



DNA Extraction From Blood

BCH361- Practical

Genome:

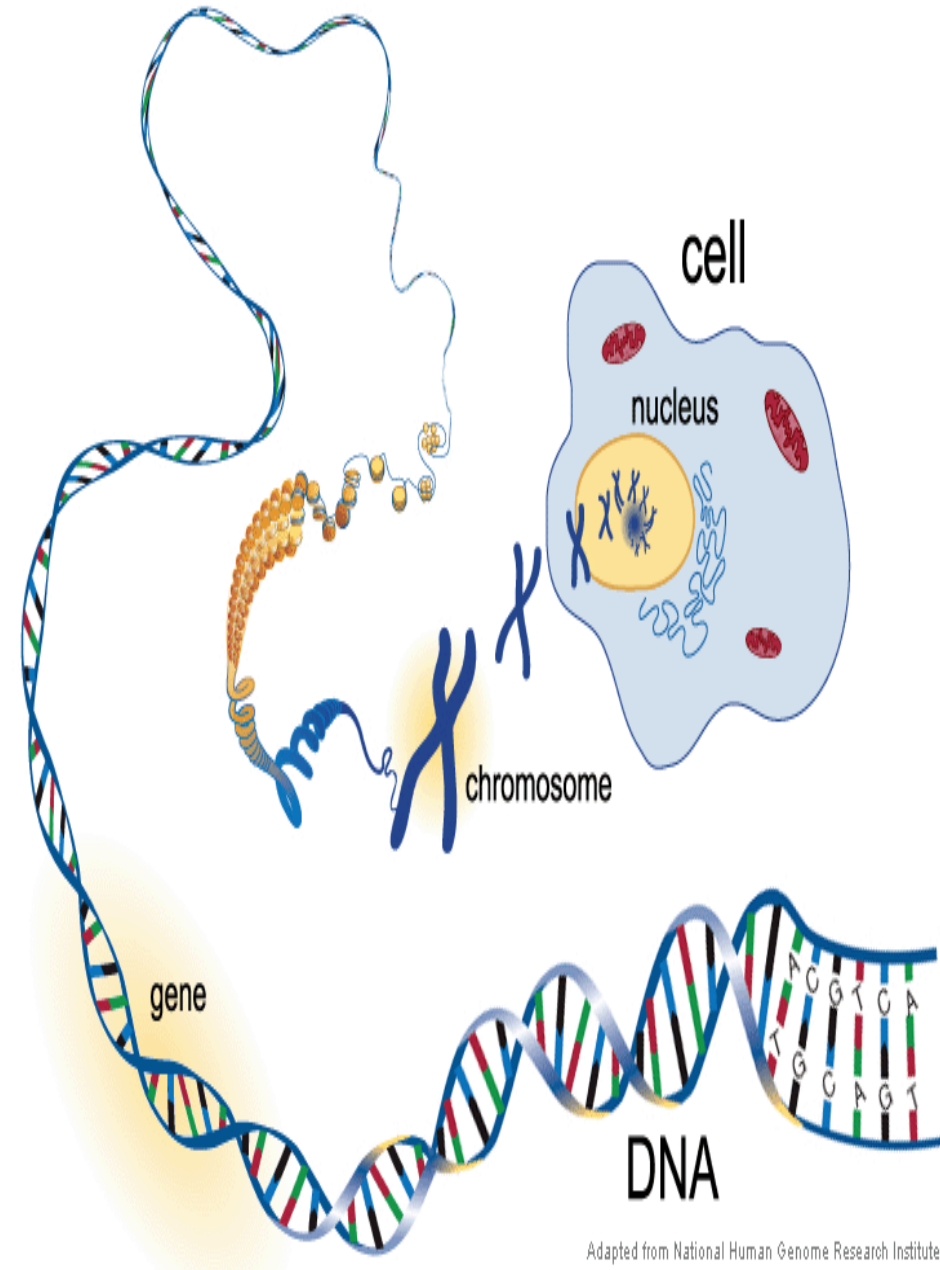
The genome is the genetic material of an organism.

The genomes of almost all organisms are **DNA**.

