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Cell Biology: Prokaryotes vs Eukaryotes

Printable Flashcards — Pre-Med Biology

Compare prokaryotic and eukaryotic cells. Ribosomes, membranes, DNA organization, and classic exam traps.

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110 cards — Printable Flashcards

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1

Prokaryote vs eukaryote:
what's the headline difference?

2

Do prokaryotes have membrane-bound organelles like mitochondria or Golgi?

3

Where is DNA found in a typical bacterial cell?

4

Typical DNA shape: bacteria
vs eukaryotic nuclear DNA?

5

Size trap: are prokaryotes always
"tiny" and eukaryotes always "big"?

6

Ribosomes: bacteria have 70S or 80S?

7

Eukaryotic cytosolic ribosomes are 70S or 80S?

8

Bacterial ribosomes are {{c1::70S}}, while
eukaryotic cytosolic ribosomes are {{c2::80S}}.

2

No. They don't have membrane-bound organelles.

1

Eukaryotes have a nucleus (DNA in a membrane compartment). Prokaryotes don't.

4

Bacteria: usually one circular chromosome.
Eukaryotic nucleus: multiple linear chromosomes.

3

In the nucleoid region (not inside a nucleus).

6

70S.

5

Usually prokaryotes are smaller, but size alone isn't a definition.

8

Bacterial ribosomes are 70S, while eukaryotic cytosolic ribosomes are 80S.

7

80S.

9

Do prokaryotes do mitosis?

10

In prokaryotes, transcription and translation happen... separately or at the same time?

11

If a stem says "translation starts while mRNA is still being made," that's a clue for what kind of cell?

12

Do bacteria have introns and heavy mRNA processing like eukaryotes?

13

What is an operon (and which cells use it a lot)?

14

Polycistronic mRNA: bacteria or eukaryotes (mostly)?

15

Prokaryotes have a nucleus, yes or no?

16

Are all prokaryotes bacteria?

10

At the same time (coupled) because there's no nucleus.

9

No. They divide by binary fission (no mitotic spindle).

12

Usually no. Bacterial mRNA is typically not spliced and doesn't get the same 5' cap/poly-A setup.

11

A prokaryotic cell.

14

Mostly bacteria.

13

A group of genes controlled by one promoter, transcribed together. Classic in bacteria.

16

No. Prokaryotes include bacteria AND archaea.

15

No.

17

Are viruses prokaryotes?

18

Eukaryotes are always multicellular: true or false?

19

Prokaryotes are always unicellular: true or false?

20

If you see "nuclear envelope" in a question, you're dealing with what?

21

Bacterial cell wall: what's it mainly made of?

22

Name the polymer that makes bacterial cell walls rigid.

23

Do all bacteria have a cell wall?

24

What does a cell wall actually do for a bacterium?

18

False. Many eukaryotes are unicellular (like yeast, many protists).

17

No. Viruses are not cells.

20

A eukaryotic cell.

19

Mostly true: they're single cells, but they can form colonies/biofilms.

22

Peptidoglycan

21

Peptidoglycan.

24

Prevents osmotic lysis and helps maintain shape.

23

No. Some (like Mycoplasma) lack a cell wall.

25

Gram-positive bacteria: thick or thin peptidoglycan?

26

Gram-negative bacteria: thick or thin peptidoglycan?

27

Gram stain result: Gram-positive appear what color?

28

Gram stain result: Gram-negative appear what color?

29

Outer membrane (Gram-negative): what's the big deal?

30

What is LPS and why does it show up in exams?

31

Periplasm: where is it found?

32

Teichoic acids: Gram-positive or Gram-negative?

26

Thin peptidoglycan, plus an outer membrane.

25

Thick peptidoglycan.

28

Pink/red (take the counterstain).

27

Purple (retain crystal violet).

30

Lipopolysaccharide in Gram-negative outer membrane; it's an endotoxin that can trigger strong immune responses.

29

It's an extra barrier (harder for some antibiotics) and it contains LPS (endotoxin).

32

Gram-positive.

31

Between the inner membrane and outer membrane in Gram-negative bacteria.

33

Bacterial plasma membrane: what process happens there that eukaryotes do in mitochondria?

34

If a prokaryote doesn't have mitochondria, how does it make ATP via oxidative phosphorylation?

35

Bacterial membrane lipids: do they usually contain cholesterol like animal cells?

36

What is a capsule (or glycocalyx) in bacteria?

37

Capsule vs slime layer: what's the simple difference?

38

Biofilm: what's the key idea?

39

Eukaryotic cell wall (plants/fungi): is it peptidoglycan?

40

Bacterial cell walls contain {{c1::peptidoglycan}}, plant cell walls contain {{c2::cellulose}}, and fungal cell walls contain {{c3::chitin}}.

