MEDICAL BIOLOGY

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OUT LINE

1- prokaryotic cells

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1- PROKARYOTIC CELLS

- prokaryotes have a cell wall surrounding the cell membrane except in mycoplasma. The fluid matrix filling the cell is the cytoplasm. There is no well-defined nucleus. The genetic material is basically naked, not enveloped by a nuclear membrane. In addition to the genomic DNA (the single chromosome/circular DNA), many bacteria have small circular DNA outside the genomic DNA. These smaller DNA are called plasmids. The plasmid DNA confers certain unique phenotypic characters to such bacteria. One such character is resistance to antibiotics. In higher classes you will learn that this plasmid DNA is used to monitor bacterial transformation with foreign DNA. Nuclear membrane is found in eukaryotes.

1- PROKARYOTIC CELLS

- In prokaryotic . No organelles, like the ones in eukaryotes, are found in prokaryotic cells except
- ribosomes. Prokaryotes have something unique in the form of inclusions. A specialised differentiated form of cell membrane called mesosome is the characteristic of prokaryotes. They are essentially infoldings of cell membrane

1-1- CELL ENVELOPE AND ITS MODIFICATION

- Most prokaryotic cells, particularly the bacterial cells, have a chemically complex cell envelope. The cell envelope consists of a tightly bound three layered structure i.e., the outermost glycocalyx followed by the cell wall and then the plasma membrane. Although each layer of the envelope performs distinct function, they act together as a single protective unit. **Bacteria** can be classified into two groups on the basis of the differences in the cell envelopes and the manner in which they respond to the **staining** procedure developed by Gram viz., those that take up the gram stain are **Gram positive** and the others that do not are called **Gram negative** bacteria.

