



DNA Fingerprinting

PRACTICAL SESSION

Topics to be learnt



Lesson 1. Introduction



Lesson 2. Different types of DNA evidences



Lesson 3. Instrumentation



Lesson 4. DNA Extraction and Fingerprinting



Lesson 5. Analysis and Interpretation of Results



Introduction

What is DNA?

- Hereditary material

Where is it present?

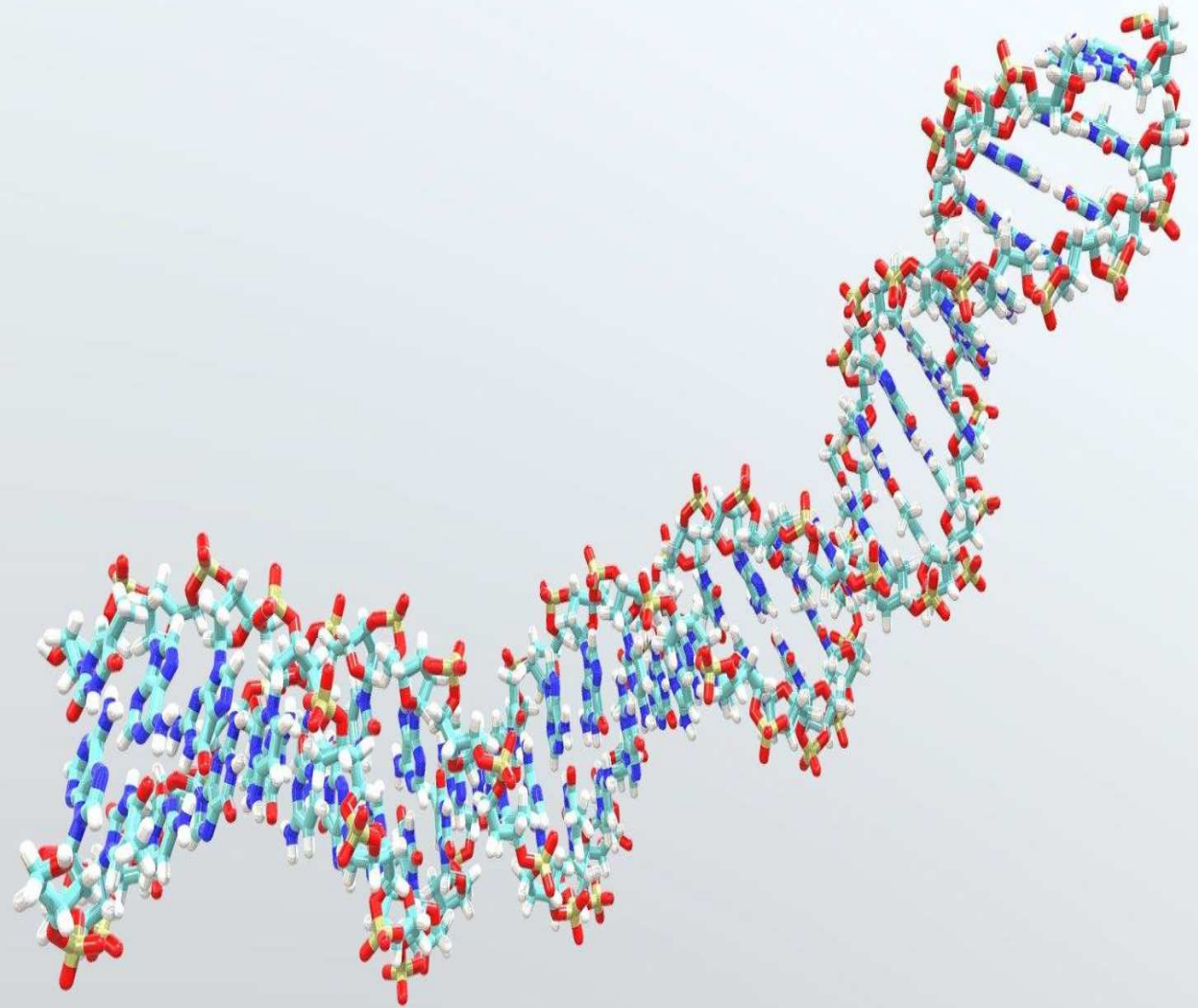
- Nearly every cell

Why is it important?