34

By using the cell (plasma) membrane for the electron transport chain.

33

Electron transport chain / respiration (in many bacteria).

36

An outer sticky layer that helps with protection and attachment.

35

Usually no (exception: Mycoplasma can use sterols).

38

A community of bacteria stuck to a surface, embedded in a protective matrix (often from glycocalyx).

37

Capsule is more organized/tightly attached; slime layer is looser.

40

Bacterial cell walls contain peptidoglycan, plant cell walls contain cellulose, and fungal cell walls contain chitin.

39

No. Plants use cellulose; fungi use chitin.

41

Antibiotics like penicillin mainly target what bacterial structure?

42

Lysozyme (in tears/saliva) breaks down what?

43

Why are Gram-negative bacteria often harder to kill with some antibiotics?

44

What are porins (high-yield idea) and where are they?

45

Archaea cell walls: do they contain peptidoglycan?

46

Fimbriae: what are they for?

47

Pili vs fimbriae: what should you remember?

48

What is bacterial conjugation?

42

Peptidoglycan in bacterial cell walls.

41

Peptidoglycan cross-linking in the cell wall.

44

Protein channels in the Gram-negative outer membrane that let small molecules pass.

43

Their outer membrane is an extra barrier that blocks entry.

46

Attachment to surfaces/host cells.

45

No. Archaea lack peptidoglycan (they use other wall materials).

48

Direct DNA transfer between bacteria, usually via a sex pilus/plasmid.

47

Fimbriae = attachment. Sex pilus = DNA transfer (conjugation).

49

Transformation vs transduction vs conjugation: which one is "picking up naked DNA"?

50

Which horizontal gene transfer method uses viruses (bacteriophages)?

51

Horizontal gene transfer: {{c1::conjugation}} uses cell-to-cell contact, {{c2::transformation}} uses free DNA, and {{c3::transduction}} uses a phage.

52

Bacterial flagella: do they beat like eukaryotic flagella?

53

Eukaryotic flagella/cilia are built from what cytoskeleton structure?

54

What protein makes up bacterial flagella?

55

How do bacteria change direction when swimming? (big idea)

56

What is chemotaxis?

50

Transduction.

49

Transformation.

52

No. Bacterial flagella rotate like a motor.

51

Horizontal gene transfer: conjugation uses cell-to-cell contact, transformation uses free DNA, and transduction uses a phage.

54

Flagellin.

53

Microtubules (9+2 in motile ones).

56

Movement toward or away from a chemical signal.

55

They change flagellar rotation, causing runs and tumbles.

57

If a stem says "hair-like projections that increase absorption," is that bacteria flagella?

58

Do bacteria do endocytosis to take in nutrients?

59

What's the bacterial version of "surface attachment" structures?

60

Structure used in bacterial conjugation for DNA transfer?

61

Nucleoid: is it membrane-bound?

62

Plasmid: what is it?

63

Why do plasmids matter clinically?

64

Do eukaryotes have plasmids in the same way bacteria do?

58

No. They use transporters in the membrane, not endocytosis.

57

No. That's microvilli (actin) in eukaryotic cells.

60

Sex pilus

59

Fimbriae and pili.

62

A small circular DNA molecule separate from the main chromosome.

61

No.

64

Not usually (with some exceptions like yeast plasmids), but it's mainly a bacterial thing in basic biology.

63

They can spread antibiotic resistance genes fast.

65

Prokaryotic ribosomes float where?

66

Bacterial chromosome copy number: usually one or many?

67

Inclusion bodies: what are they (high-yield idea)?

68

Do prokaryotes have cytoskeleton proteins at all?

69

Bacterial division protein that forms a ring at the future division site (analogy to tubulin)?

70

Do bacteria have a true nucleus, yes/no?

71

How is bacterial DNA packaged compared to eukaryotic DNA with histones?

72

If a question says "nucleosomes" and "histones," that's pointing to what?

66

Usually one main chromosome
(but it replicates before division).

65

In the cytosol (no rough ER).

68

Yes, but simpler (e.g., FtsZ
for division, MreB for shape).

67

Storage granules for nutrients/ions
(like glycogen, phosphate, sulfur).

70

No.

69

FtsZ

72

Eukaryotic chromatin (in the nucleus).

71

Bacterial DNA is supercoiled and bound
by nucleoid-associated proteins, but not
wrapped in true histones like eukaryotes.

73

What is supercoiling used for in bacteria?

74

If a prokaryote is photosynthetic (like cyanobacteria), does it have chloroplasts?

75

Where does oxidative phosphorylation happen in eukaryotes vs bacteria?

76

Eukaryotes separate transcription and translation using the {{c1::nucleus}}; prokaryotes can couple them because they {{c2::lack a nucleus}}.

