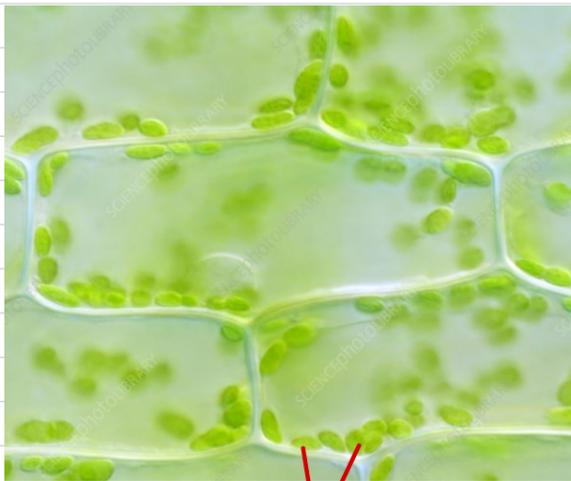


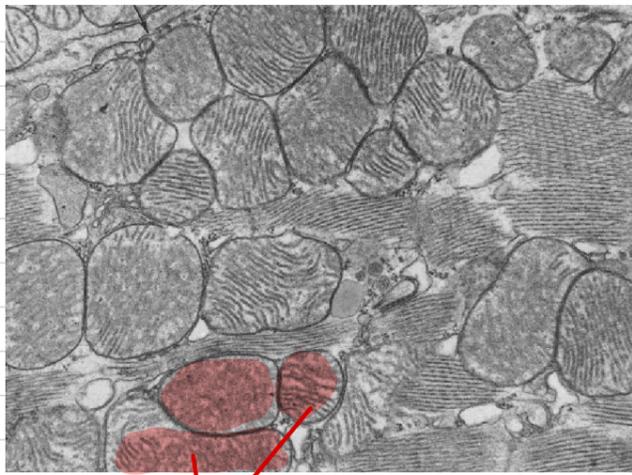
Markscheme

1



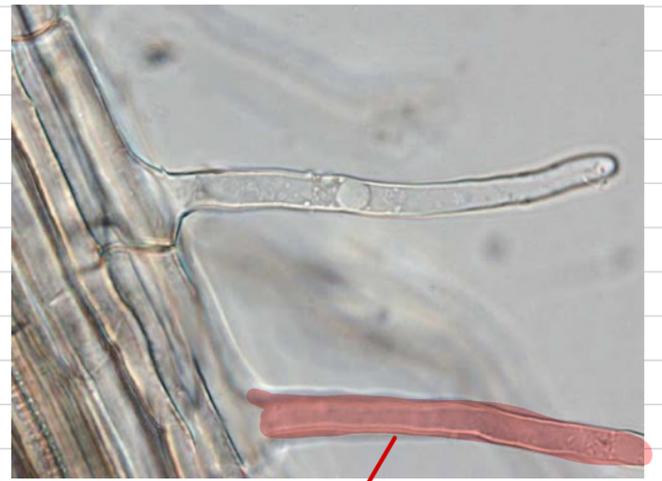
many chloroplasts
 ↳ suggests a lot of photosynthesis

leaf palisade cell



many mitochondria
 ↳ suggests a large demand for energy

muscle cell



large extensions
 ↳ suggests transport

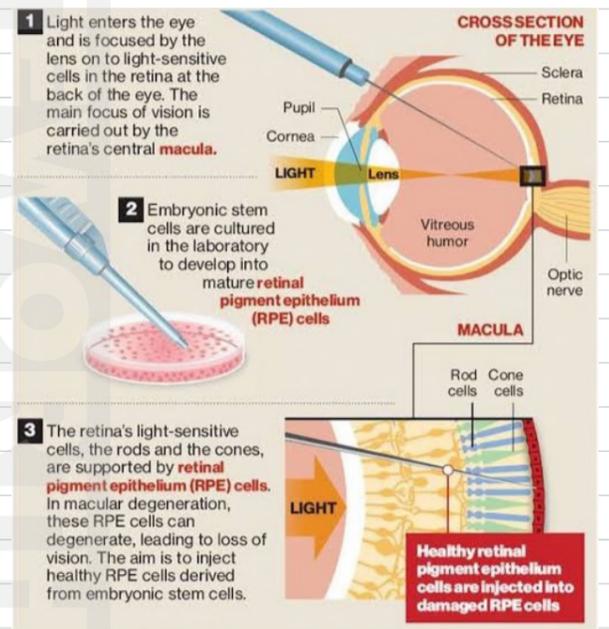
root hair cell

2

a) During development, there is a lot of growth and differentiation into tissues and organs so stem cells are needed as adults, development is over, so there is less need. Still some stem cells (blood stem cells in bone marrow)

b) Embryonic stem cells can differentiate into any cell and divide rapidly
 ↳ can be used to replace damaged or faulty tissue

ex: Stargardt's disease: genetic degenerative eye disorder. The retina cells start to die, leading to blindness
 ↳ treatment: stem cells can be differentiated into retinal cells and injected into the retina the new retinal cells replace damaged ones

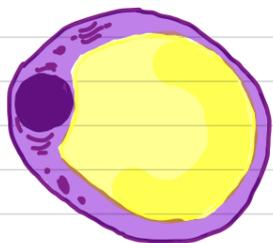


ex: Leukemia (cancer of the blood): many blood cells (including white blood cells) are faulty - weakened immune system
 ↳ treatment: blood stem cells are harvested from patient chemotherapy kills many fast-dividing cells (like cancer but also healthy cells) blood stem cells injected back into patient and divide & replace lost cells

3

Yes. All cells with a nucleus have the same genes, whether they are specialized or not. The difference is which genes are expressed and which are not. Becoming specialized doesn't mean losing/gaining/changing genes, rather it is focusing on fewer.

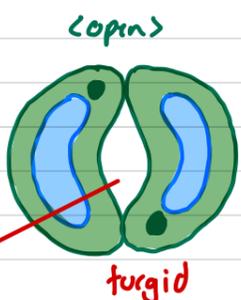
4



Adipose (fat) cell

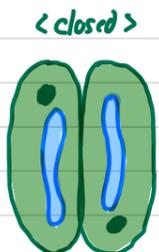
function: collect, store, & release lipids (fats)

structure: large, central vacuole
 organelles pushed to the side) ↳ stores a lot of fat



<open>

turgid



<closed>

flaccid

Guard cells

function: regulate the influx of CO₂ and water in plants when they fill with water - open, no water - close.

structure: Kidney-shaped ↳ allows pore to form between them when turgid
 large vacuoles ↳ fill with water to become turgid
 thick inner walls
 thin outer walls ↳ allows cells to bulge outward when turgid

5

many possible answers