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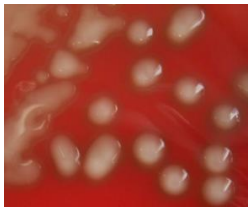
Group: B

Q1: Identify the procedure based on the solution used, and then, explain in which procedure you face more challenges? Give a reason.

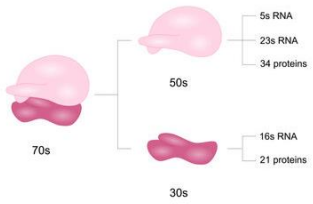
Answer: A. **Blood DNA isolation B. Bacterial DNA isolation.** (Blood DNA isolation presents more challenges compared to bacterial DNA isolation due to the presence of **nucleases** in eukaryotic cells).

Q2. What is the name of the bacterium featured in the images, and in which significant experiments was this bacterium used?



Answer: The bacterium is ***Streptococcus pneumoniae***, and it was used in the **Griffith and Avery-MacLeod-McCarty** experiments.

Q3. Identify the type of cell based on the provided information? And 3 characteristics.



Answer: This is a **prokaryotic** cell because it contains 70S ribosomes. **Single circular chromosome, nucleus absent, no membrane bounded organelles.**

Q4. Name the following items placed on the table?

A. **Micropipette tip B. PCR tube C. Collection tube**

Q5. Name the type of restriction enzyme and provide its full nomenclature based on its abbreviation? Explain it is role in Lab?

Answer: The restriction enzyme is XhoI, which stands for ***Xanthomonas vasicola*** I, **type 2, sticky ends.**

1. **Gene cloning 2. DNA mapping**

Q6. Why doesn't a restriction enzyme digest its own DNA sequence, even if it is present in the same bacterial cell? Explain in detail. Answer: Restriction enzymes do not digest their own DNA sequences due to a protective mechanism called **DNA methylation.** In this process, specific nucleotides within the recognition site of the restriction enzyme are methylated, typically **at adenine (A) and cytosine (C) residues**. This methylation prevents the restriction enzyme from recognizing and cleaving its own DNA sequence.

Q7. If the below solution is not available in the lab, what can you use to rupture the cell membrane?

Answer: **Detergent** can be used to rupture the cell membrane when a specific lysis solution is not available.

Q8. What is the benefit of using the below solution in DNA isolation, and what is its main component?

Answer: The provided solution is a **washing solution**, primarily consisting of about **60% to 90% ethanol.** It is beneficial in DNA isolation for several reasons:

1. **Removal of Contaminants**: Ethanol in the washing solution helps to remove contaminants, such as salts and proteins, from the DNA sample.
2. **Precipitation of DNA**: Ethanol is often used to precipitate DNA from a solution. When added to a DNA-containing solution, ethanol causes the DNA molecules to aggregate and become insoluble, allowing them to be easily separated from the rest of the solution.

Q9. Convert the following quantities to the requested units:

A. 20 microliters to liters, B. 10 angstroms to nanometers, C. 100 µl to microliters.

Answers:

A. 20 microliters is equal to 0.00002 liters.

B. 10 angstroms is equal to 1 nanometer.

C. 100 µl is equivalent to 100 microliters.

Q 10. In the final step of DNA blood isolation before storage, a solution is used. Can you identify the name of this solution, and then explain its role in the process?

Answer: The solution used in this step is called an **elution solution**. Its role is to facilitate the **release (elution) of purified DNA** from the solid phase, making it available for further analysis or storage. This process ensures that the isolated DNA is in a form **suitable** for **downstream applications**, such as PCR, sequencing, or other molecular biology experiments.

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