The only exceptions being some viruses that have **RNA genomes**.

DNA–protein complexes called **chromosomes**.

Genomic DNA contains **genes**.



Adapted from National Human Genome Research Institute

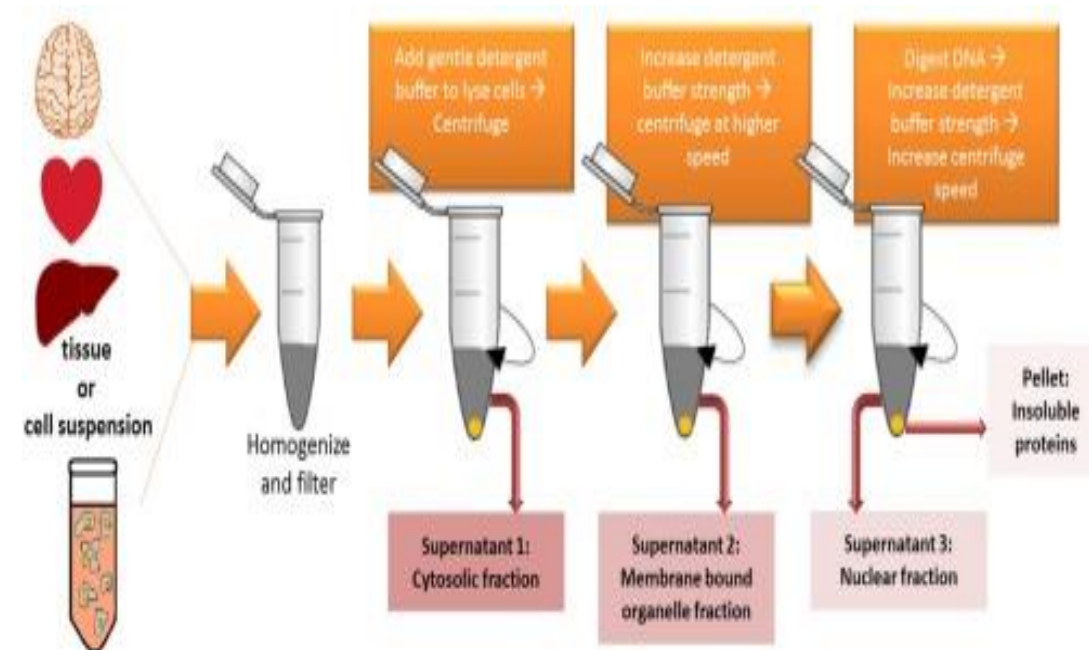
DNA extraction:

DNA isolation is an essential technique in molecular biology.

It is the first step for studying DNA!

Practically DNA can be isolated from any part of human body.

→ You must choose the correct source !



Method of DNA extraction:

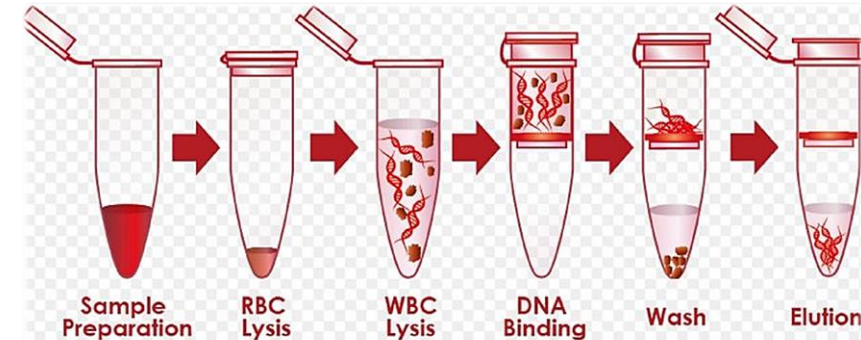
- Many different methods and technologies are available for the isolation of genomic DNA.

→ You choose the most appropriate method !

