جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

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قسـم الادلة الجنائية

المحاضرة السابعة

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DNA Extraction and Gel Electrophoresis

DNA extraction: DNA extraction is the process of isolating DNA from the cells of an organism isolated from a sample, typically a biological sample such as blood, saliva, or tissue. It involves breaking open the cells, removing proteins and other contaminants, and purifying the DNA so that it is free of other cellular components.

DNA extraction methods are broadly categorized into:

1. Chemical-based (or solution- based) DNA extraction methods.

2. Solid-phase DNA extraction methods (Physical method).

Chemical-based DNA extraction method
The Chemical or solution-based method uses many organic and inorganic solutions. Chemicals like phenol, chloroform, CTAB Triton X100, SDS, isoamyl alcohol, Tris and EDTA are used in the chemical -based DNA extraction method.

The solution-based or chemical-based DNA extraction method is subdivided into:
 Organic solvent-based DNA extraction

This method depends on the use of organic substances such as phenol and chloroform.
Example: Phenol-chloroform and isoamyl alcohol
 Inorganic solvent-based DNA extraction
It depends on the inorganic solvents.
Example:

Proteinase K DNA extraction

Salting out method
SDS DNA extraction
CTAB DNA extraction
Silica-gel-based techniques

Physical or Solid-Based DNA Extraction Methods

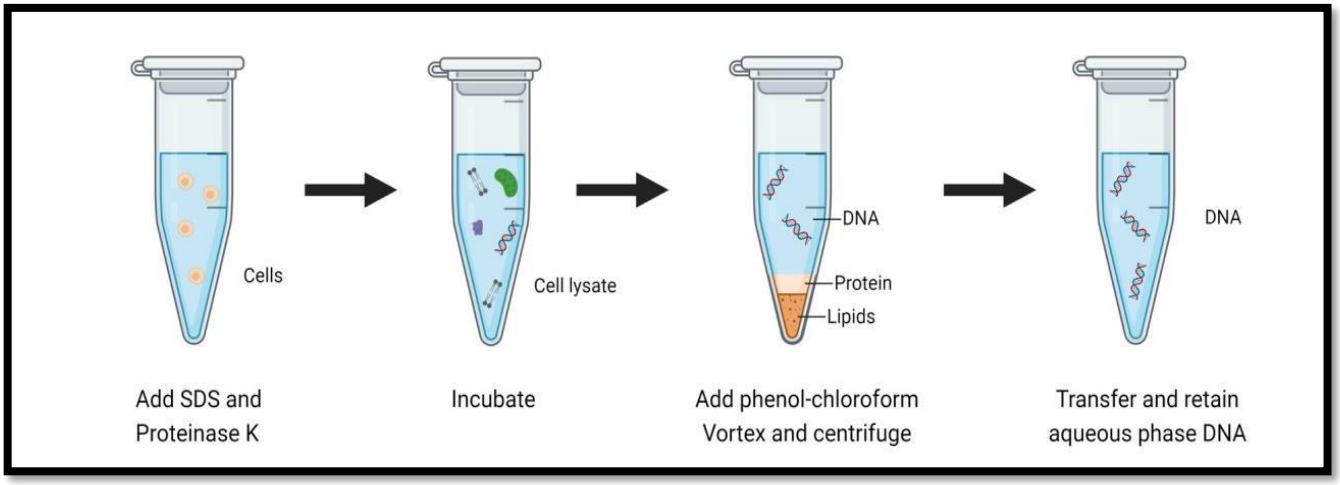
- Paper DNA extraction
- Magnetic bead DNA extraction

Liquid-Liquid DNA Extraction

Liquid-liquid extraction is one of the commonest methods for nucleic acid extraction. In this method the solutions prepared by various chemical compositions are used for extraction and it mainly relies on lysis buffer preparation.
Lysis buffer is prepared in one or two solutions as it uses many chemicals.
Common chemicals that used for liquid-liquid DNA extraction are Phenol, chloroform, isoamyl alcohol, CTAB, SDS, Tris, EDTA, MgCl2, and other detergents.
These methods commonly require centrifugation for separation. Examples of liquid-liquid DNA extraction methods: Phenol, chloroform and isoamyl alcohol DNA extraction, SDS DNA extraction and CTAB DNA extraction

The method involves three necessary steps namely:

1- lysed
2- precipitation
3- purification



Gel electrophoresis: is a laboratory method used to separate mixtures of DNA, RNA, or proteins according to molecular size. In gel electrophoresis, the molecules to be separated are pushed by an electrical field through a gel that contains small pores. The molecules travel through the pores in the gel at a speed that is inversely related to their lengths. This means that a small DNA molecule will travel a greater distance through the gel than will a larger DNA molecule

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