- Identification

Forensic Application?

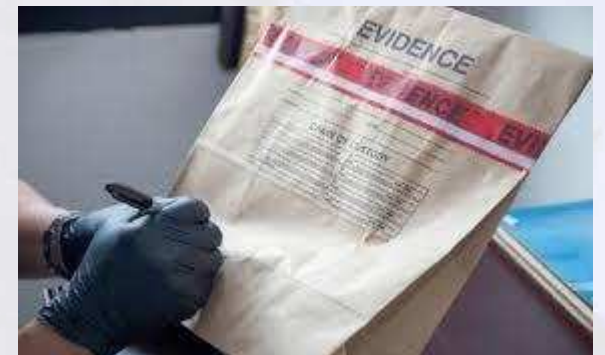
- Criminal Investigation
- Paternity Testing



Handling DNA Evidences

- Gloves, masks
- Disposable instruments/ thoroughly cleaned before use
- Avoid touching area of suspicion (DNA present)
- Don't touch other objects including self
- Don't cough or sneeze over evidence
- Air dry before packing at room temperature
 - Heat/ sun – degrades DNA
 - Moisture – bacterial growth
- Packing- Paper bags/ envelope; no plastic; do not staple
- Sealed, labelled and maintain chain of custody

- Control Samples – comparison/ elimination