- Main steps in DNA isolation procedure:

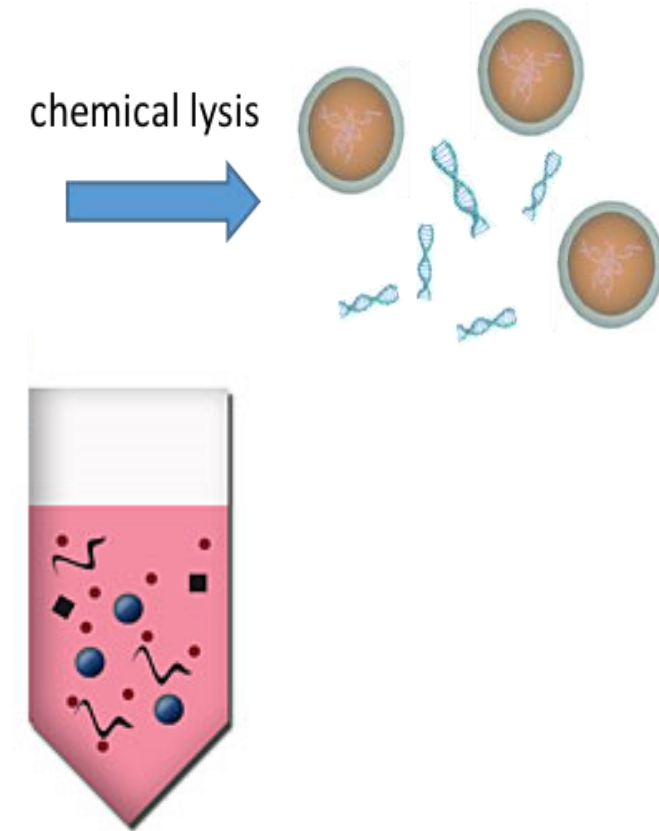


- A number of commercial DNA purification **kits** use the same principles as the manual method. (need low quantity of sample*)



Lysis is carried out in a salt solution, containing detergents to denature proteins or proteases. It results in the breakdown of cells and dissolving of membranes.

*Presence of proteins, lipids and some other organic or inorganic compounds in the DNA preparation can interfere with DNA analysis methods, e.g. PCR



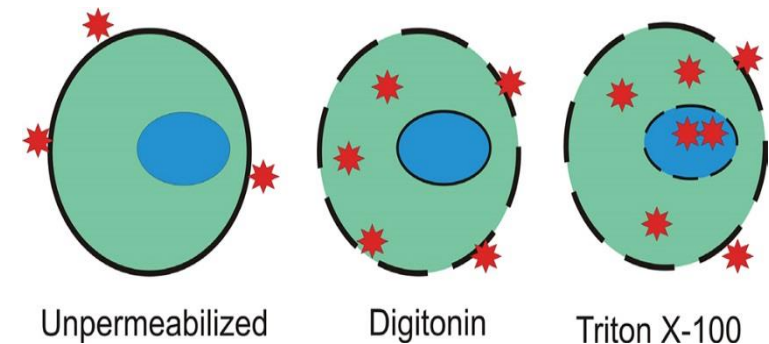
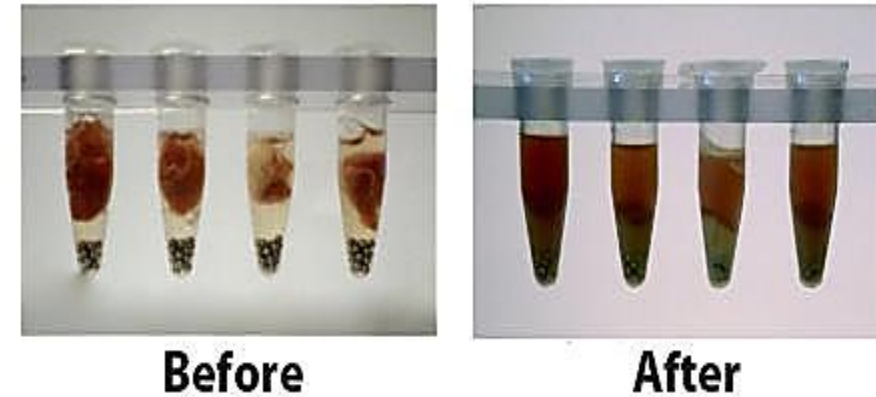
Practical Part

Aim:

- To isolate pure genomic DNA from blood sample.

