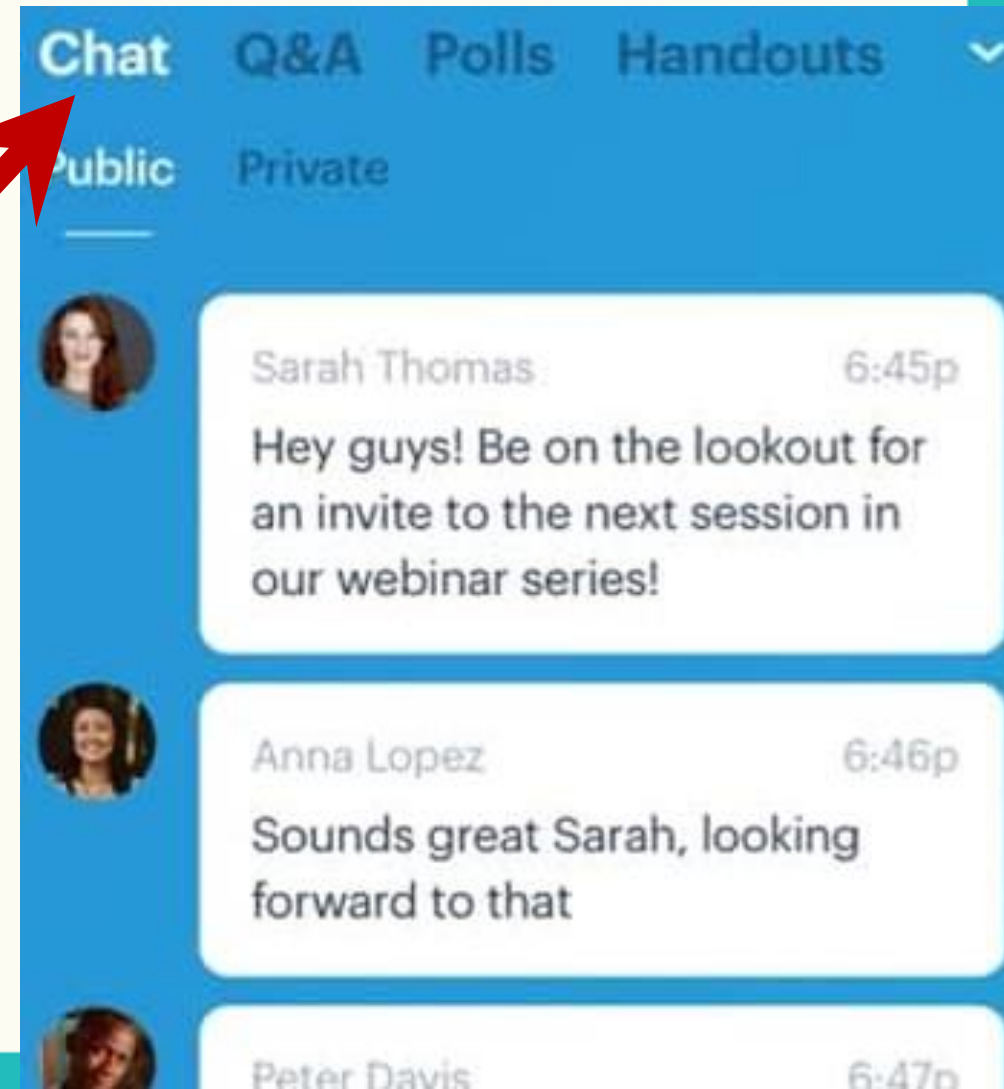


Mastering the Free Response Section in AP BIOLOGY

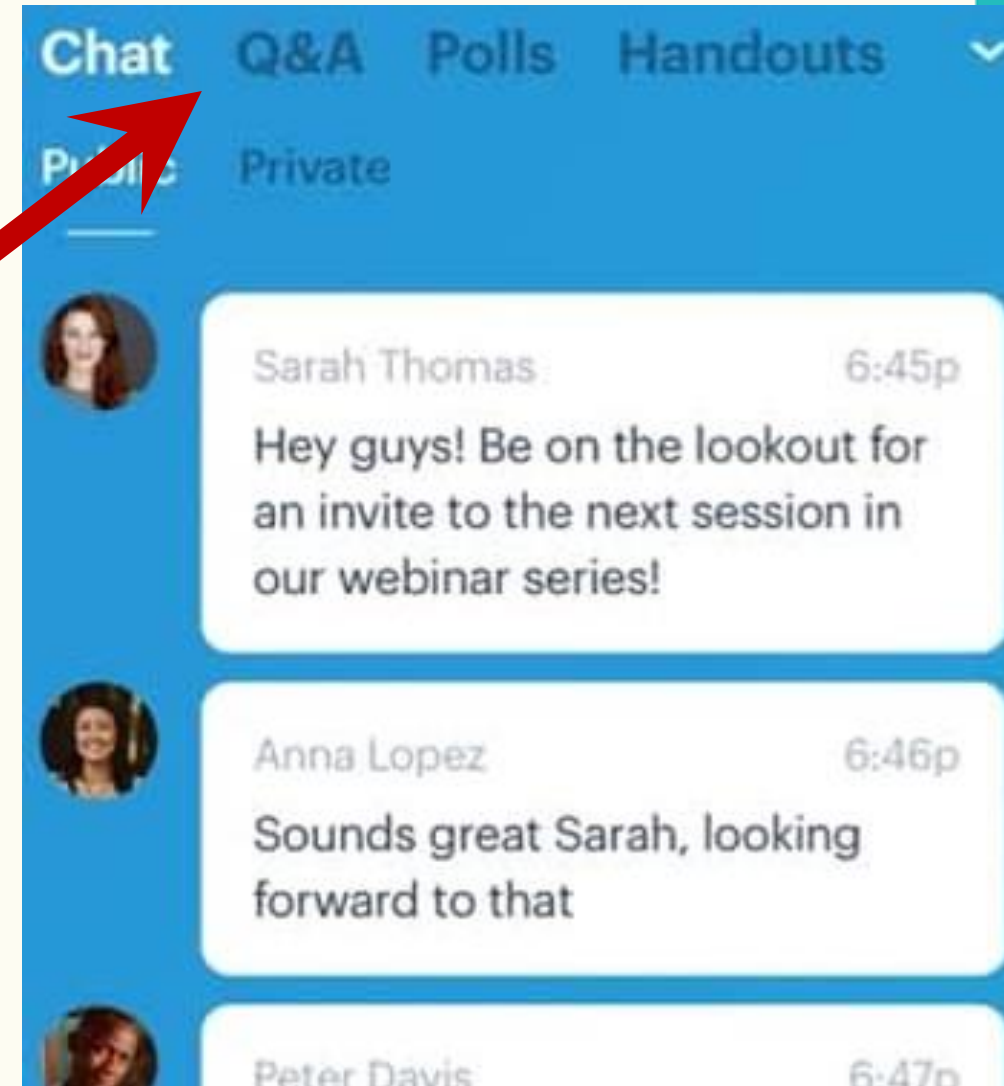