77

Bacterial mRNA lifespan: usually long or short compared to eukaryotic mRNA?

78

If you see "poly-A tail" and "5' cap" in a question, that's mainly which cells?

79

Does a bacterial cell have ER, Golgi, lysosomes, mitochondria?

80

So what DOES a bacterial cell have internally?

74

No. Photosynthesis happens on internal membranes, not chloroplasts.

73

Packing a long circular DNA molecule into a small cell, and controlling gene expression/access.

76

Eukaryotes separate transcription and translation using the nucleus; prokaryotes can couple them because they lack a nucleus.

75

Eukaryotes: inner mitochondrial membrane. Bacteria: plasma membrane.

78

Eukaryotic mRNA processing.

77

Usually shorter.

80

Cytoplasm, nucleoid (DNA), ribosomes, plasma membrane, often a cell wall, and sometimes capsule/flagella/pili/plasmids.

79

No.

81

Bacterial DNA replication usually starts at how many origins?

82

Eukaryotic nuclear DNA replication starts at one origin or many?

83

Binary fission steps (super simplified)?

84

Do bacteria have a mitotic spindle made of microtubules?

85

What's a septum in bacterial division?

86

Telomeres: who has them?

87

Why do eukaryotes need mitosis but bacteria don't?

88

Prokaryotes are haploid or diploid (usually)?

82

Many origins per chromosome.

81

Usually one origin on the circular chromosome.

84

No.

83

Replicate DNA -> segregate DNA -> septum forms -> cell splits.

86

Eukaryotic linear chromosomes (in the nucleus) have telomeres. Bacterial circular chromosomes don't need them.

85

The new cross-wall that forms between the two daughter cells during fission.

88

Usually haploid.

87

Eukaryotes must separate many linear chromosomes; bacteria usually have one circular chromosome and divide differently.

89

Do bacteria do meiosis?

90

If a question describes "spores" in bacteria, is that the same as fungal spores for reproduction?

91

Endospore: why do some bacteria make them?

92

If a bacterium lacks a cell wall, what becomes a huge problem?

93

Archaea vs bacteria: what's one clean membrane difference?

94

If a question says "extremophile" (hot springs, very salty), which prokaryote group is it hinting at?

95

Do prokaryotes have cytoplasmic membrane infoldings?

96

What's the bacterial equivalent of a "nuclear membrane"?

90

No. Bacterial endospores are survival structures, not reproduction.

89

No.

92

Osmotic lysis (bursting) unless it lives in a protected environment.

91

To survive extreme conditions (heat, drying, chemicals).

94

Archaea (often).

93

Archaea have ether-linked membrane lipids; bacteria/eukaryotes mostly have ester-linked lipids.

96

There isn't one.

95

Some do, but don't call them "mitochondria" or "ER."

97

Can bacteria do transcription without RNA polymerase?

98

If you see "ribosomes attached to rough ER," which cell type is that?

99

If you see "Golgi stacks" in a diagram, prokaryote or eukaryote?

100

Fast check: if a cell has 70S ribosomes AND a nucleus, what's going on?

101

Eukaryotic DNA is in the nucleus. Where is bacterial DNA attached/organized?

102

If the question says "membrane-bound compartment for digestion," what organelle is it, and which cell type?

103

If the question says "endocytosis" or "exocytosis," which cell type is it pointing to?

104

If a cell has chloroplasts, it's definitely...

98

Eukaryotic.

97

No. They still need RNA polymerase (just a simpler setup than eukaryotes).

100

It's probably a eukaryotic cell, and you're seeing mitochondrial/chloroplast ribosomes.

99

Eukaryote.

102

Lysosome, eukaryotic cell.

101

In the nucleoid, often associated with the cell membrane and proteins (not a membrane compartment).

104

Eukaryotic (plant/algae).

103

Eukaryotic.

105

If a cell has peptidoglycan, it's definitely...

106

If a cell has cellulose in its wall, it's definitely...

107

If a cell has chitin in its wall, it's definitely...

108

Bacteria vs eukaryotes: where does protein synthesis happen?

109

What does "prokaryotic" literally hint at? (helpful mnemonic)

110

Bacteria typically divide by {{c1::binary fission}}, while eukaryotic somatic cells divide by {{c2::mitosis}}.

106

Eukaryotic plant cell (or plant-like algae).

105

Bacterial (a prokaryote).

108

Both use ribosomes. In bacteria it's in the cytosol. In eukaryotes it's in cytosol and on rough ER.

107

Fungal eukaryote.

110

Bacteria typically divide by binary fission, while eukaryotic somatic cells divide by mitosis.

109

Before nucleus (no true nucleus).