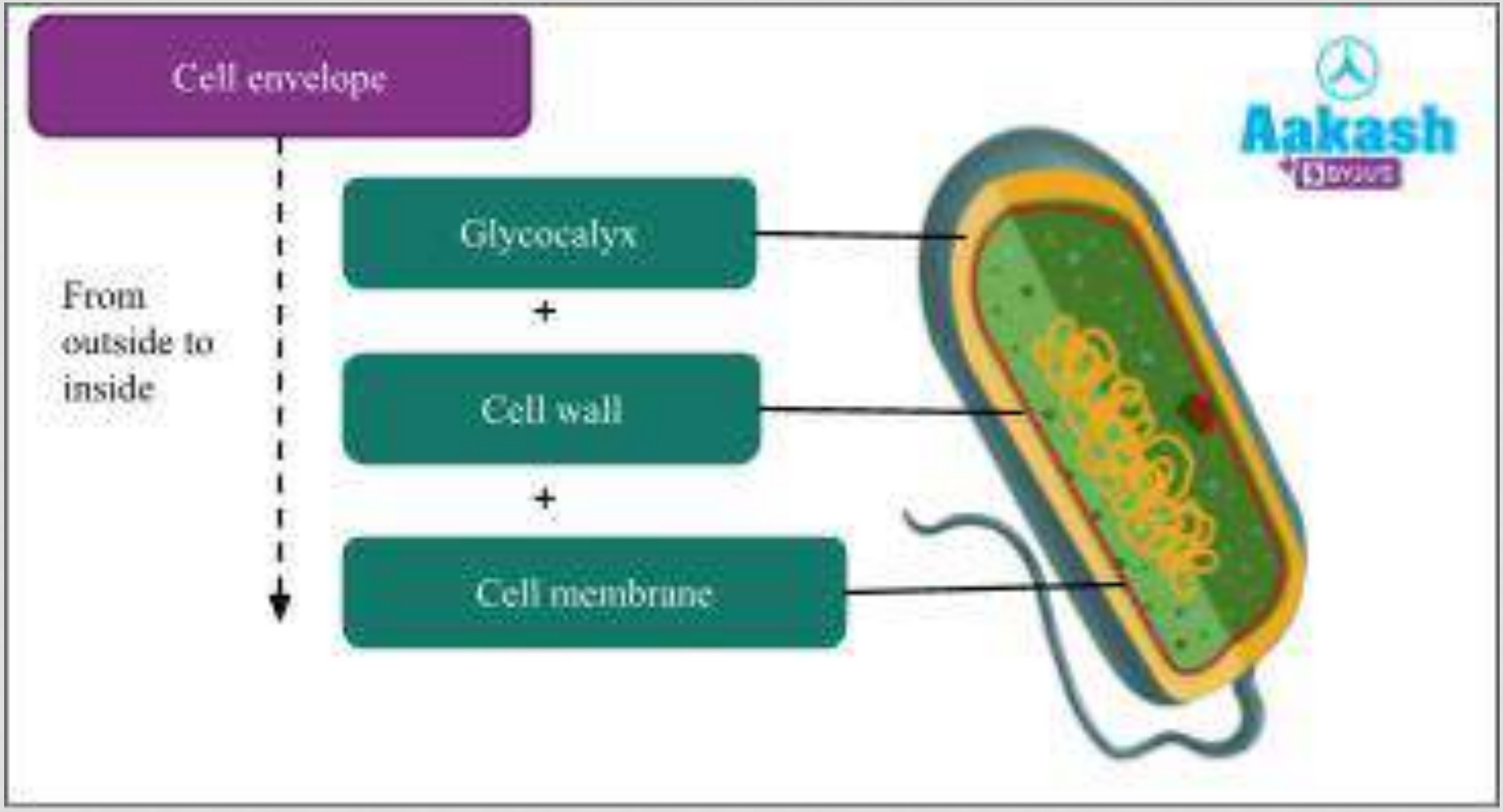


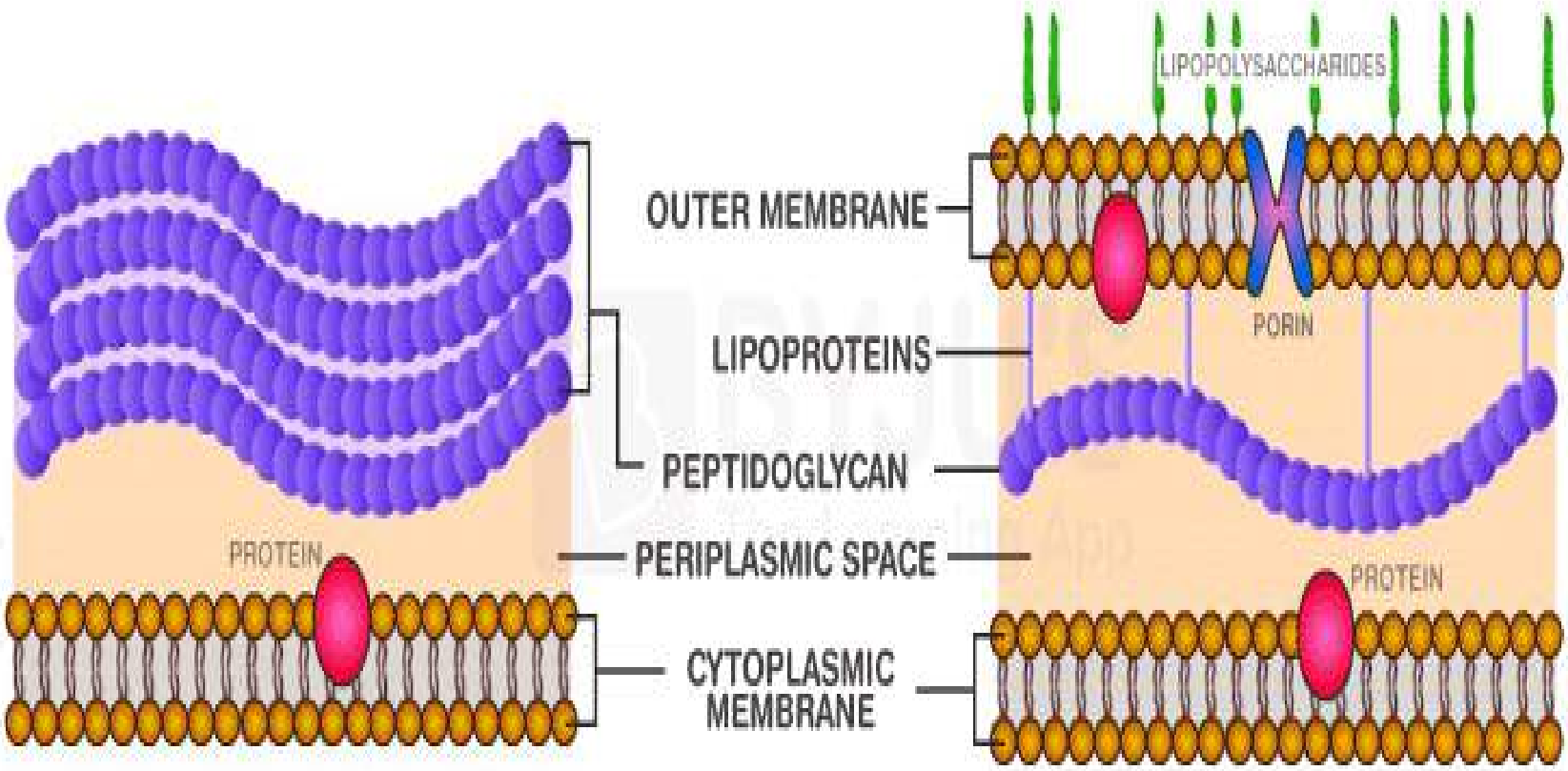
Fig: Parts of prokaryotic cell envelope

1-2- PLASMA MEMBRANE

- The plasma membrane is selectively permeable in nature and interacts with the outside world. This membrane is similar structurally to that of the eukaryotes.
- A special membranous structure is the mesosome which is formed by the extensions of plasma membrane into the cell. These extensions are in the form of vesicles, tubules and lamellae. They help in cell wall

