Tutorial session 3: Bacterial cell structure (Part II)

Learning objectives:

- Differentiate the specific structural features of bacterial cells
- Understand the organization and regulation of genetic material in bacteria
- Apply knowledge to distinguish between vertical and horizontal gene transfer mechanisms.

Exercise I

1. What are the main functions of the bacterial cytoplasmic membrane?

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2. What are the differences between bacterial and eukaryotic ribosomes?

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3. What is a polysome?

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4. What advantage do gas vacuoles confer to aquatic bacteria?

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Exercise II

1. Describe the general morphology of the bacterial chromosome.

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2. What are the fundamental differences between bacterial and eukaryotic chromosomes?

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3. Recall the base-pairing rule.

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4. Define an operon.

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5. Name the replication model used by most bacteria.

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6. What are Okazaki fragments and on which strand do they appear?

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7. Put the following steps in order and match them with the corresponding enzymes:

- Strand elongation
- Primer synthesis
- Unwinding of the double helix
- Fragment ligation
- Separation of daughter chromosomes

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Excercice III

1. What is a plasmid? How does it differ from the bacterial chromosome?

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2. What does the term "episome" mean?

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3. What are the two replication models described in plasmid replication?

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Match each plasmid type with the property it confers:

Plasmid Type	Property
F plasmid (fertility)	A. Antibiotic resistance
R plasmid	B. Production of bacteriocins
Virulence plasmid	C. Transfer by conjugation
Metabolic plasmid	D. Pathogenicity factors (toxins, adhesins)
Bacteriocin plasmid	E. Utilization of new carbon sources

4. Distinguish between vertical and horizontal plasmid transfer.

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5. Name the three mechanisms of horizontal gene transfer in bacteria and give a brief description of each.

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