**with
Tiffany Jones
& Josh Kaspar**

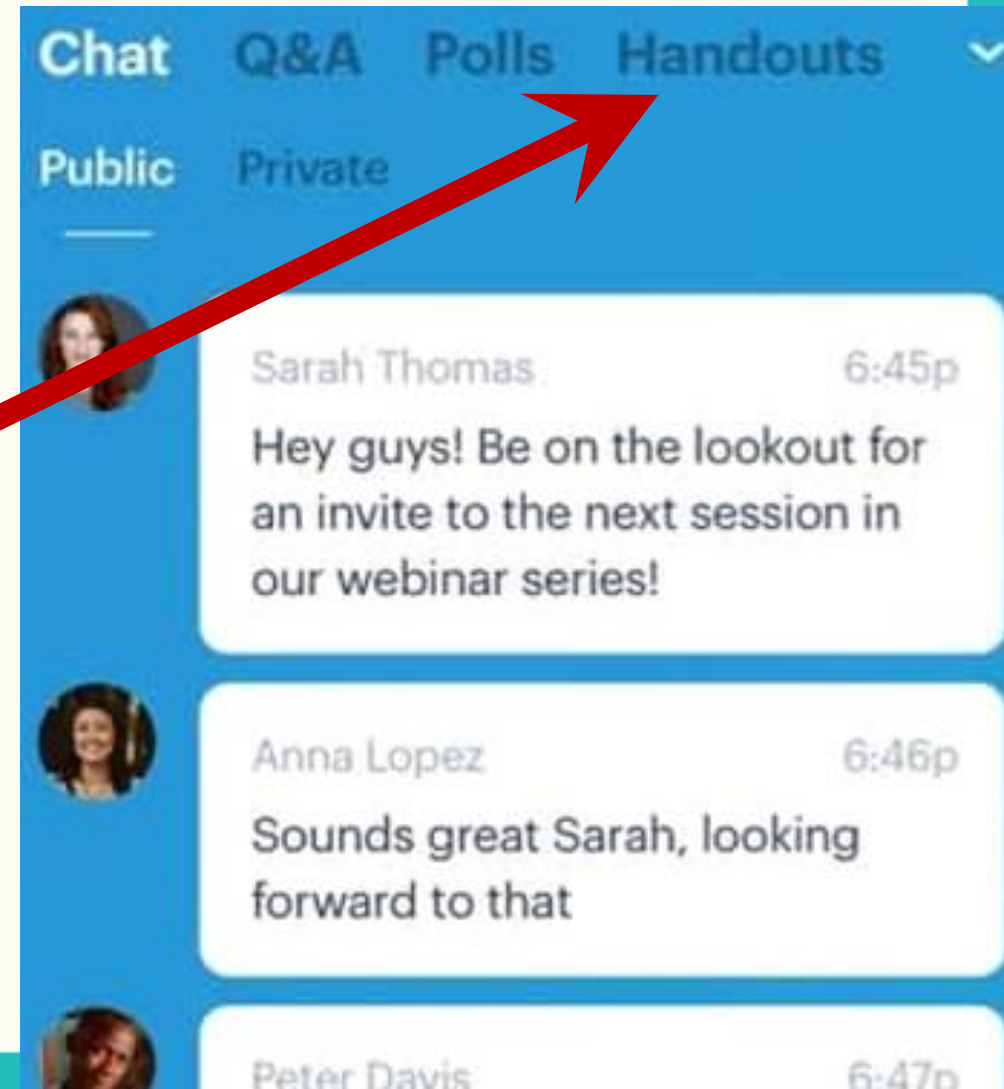
Don't be shy! Talk
to us in the **Chat**
section



