

INKBIOLOGY FLASHCARDS

Cells, microscopy and biological organisation

Unit B01 · 36 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in mark-scheme wording, and the misconceptions that lose marks. These cards and each lesson's whole-lesson check run on the website with spaced-repetition scheduling, at inkphysics.co.uk/biology/flashcards.

DEFINITION

Define: Organelle.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Ultrastructure.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Cytoplasm.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Nuclear envelope.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Nucleolus.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Rough endoplasmic reticulum.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Smooth endoplasmic reticulum.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Ribosome.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

The detail of a cell's internal structure as revealed by an electron microscope.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

A structure inside a cell with a distinct function, usually but not always surrounded by its own membrane.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

The double membrane surrounding the nucleus, continuous with the endoplasmic reticulum and perforated by nuclear pores.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Everything inside the cell-surface membrane except the nucleus: the cytosol and the organelles suspended in it.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Flattened membrane sacs with ribosomes attached, which make and transport proteins for export or for membranes.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

A dense region within the nucleus where ribosomal RNA is made and ribosomes are assembled.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

A structure of ribosomal RNA and protein, in two subunits, with no membrane, which is the site of translation. 80S in eukaryotic cytoplasm, 70S in prokaryotes and in mitochondria and chloroplasts.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Membrane sacs without ribosomes, which synthesise lipids and steroids and store calcium ions.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Lysosome.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Crista.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

SPOT THE ERROR

Say what is wrong with this claim:

A cell is a bag of jelly with organelles floating loose in it, each one a separate gadget doing its own job.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

Define: Magnification.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN T

DEFINITION

Define: Resolution.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN T

DEFINITION

Define: Empty magnification.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN T

DEFINITION

Define: Artefact.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN T

DEFINITION

Define: Eyepiece graticule.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN T

DEFINITION

A fold of the inner mitochondrial membrane, giving a large surface area for the electron transport chain.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

A vesicle containing hydrolytic enzymes, bounded by a single membrane, which digests worn-out organelles and engulfed material.

CELL STRUCTURE: WHAT EACH ORGANELLE IS SHAPED FOR

DEFINITION

How many times larger the image is than the actual object. A ratio, with no units.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE

SPOT THE ERROR

They are not separate gadgets. The nuclear envelope runs straight on into the endoplasmic reticulum, and a protein bound for export passes from rough ER to Golgi to vesicle to the surface without crossing a membrane. Each shape is built for its job, and the pairing is what earns marks.

DEFINITION

Enlarging an image beyond the detail its resolution contains, so nothing further becomes visible.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE

DEFINITION

The minimum distance between two points at which they can still be distinguished as separate. A length, and smaller is better.

DEFINITION

A ruled scale in the eyepiece whose divisions have no fixed length until it is calibrated.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE

DEFINITION

A structure seen in a prepared specimen that was not present in the living cell, produced by the preparation or imaging process.

DEFINITION

Define: Stage micrometer.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE

SPOT THE ERROR

Say what is wrong with this claim:

A microscope that magnifies more shows you more.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE

DEFINITION

Define: Prokaryotic cell.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Plasmid.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Capsule.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Nucleoid.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Virus.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Capsid.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

SPOT THE ERROR

Magnification is how much bigger; resolution is how much detail there is to enlarge. A light microscope cannot separate two points closer than about $0.2\text{ }\mu\text{m}$, so enlarging past that gives a bigger blur and nothing new.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE WITH A MICROSCOPE

DEFINITION

A slide bearing a scale of known length, used to calibrate an eyepiece graticule for one particular objective lens.

MICROSCOPY: MAGNIFICATION, RESOLUTION AND WHAT YOU CAN SEE WITH A MICROSCOPE

DEFINITION

A small circular molecule of DNA, separate from the main chromosome, which replicates independently and often carries genes such as antibiotic resistance.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

A cell with no nucleus and no membrane-bound organelles, whose DNA is a single circular molecule free in the cytoplasm.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

The region of a prokaryotic cell occupied by its circular DNA, with no surrounding membrane.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

A layer of slime outside the cell wall which retains water, aids attachment and gives some protection from phagocytosis.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

The protein coat surrounding a virus's genetic material.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

An acellular infectious particle consisting of nucleic acid within a protein capsid, sometimes with a lipid envelope, which can only replicate inside a host cell.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Attachment protein.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Reverse transcriptase.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

SPOT THE ERROR

Say what is wrong with this claim:

Bacteria are simple cells and viruses are just very small bacteria.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Define: Differentiation.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Specialised cell.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Totipotent.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Pluripotent.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Multipotent.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

An enzyme carried by retroviruses such as HIV which catalyses the synthesis of DNA from an RNA template.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

A protein on a virus's surface with a shape complementary to a receptor on its host cell, which determines which cells it can infect.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

The process by which a cell develops the structures and characteristics needed to carry out a particular function, through some genes being expressed and others not.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS OF CELL

SPOT THE ERROR

A virus is not a small bacterium. It has no cytoplasm, no ribosomes, no membrane of its own and no metabolism: it cannot make a protein, respire or divide. That is why antibiotics work on bacteria and do nothing whatever to viruses.

PROKARYOTIC CELLS AND VIRUSES: LESS MACHINERY, SAME PROBLEMS

DEFINITION

Able to develop into any cell type in the organism and into the extra-embryonic tissues such as the placenta. Found in the zygote and the cells of the first few divisions.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS OF CELL

DEFINITION

A cell whose structure is adapted to one particular function.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS OF CELL

DEFINITION

Able to develop into a limited range of cell types. Found in adult stem cells, such as those in bone marrow which produce the blood cells.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS OF CELL

DEFINITION

Able to develop into any cell type in the body, but not into the placenta. Found in embryonic stem cells in the blastocyst.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS OF CELL

DEFINITION

Define: Tissue.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Organ.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

Define: Organ system.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

SPOT THE ERROR

Say what is wrong with this claim:

A neurone kept the nerve genes and lost the rest, and that is how it differs from a red blood cell.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

A structure made of several different tissues working together to perform a particular function.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

A group of similar cells working together to perform a particular function.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

SPOT THE ERROR

Nothing is discarded. Almost every nucleated cell holds a complete genome, so a cell in your retina carries the insulin gene and never uses it. What differs between cell types is which genes are transcribed.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS

DEFINITION

A group of organs working together to perform an overall life function.

SPECIALISATION: HOW ONE GENOME BECOMES TWO HUNDRED KINDS