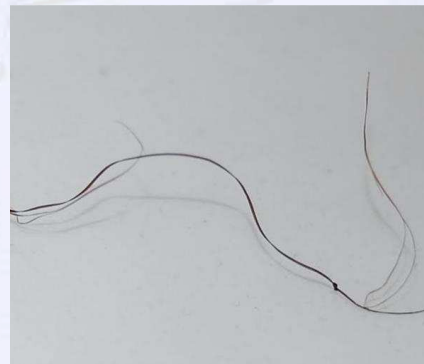


DNA Evidences in Forensics

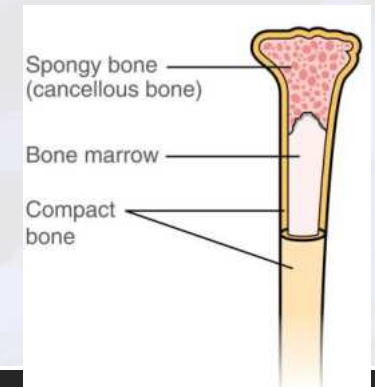
Blood



Hair

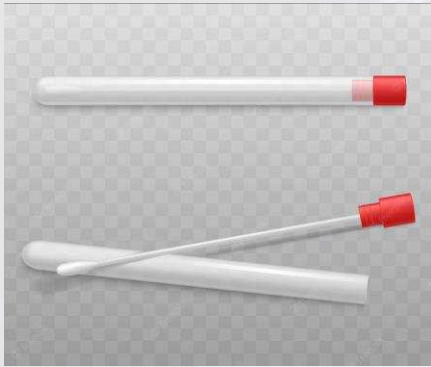


Bone



DNA Evidences in Forensics

Saliva/ sweat/ mucus/ skin cells/urine



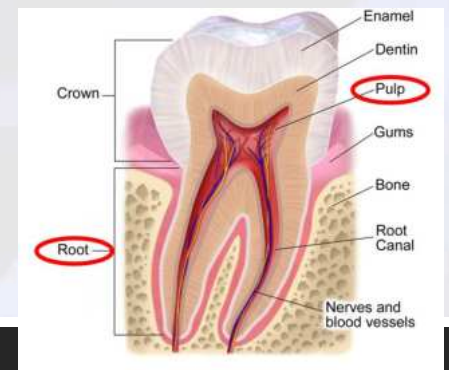
Semen/ Vaginal Discharge



Nails



Tooth









Instrumentation



PIPETTE



VORTEX



CENTRIFUGE

Instrumentation



QUBIT FLUOROMETER



THERMOCYCLER



3500 GENETIC ANALYZER

DNA Profiling

□ RFLP

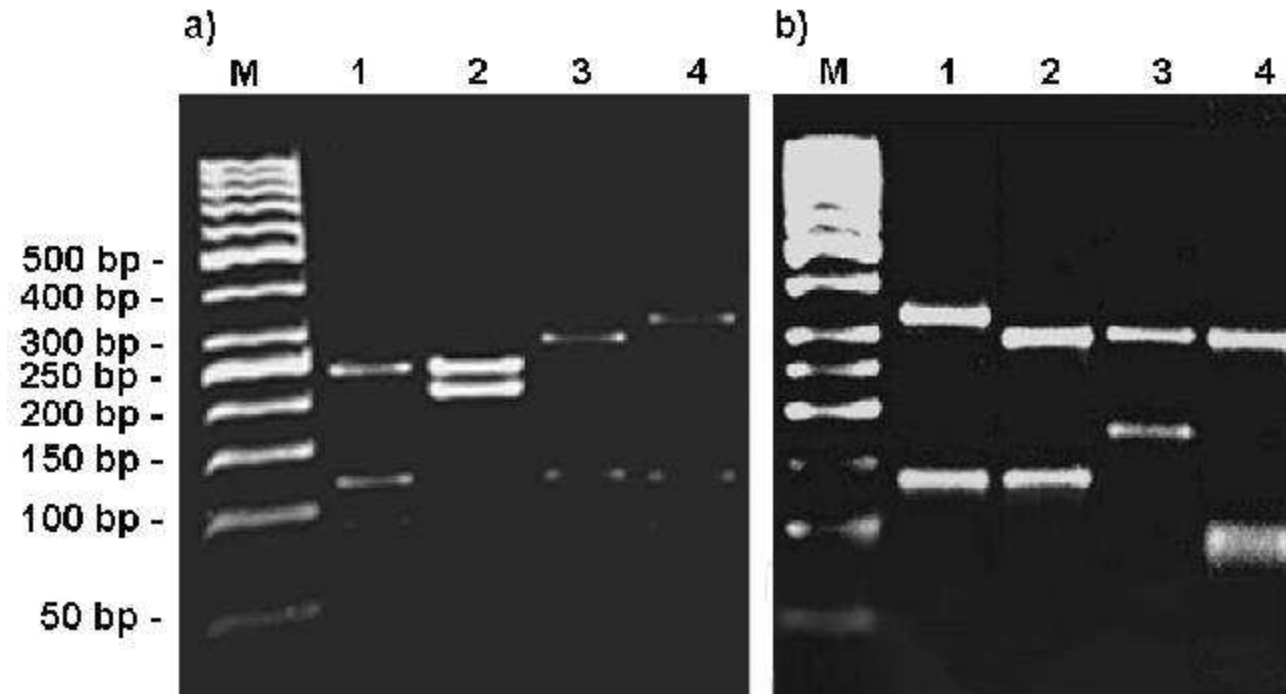
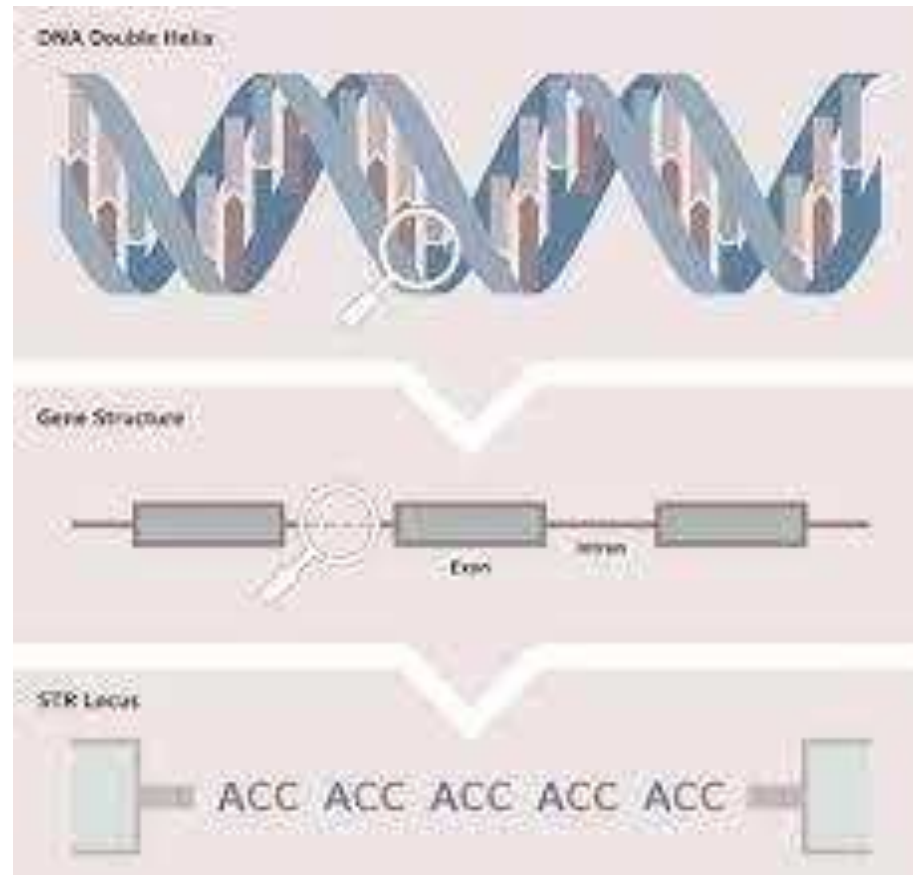