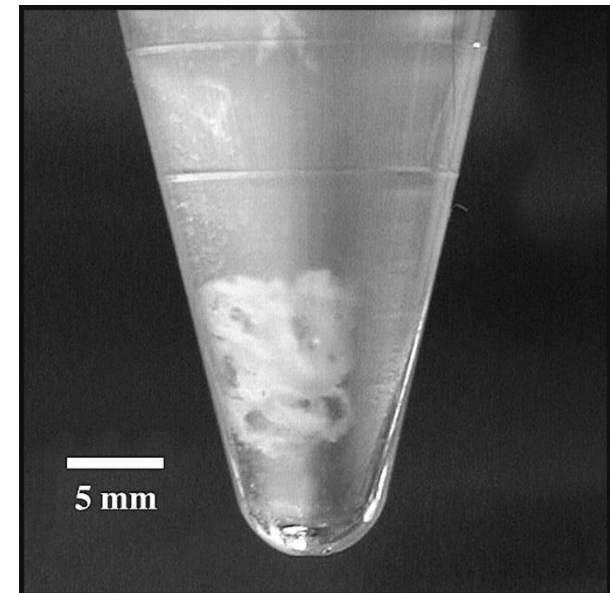
Principle:

- Physical and chemical processes of tissue homogenisation.
- Cell permeabilization, cell lysis (using hypotonic buffers).
- Removal of nucleases, protein degradation, protein precipitation, solubilisation of nucleic acids.
- Various washing steps then precipitation of the DNA.



Results:

- Cloudy precipitation can be seen by the naked eye, and it represent the isolated DNA.
- The **concentration, purity, and integrity** of the extracted nucleic acid may need to be determined.

