

Basics of forensic genetics

Forensic application of DNA testing

- Identification of unknown humans/cadavers and/or human remains
- Identification and analysis of biological evidence
- Disputed paternity

Collecting evidence for genetics examination

- swabs
- blood (EDTA), paper
- gonads – ovaries, testicles
- cartilage/tendons
- bones, teeth, nails
- Biological evidence from the scene of crime
- Comparative evidence
- Samples should be stored dry or frozen

Disclosure of biological evidence

- semen – light 450 nm, immunochromatographic tests, PSA
- saliva – amylase tests
- hair
- Blood stains – luminol test, immunochromatographic tests (human haemoglobin)
- DNA markers

The workflow for dna testing

- Collection
- Isolation
- Concentration of DNA
- PCR multiplex analysis (10-16 of polymorphic sections 100-400 nucleotides)
- Electrophoretic separation (capillary electrophoresis)
- Data analysis/ comparative analysis

Mitochondrial DNA

- mtDNA
- inherited in maternal line
- Resistant for biological degradation processes
- Statistically two unrelated individuals differ in mtDNA haplotypes in 8 positions

STR-Y

- inherited in the male line
- Genetic origin
- Mixture of male and female DNA
- rapes

STR-X

- Chromosome X inherited from mother
- Disputed paternity between a father and his son

DNA from animals

- Lack of PCR reaction
- a comparison of the mtDNA nucleotide sequence for cytochrome-B can be done - this allows vertebrate species identification