



Molecular Biology

2nd stage

By

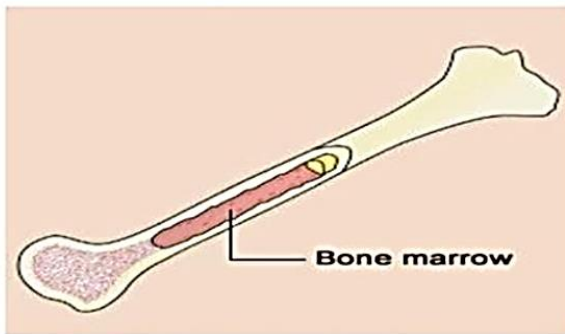
M.SC Jaafar Hamid

M.SC Nidaa Fadel

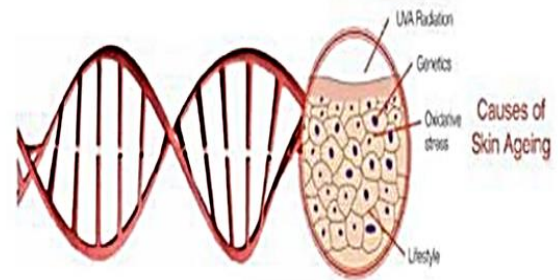
DNA extraction

DNA (deoxyribonucleic acid) DNA is a nucleic acid, made of carbon, hydrogen, oxygen, nitrogen, and phosphorous. A fundamental molecule found in all living things. Carries the genetic information in the cell. DNA is in the nucleus of almost every cell in your body.

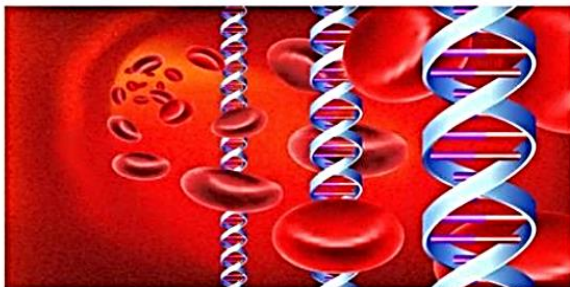
DNA can be extracted from almost any intact cellular tissue



bone marrow



Skin



Blood



Saliva

DNA isolation is one of the most basic and essential techniques in the study of DNA. The extraction of DNA from cells and its purification are primary importance to the field of biotechnology and forensics

The process of extracting DNA from operations necessary to obtain a sample of DNA and whatever the source extraction (bacteria, eukaryotic cells), the extraction process also provides remove impurities (الشوائب) associated with proteins and fats model and others.

Most DNA extraction protocols consist of two parts

1. A technique to lyse the cells gently and solubilize the DNA
2. Enzymatic or chemical methods to remove contaminating proteins, RNA, or macromolecules

While In plants, the nucleus is protected within a nuclear membrane, which is surrounded, by a cell membrane and a cell wall. Four steps are used to remove and purify the DNA from the rest of the cell: Lysis, Precipitation, Wash, and Resuspension.

There are nucleic acids in living cells are interconnected with proteins as they appear in the cell is a Nucleoprotein complex, so begin extraction first process of cracking walls or cell membranes are careful to allow the exit of DNA and other cellular components without exposing them to significant damage, the process of removing proteins (Deproteinization process) involving three transactions :

1. **Enzymatic Treatments:** These transactions involve the use of proteolytic enzymes such as proteinase K & Pronase that lead to cracking molecules of protein to short peptide chains to facilitate removal in subsequent transactions.

2. Chemical Treatments: which divided in three treatments:

- Chelating agents such as EDTA (Ethylene Diamine Tetra Acetic Acid), It has the ability to pull and remove ions bilateral parity Ca^{++} & Mg^{++} That contribute to maintaining the stability of protein complex and the stability of nuclear and cellular membranes, In addition to being catalysts for the effectiveness of enzymes Nuclease.
- Detergent agents: such as SDS (Sodium Dodecyl Sulfate): Is a biological detergent. Which disrupts the lipid layers, helps to dissolve membranes & binds positive charges of chromosomal proteins (histones) to release the DNA into the solution.
- Treatment organic solvents: such substance Isoamyl alcohol, Chloroform, Phenol: DNA will be precipitated by adding cold alcohol to the cell extract; DNA will come out of the suspension and may be seen and collected on a glass rod.

3. Mechanical Treatments:

This process is by using Centrifuge. The type of treatments used in extraction depends on the type of tissue you want to isolate the DNA from it, and in general, the extraction of DNA from animal tissue is much easier than the isolation of plant tissue for hardness cellular walls plants add to oppose the presence of sugars and other metabolic product with purification processes.