Fig. 1. PCR/RFLP analysis of family *Gadidae* with *DdeI* a)

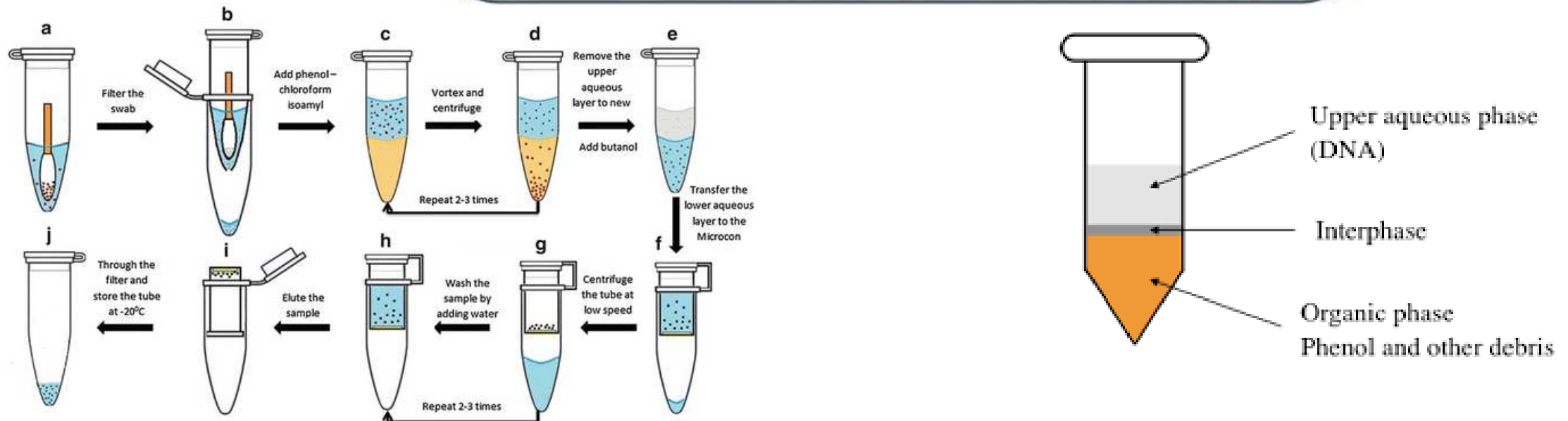
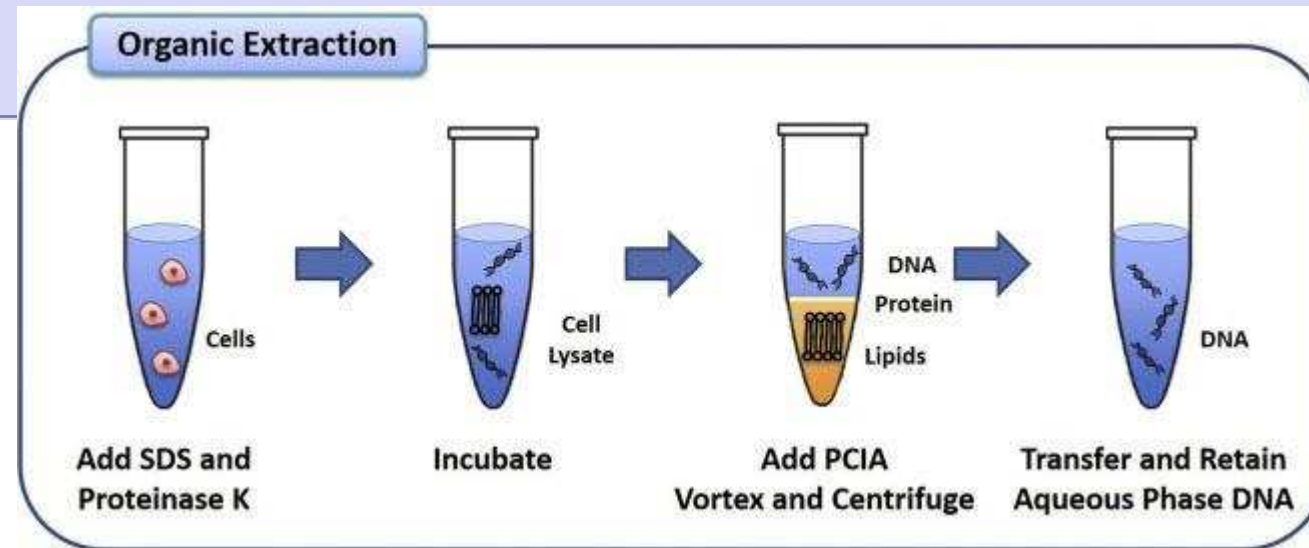
DNA Profiling