GRAM POSITIVE VS. NEGATIVE CELL WALL

BYJU'S The Learning App



Gram positive

Gram negative

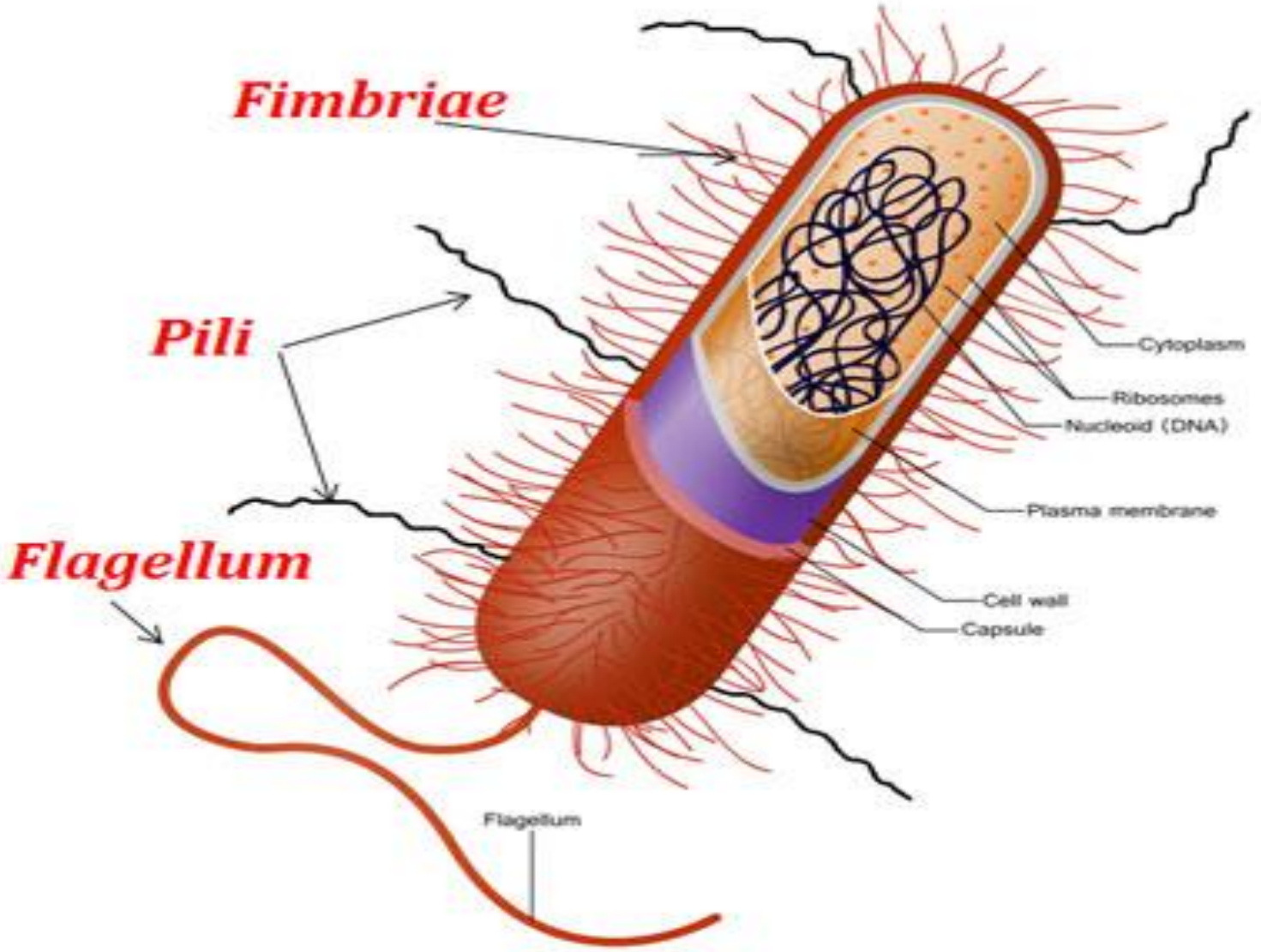
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1-3- FLAGELLA,PILLI, FIMBRIAE

- Bacterial cells may be motile or non-motile. If motile, they have thin filamentous extensions from their cell wall called flagella. Bacteria show a range in the number and arrangement of flagella. Bacterial flagellum is composed of three parts – filament, hook and basal body. The filament is the longest portion and extends from the cell surface to the outside.

1-3- FLAGELLA ,PILLI , FIMBRIAE

- Besides flagella, Pili and Fimbriae are also surface structures of the bacteria but do not play a role in motility. The pili are elongated tubular structures made of a special protein. The fimbriae are small bristle like fibres sprouting out of the cell. In some bacteria, they are known to help attach the bacteria to rocks in streams and also to the host tissues.

