Al-Mustaqbal University
College of Sciences
Intelligent Medical Systems
Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

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LECTURE: (4)

Subject: Molecular Biology
Level: Second
Lecturer: MSc. Sura Mohammed jasim

DNA extraction

The benefits of DNA extraction are as follows

1. Scientific research:
2. Genetic diagnosis:
3. Forensic medicine:
4. Agriculture and crop improvement:
5. Drug development:
6. Evolutionary studies:
7. Disease research and prevention:
8. Conservation and biodiversity:
9. Parentage and ancestry testing:
10. Personalized medicine:
11. Biotechnology and genetic engineering:

*These are just a few examples of the broad range of benefits that DNA extraction offers across different scientific, medical, and environmental fields. The extraction and analysis of DNA continue to revolutionize our understanding of life, genetics, and the development of innovative solutions to various challenges.

DNA extraction from fresh blood:-

1. Collect fresh human blood in an anticoagulant-treat collection tube.

2. Transfer up to 200 µl of fresh blood to a 1.5 ml microcentrifuge tube

3. Add 3x the sample volume of RBC Lysis Buffer and mix by vortex. For example: add 600 µl of RBC Lysis Buffer to the 300 µl of the blood sample **(lysis buffer is used in DNA extraction to effectively separate and break down cells. Lysis buffer contains a combination of ingredients that work together to break down the cell membrane of cells and release cellular content including DNA)**

4. Incubate the sample mixture at room temperature for 10 min 25c

5. Add 200 µl of FABG Buffer to the sample mixture. And mix well by vortexing. (FABGE solution is used to achieve efficient and pure DNA extraction. FABGE breaks down the cell membrane and improves DNA deposition and extraction)

6. Incubate the sample mixture at room temperature for 15 min at 70c

7. Add 200 µl of ethanol (96~100%) to the sample and vortex for 10 sec.

Transfer the sample mixture carefully to FABG Column. Centrifuge at speed 14,000 rpm or 18,000 x g for 1 min. Discard the Collection Tube and place the FABG Column to a new Collection Tube(Add absolute ethanol 1. DNA precipitation 2. Remove impurities 3. DNA concentration)

8. Add 400 µl of W1 Buffer to the FABG Column and centrifuge for 1 m at speed 14,000 rpm or 18,000 x g.
Discard the flow-through and place the FABG Column back to the Collection Tube.

9. Add 600 µl of Wash Buffer to the FABG Column and centrifuge for 1 m at speed 14,000 rpm or 18,000 x g. Discard the flow-through and place the FABG Column back to the Collection Tube.(wash 1 and wash buffer 1. Remove impurities 2. Purification 3. Avoid pollution)

10. Place the dry FABG Column to a new 1.5 ml microcentrifuge tube.

11. Add 100 µl of Elution Buffer to the membrane center of FABG.

(Elution buffer is a solution used in DNA extraction to recover extracted DNA from carriers, membranes, or templates used in the extraction process. It is used in the final extraction step to obtain purified and concentrated DNA)

12. Incubate the FAGB Column at 37 ºC for 10 min in an incubator.

13. Centrifuge for 1 minute at full speed 14,000 rpm or 18,000 x g to elute the DNA

14. Store the DNA fragment at 4ºC or -20ºc