□ STR

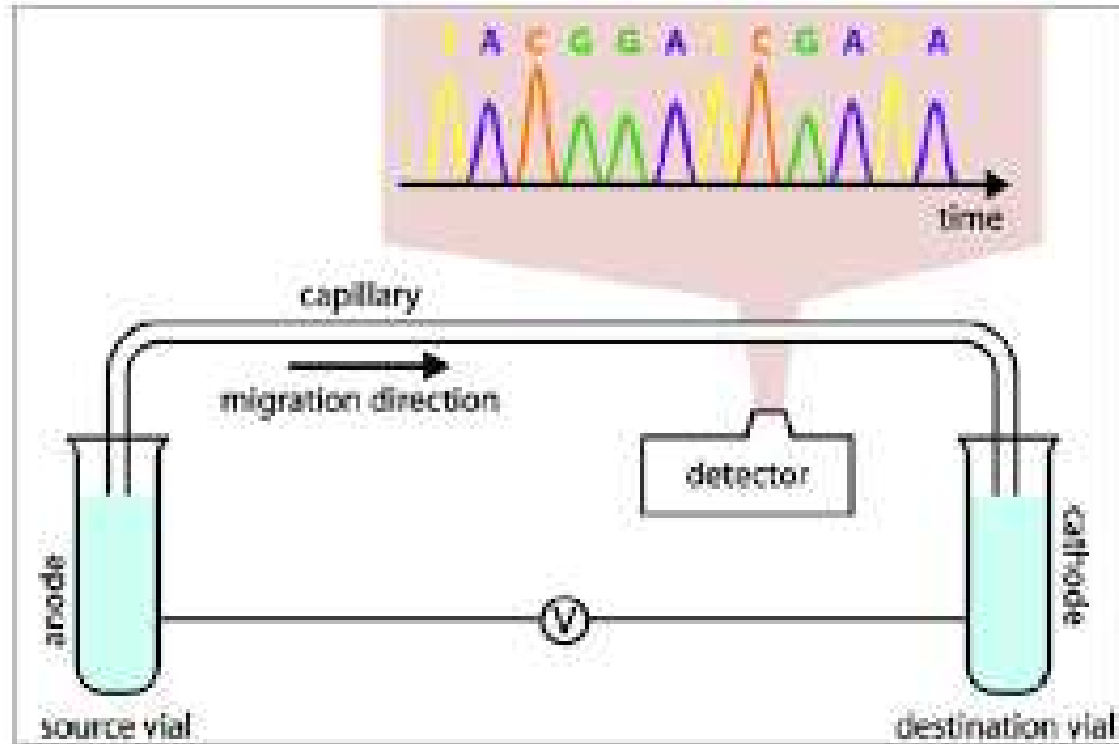


□ Multiplexing

DNA Extraction