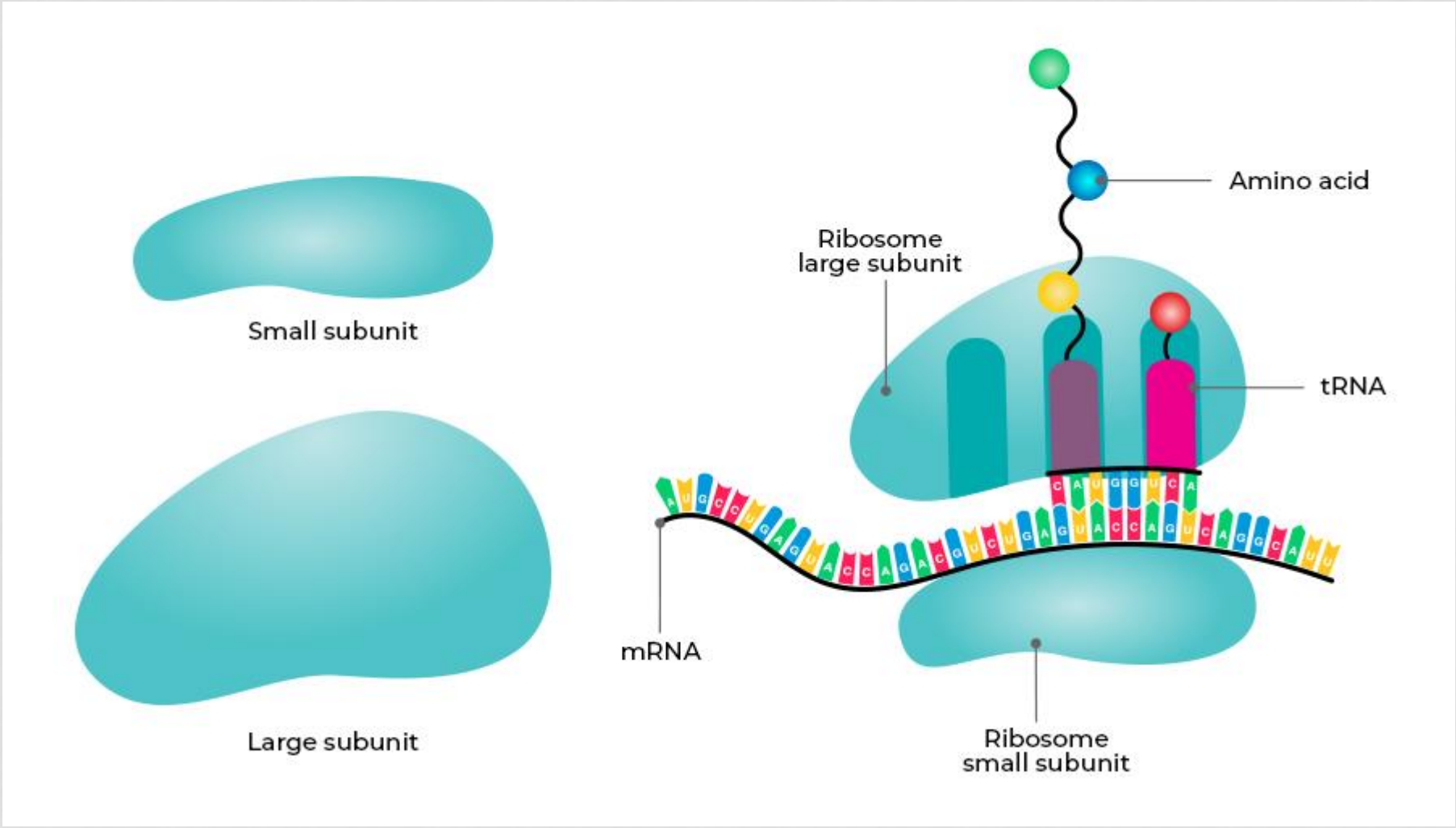


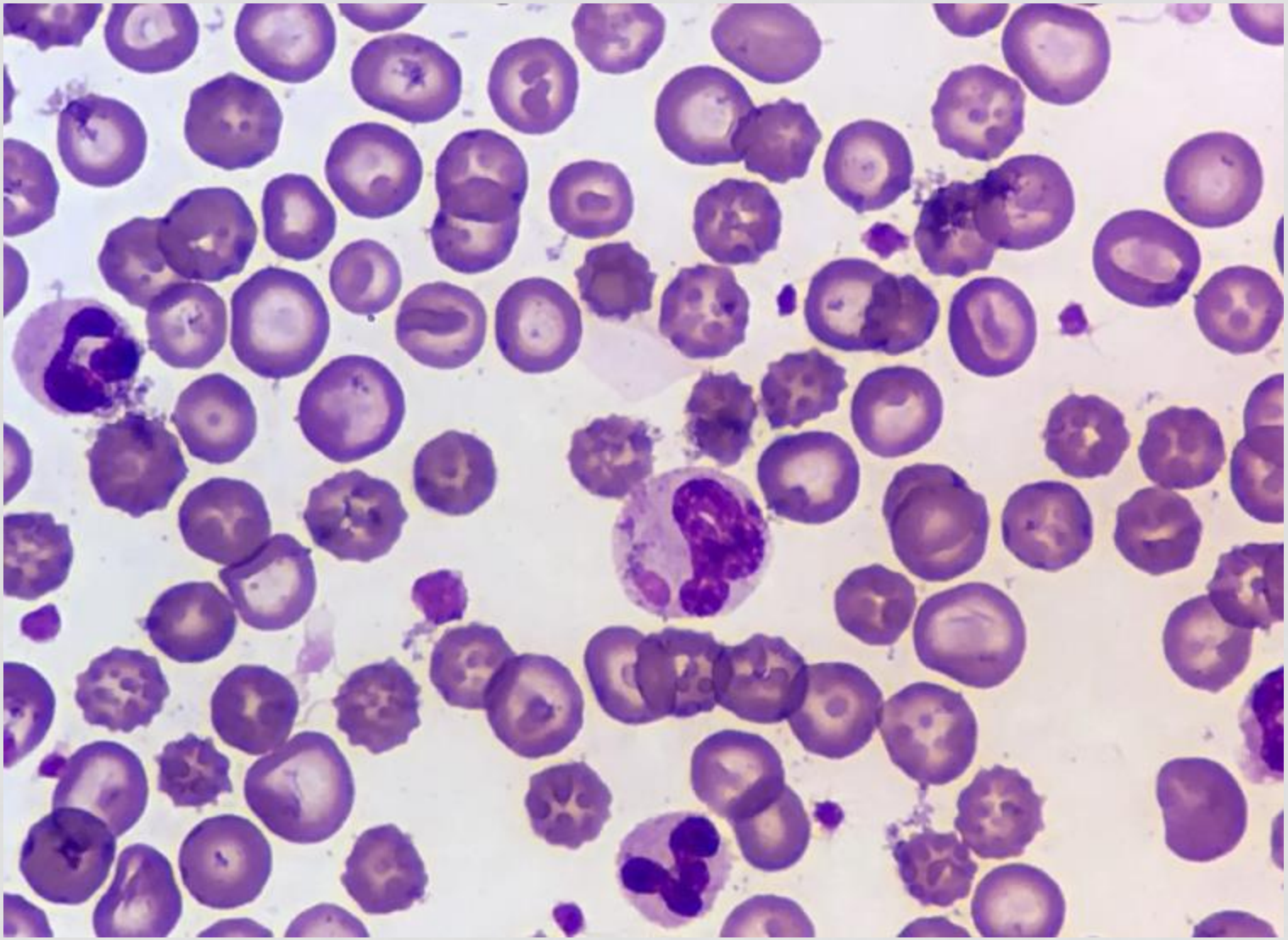
Cell-Surface Appendages of a Bacterial Cell

1-4- RIBOSOMES AND INCLUSION BODIES

- In prokaryotes, **ribosomes** are associated with the plasma membrane of the cell. They are about 15 nm by 20 nm in size and are made of two subunits - 50S and 30S units which when present together form 70S prokaryotic ribosomes. Ribosomes are the site of protein synthesis. Several ribosomes may attach to a single mRNA and form a chain called polyribosomes or polysome.

- **Inclusion bodies**: Reserve material in prokaryotic cells are stored in the cytoplasm in the form of inclusion bodies. These are not bound by any membrane system and lie free in the cytoplasm, e.g., phosphate granules, cyanophycean granules and glycogen granules. Gas vacuoles are found in blue green and purple and green photosynthetic bacteria.


Small subunit
Large subunit
Amino acid
Ribosome
large subunit
tRNA
mRNA
Ribosome
small subunit



Inclusion Bodies


THANK
YOU
FOR
YOUR
ATTENTION