thereby allowing a 99.9999% accuracy in identification of any individual. Stored in a safe place, the M-Card provides identification after an accident when the victim cannot be identified on the basis of morphological features. As with paternity testing, 16 genetic markers are used, thereby creating an individual DNA profile that statistically exists only once in a trillion humans.

General information/data security

The DNA regions used for individual identification, as in the M-Card profile, are specific isolated genetic loci in the non-coding regions of the genomic DNA, where no functional genes are encoded. Therefore it is not possible to derive any information concerning potential genetic diseases or personal features from these results. All DNA samples are destroyed after the test results have been finalised.

Since 1998, Medigenomix has been providing DNA analyses for R&D as well as for various routine applications and has become highly reputed as a reliable provider of DNA identity and paternity services. The laboratory has regularly taken part in the inter-laboratory tests of the German Society for judicial medicine and the criminal institutes of the federal government and the German "Länder", GEDNAP. As a contract partner lab of several criminal investigation departments of the “Länder”, Medigenomix has analysed more than 40 000 samples for the National DNA-Database.

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