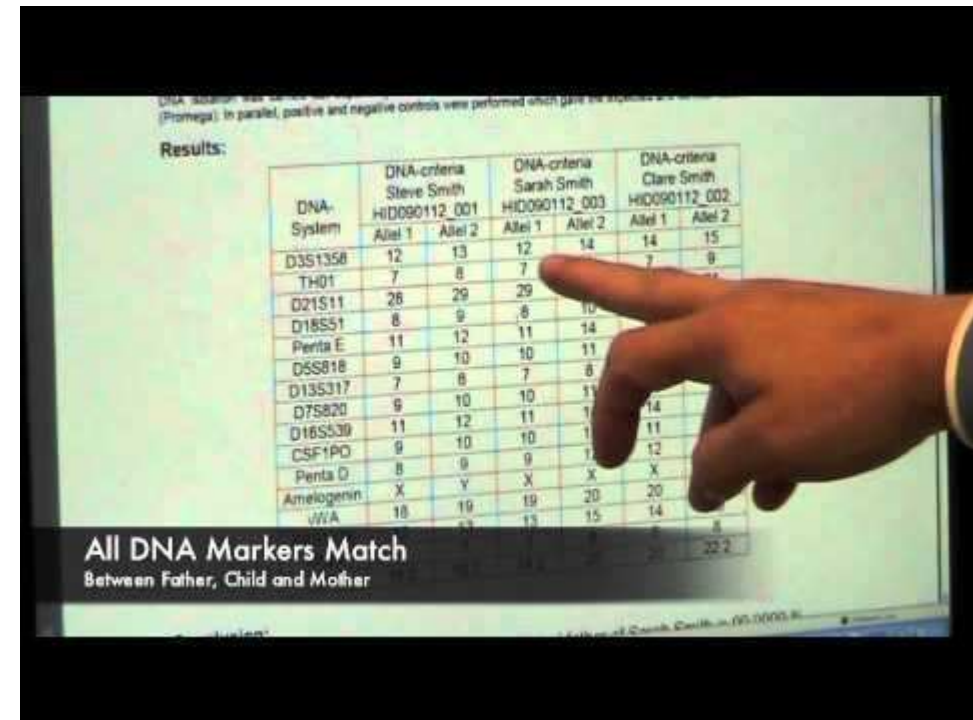
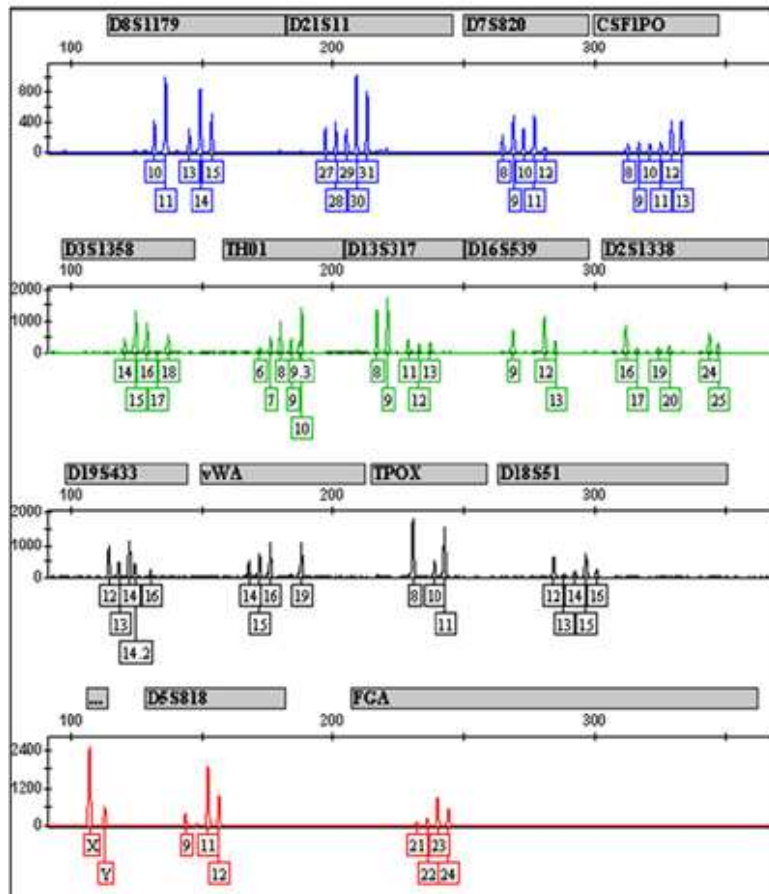
Capillary Electrophoresis