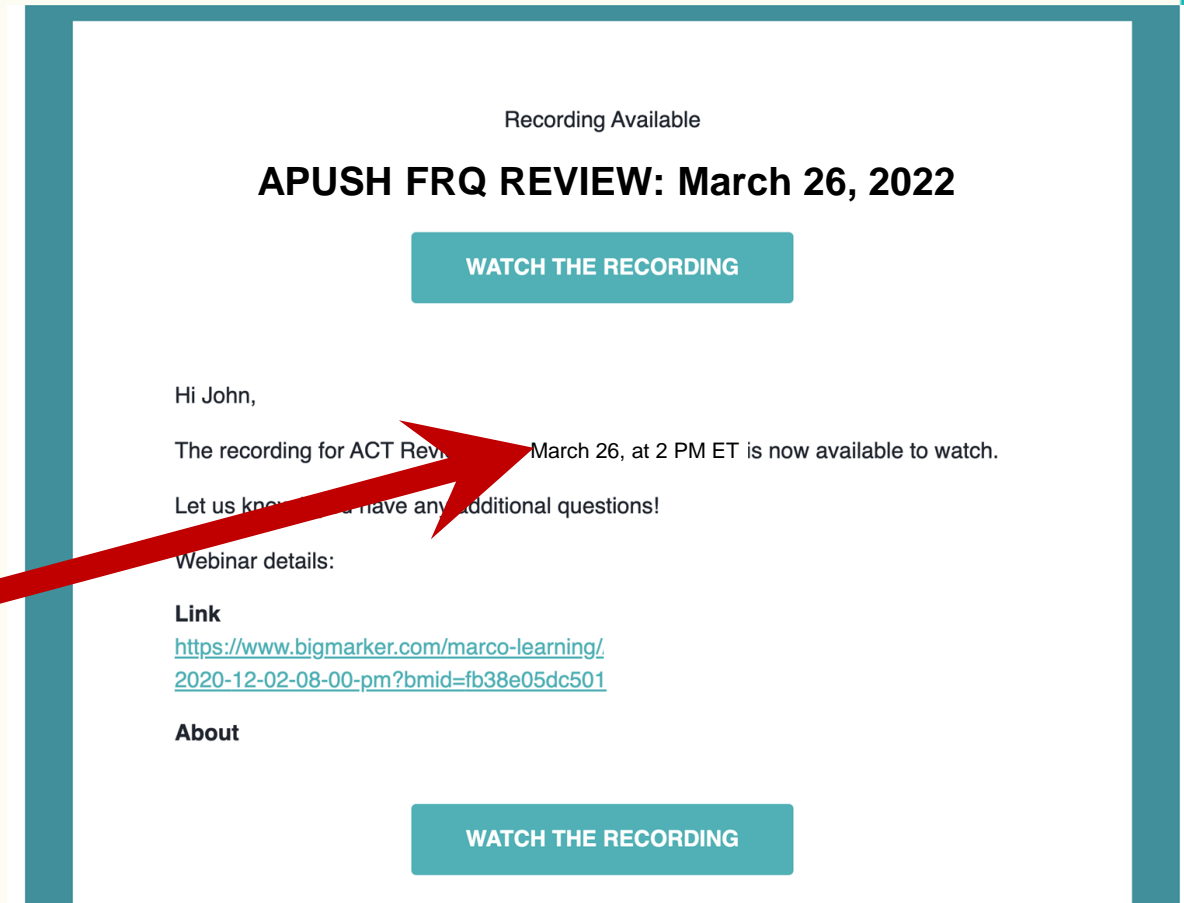
Post your questions in the **Q&A Section** and upvote your favorite questions.