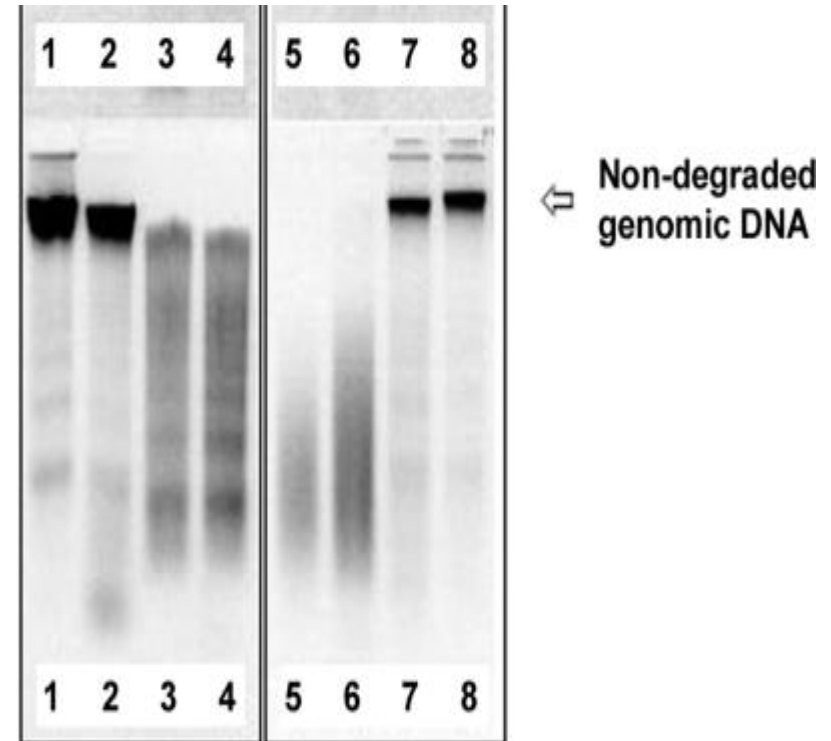
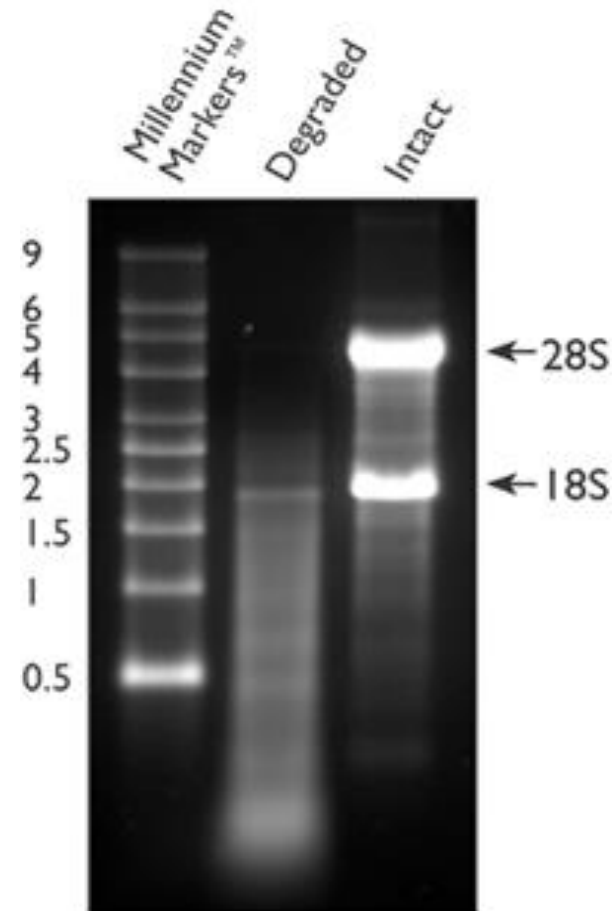
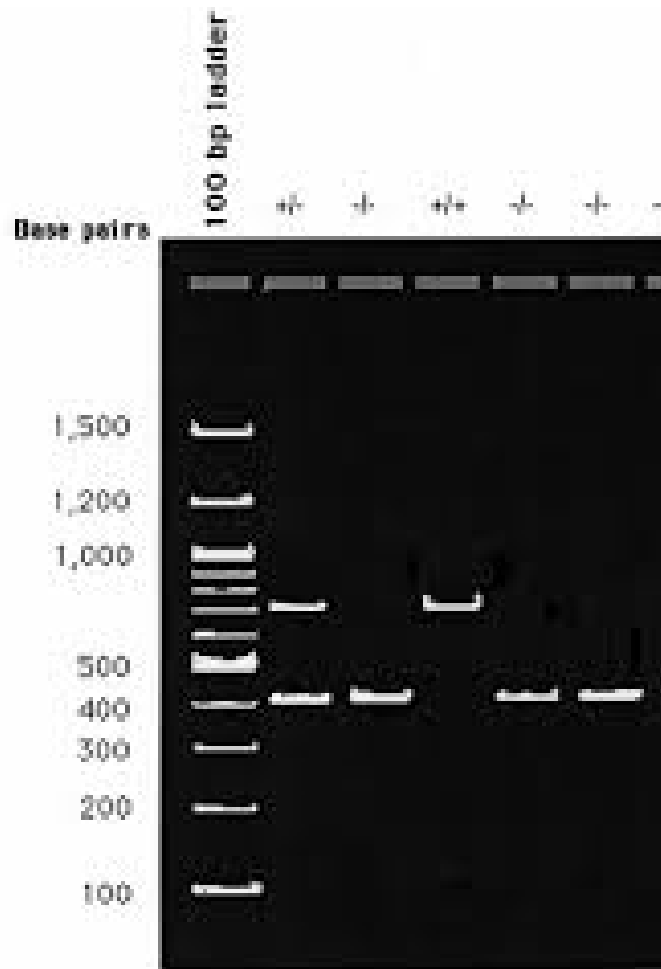


Determine the concentration and purity using Nanodrop

- Measuring the intensity of absorbance of the DNA solution at wavelengths 260 nm and 280 nm is used as a measure of **DNA purity**.
- A pure sample of DNA has a ratio of **1.8** at **260/280**.
- A DNA preparation that is contaminated with protein will have a 260/280 ratio **lower** than 1.8.



Check the integrity of DNA by Gel-Electrophoresis (Lab 3)



Homework:

- **Search for a method for DNA extraction and explain it briefly.**