Electro osmotic flow- momentum, heat and mass transport under influence of electric field

Result

3-person mixture (Identifiler data, 1ng DNA, 5:2:1)



Report

AUTOSOMAL STR LOCI	Sample 1 (Alleged Father)	Sample 2 (Son)	Sample 3 (Alleged Mother)
	ALLELE DATA		
1. D3S1358	16, 17.2	16, 17.2	16, 18.2
2. vWA	15, 17	17, 19	19, 20
3. D16S539	9, 12	9, 9	9, 9
4. CSF1PO	10.3, 11.3	9, 10.3	9, 10.3
5. TPOX	10.3, 10.3	7.3, 10.3	7.3, 10.3
6. Y indel	1	1	N.A.
7. Amelogenin	X, Y	X, Y	X, X
8. D8S1179	13, 14	13, 16	10, 16
9. D21S11	31, 32.2	30, 32.2	30, 32.2
10. D18S51	20, 20	12.2, 20	12.2, 14.2
11. DYS391	10	10	N.A.
12. D2S441	9, 10	10, 11	11, 13.3
13. D19S433	14, 16	14, 15.2	13, 15.2
14. TH01	6, 6	6, 8	7, 8
15. FGA	21, 23	22, 23	22, 25
16. D22S1045	12, 12	12, 12	12, 14
17. D5S818	12, 15	11, 12	11, 12
18. D13S317	13, 13	13, 13	10, 13
19. D7S820	10, 12	10, 12	11, 12
20. SE33	21, 21	21, 22	22, 30.2
21. D10S1248	15, 15	13, 15	13, 14
22. D1S1656	11, 14	11, 14	11, 13
23. D12S391	17.3, 18.3	18, 18.3	18, 19.3
24. D2S1338	18, 22	18, 18	18, 26

REMARKS: Compatible / matching alleles observed at all 21 autosomal STR loci is indicative that the alleged parents have all the genetic markers that must be contributed to the child by the biological parents.

Report

AUTOSOMAL STR LOCI	Sample 1 (Plaintiff)	Sample 2 (Defendant and Alleged Father)
	ALLELE DATA	
1. D8S1179	11, 12	13, 17
2. D21S11	29.2, 30	29.2, 31
3. D7S820	10, 11	10, 11
4. CSF1PO	10.2, 12	11, 12
5. D3S1358	15.2, 15.2	14, 15.2
6. TH01	5.3, 7	7.3, 9
7. D13S317	9, 13	9, 11
8. D16S539	11, 11	11, 13
9. D2S1338	18, 20	16, 20
10. D19S433	11.2, 15	12, 14
11. vWA	13, 15.2	13, 17
12. TPOX	7, 10	7, 7
13. D18S51	16, 20.2	15, 19.2
14. Amelogenin	X, Y	X, Y
15. D5S818	10, 11	9, 12
16. FGA	22.2, 23.2	22.2, 24.2

REMARKS: Incompatible / mismatching alleles observed at 5 out of 15 autosomal STR loci i.e., D8S1179, TH01, D19S433, D18S51 and D5S818 between the samples 1 and 2.



Thank You!