Download your handouts and links in the **Handouts** tab.



All sessions
**will be
recorded** and
sent to you
via email.



Recording Available

APUSH FRQ REVIEW: March 26, 2022

[WATCH THE RECORDING](#)

Hi John,

The recording for ACT Rev. March 26, at 2 PM ET is now available to watch.

Let us know if you have any additional questions!

Webinar details:

Link
<https://www.bigmarker.com/marco-learning/2020-12-02-08-00-pm?bmid=fb38e05dc501>

About

[WATCH THE RECORDING](#)

A red arrow points from the text 'will be recorded' in the main text to the 'WATCH THE RECORDING' button in the email screenshot.

Welcome – Who Are You?

Mr. Joshua Kaspar

- 10 Years of AP Biology
- Florida
- B.A. in Science
Education – Biology
- AP teacher trainer and
mentor



Welcome – Who Are You?

Mrs. Tiffany Jones

- 11 years of AP Biology
- Georgia
- AP Reader
- B.S. in Biology
- Ed.S. in Instructional Tech



AP Review Sessions:

3/11: Big Idea #3

3/18: Big Idea #4

4/15: 2022 FRQ 1 & 2

4/29: 2022 FRQ #3 - 6



Subscribe to:
Marco Learning



**Follow us on your
favorite social
media channels!**



**@marcolearning
@apbiopenguins**



**@marcolearning
@apbiopenguins**



**Marco Learning
AP Bio Insta-Review**

Exam Format

AP Bio Exam: May 10th at 12pm
Countdown: 74 days...

Time: 90 minutes

- Section I: Multiple Choice
- 60 Questions
- 50% of Exam Weighting

Time: 90 minutes

- Section II: Free Response
- 6 Questions (2 long, 4 short)
- 50% of Exam Weighting



Based on the 2020 Practice Exam Scoring Guidelines
You need approximately 54 of the available 120 points for
a 3 on the exam

Tips & Tricks

FRQ Timing:

- Approximate:
25 min per long & 10 min per short
- Recommendation:
20 min per long & 8 min per short
- Time on Page
- Checkboxes for each bold task
- Order of Knowledge/Ability
- Watch your question number

Strategy for Free Response

1. Read the question
2. Read the question carefully
3. Read all of the question
4. Make sure the question has been read
5. Read. The. Question.



Strategy for Free Response

1. Label your responses
2. Write in knowledge order
3. Use the diagram(s)
4. Do not restate the question
5. Additional examples are not scored



Extra Practice Problems

- AP Classroom – Progress Performance Checks (ask your teacher)
- AP Central Released Questions
- AP Bio Penguins Review Guide – Section Reviews

