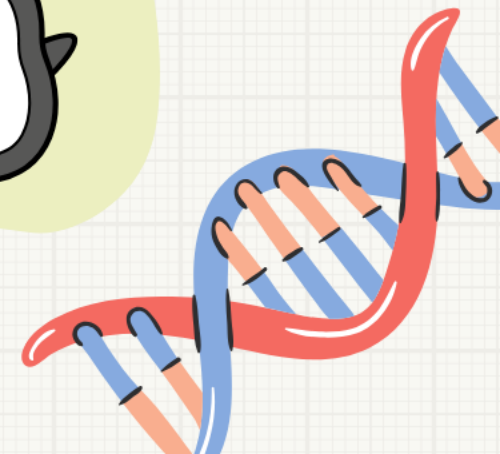
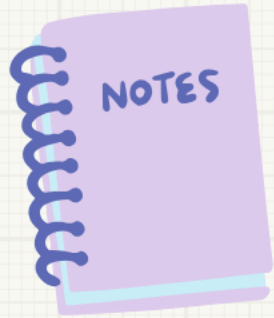


# AP Bio FRQ Fridays

2013 #6  
Cellular Organelles



The following data were collected by observing subcellular structures of three different types of eukaryotic cells.

## RELATIVE AMOUNTS OF ORGANELLES IN THREE CELL TYPES

| Cell Type | Smooth ER    | Rough ER     | Mitochondria    | Cilia   | Golgi Bodies |
|-----------|--------------|--------------|-----------------|---------|--------------|
| X         | Small amount | Small amount | Large number    | Present | Small amount |
| Y         | Large amount | Large amount | Moderate number | Absent  | Large amount |
| Z         | Absent       | Absent       | Absent          | Absent  | Absent       |

Based on an analysis of the data, **identify** a likely primary function of each cell type and **explain** how the data support the identification.



# FRQ Friday #7

2013 #6

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|          |                  |   |            |   |
|----------|------------------|---|------------|---|
| B:<br>SU | <u>Cell Type</u> | <u>Identify function</u>  |            | <u>Explain how data support identification (1 point each correct pair).</u><br><u>NOTE: No points for identification without explanation.</u>   |
|          | X                | <ul style="list-style-type: none"><li>Locomotion</li><li>Movement / surface transport</li></ul> | <u>AND</u> | Has cilia for movement <u>and</u> large amounts of mitochondria to provide energy for locomotion of cell itself (ciliated protist) or movement of particles (mucus / oocyte) along cell surface |

Hi!

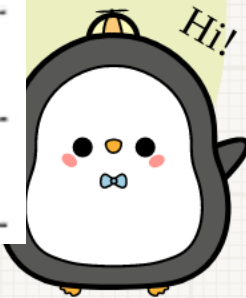
# FRQ Friday #7

2013 #6

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| <u>Cell Type</u> | <u>Identify function</u>   |                   | <u>Explain how data support identification (1 point each correct pair).</u><br><u>NOTE: No points for identification without explanation.</u>  |
|------------------|--|-------------------|--|
| X                | <ul style="list-style-type: none"> <li>Locomotion</li> <li>Movement / surface transport</li> </ul> | <b><u>AND</u></b> | Has cilia for movement and large amounts of mitochondria to provide energy for locomotion of cell itself (ciliated protist) or movement of particles (mucus / oocyte) along cell surface |

Cell X likely functions in locomotion because it has a large number of mitochondria, which perform cellular respiration and synthesize ATP, which provides the energy needed for movement. Cell X also has ~~many~~ cilia, which are used for movement.



# FRQ Friday #7

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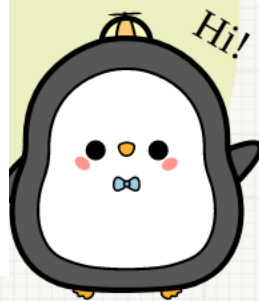
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Base  
supp

| <u>Cell Type</u> | <u>Identify function</u>   |            | <u>Explain how data support identification</u><br>(1 point each correct pair).<br><u>NOTE: No points for identification without explanation.</u> |
|------------------|--|------------|--|
| Y                | <ul style="list-style-type: none"><li>Secretion / exocytosis</li><li>Protein synthesis</li></ul> | <u>AND</u> | Has large amounts of rough ER <u>and</u> Golgi to produce and package proteins   |
|                  | <ul style="list-style-type: none"><li>Lipid/hormone synthesis</li><li>Detoxification</li></ul>   | <u>AND</u> | Has large amounts of smooth ER to produce lipids / hormones  |

data



# FRQ Friday #7

2013 #6

| <u>Cell Type</u> | <u>Identify function</u>   |            | <u>Explain how data support identification (1 point each correct pair).</u><br><u>NOTE: No points for identification without explanation.</u> |
|------------------|--|------------|---|
| Y                | <ul style="list-style-type: none"><li>• Secretion / exocytosis</li><li>• Protein synthesis</li></ul> | <u>AND</u> | Has large amounts of rough ER <u>and</u> Golgi to produce and package proteins  |

Cell Y likely functions to synthesize and excrete proteins and compounds needed elsewhere in the organism, because it has a large amount of smooth and rough ER, which function in protein synthesis and processing (and rough ER has ribosomes, which actually perform protein synthesis), and a large number of Golgi bodies, which package and ship out proteins.





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Based on an analysis of the data, **identify** a likely primary function of each cell type and **explain** how the data support the identification.



# FRQ Friday #7

2013 #6

| Cell Type | Smooth ER | Rough ER | Mitochondria | Cilia  | Golgi Bodies |
|-----------|-----------|----------|--------------|--------|--------------|
| Z         | Absent    | Absent   | Absent       | Absent | Absent       |

| <u>Cell Type</u> | <u>Identify function</u> |           | <u>Explain how data support identification (1 point each correct pair).</u><br><b>NOTE: No points for identification without explanation.</b> |            |                                   |
|------------------|--------------------------|-----------|---|------------|-----------------------------------|
| Z                | • Transport              | <u>OR</u> | • Oxygen transport in animal cells<br>• Water transport in plant cells  | <u>AND</u> | Does not require these organelles |
|                  | • Protection             | <u>OR</u> | • Epidermal cells (stratum corneum, cork, nails)  | <u>AND</u> |                                   |
|                  | • Support                | <u>OR</u> | • Ground tissue (sclerenchyma)<br>• Vascular tissue (xylem)   | <u>AND</u> |                                   |
|                  | • Storage                | <u>OR</u> | • Maximizes volume / space available (hemoglobin, oxygen)   | <u>AND</u> |                                   |
|                  | • No function            | <u>OR</u> | • Is a dead cell/is undergoing apoptosis  | <u>AND</u> |                                   |

Cell Z may be a surface or epithelial cell that serves no function except for protection or insulation, since it lacks many organelles used for other functions.