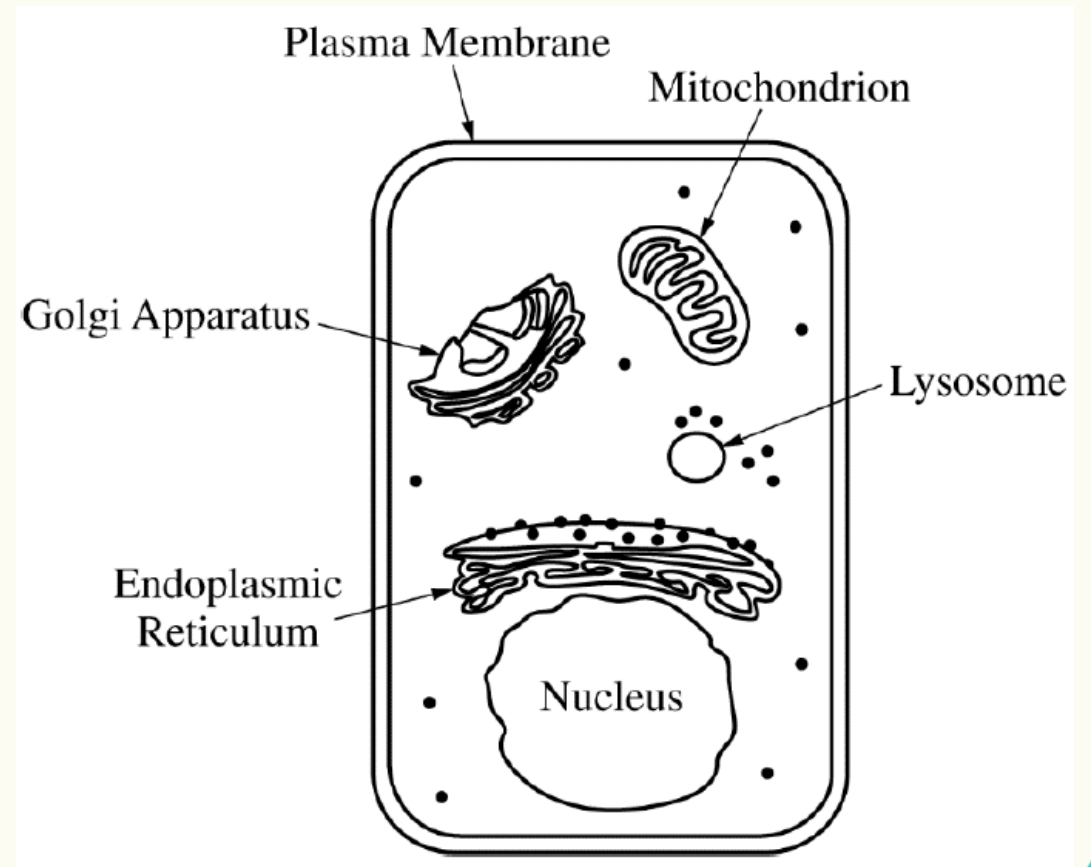


Perfect Practice Makes Perfect!
You have approximately 25 minutes per long FRQs
and 10 minutes per short FRQs

Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

(a) In the provided model of a cell, **draw** arrows to describe the pathway for production of a normal **CFTR** protein from gene expression to final cellular location.

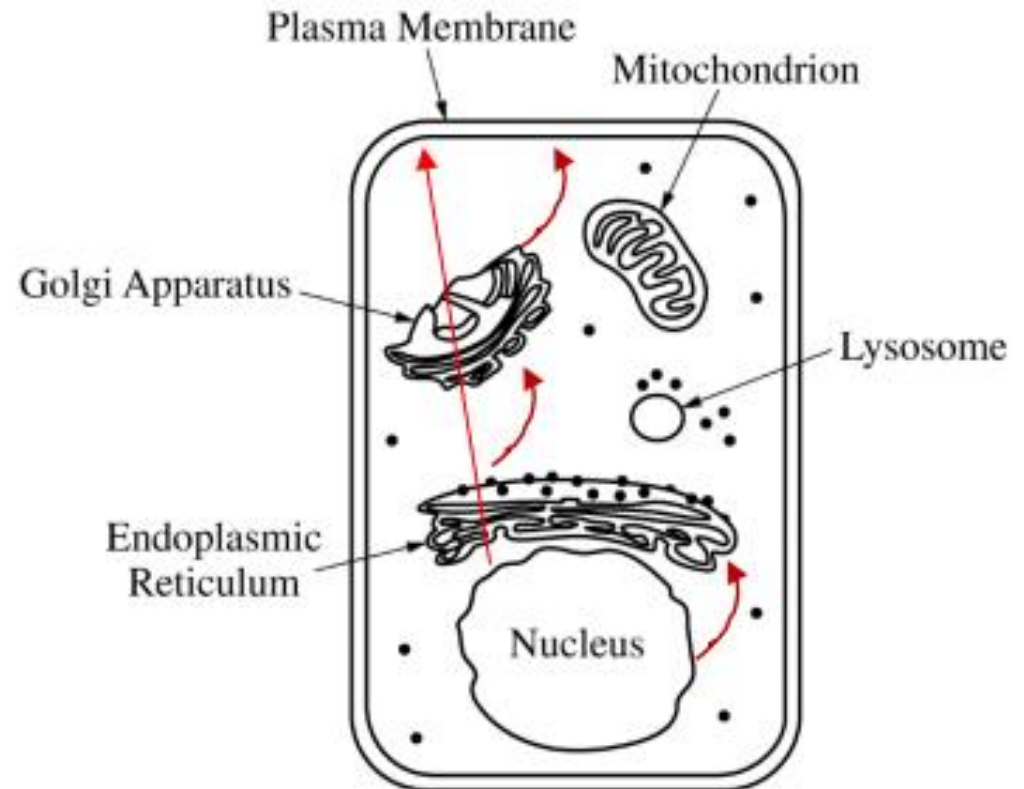


Don't forget to use your diagrams!

Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

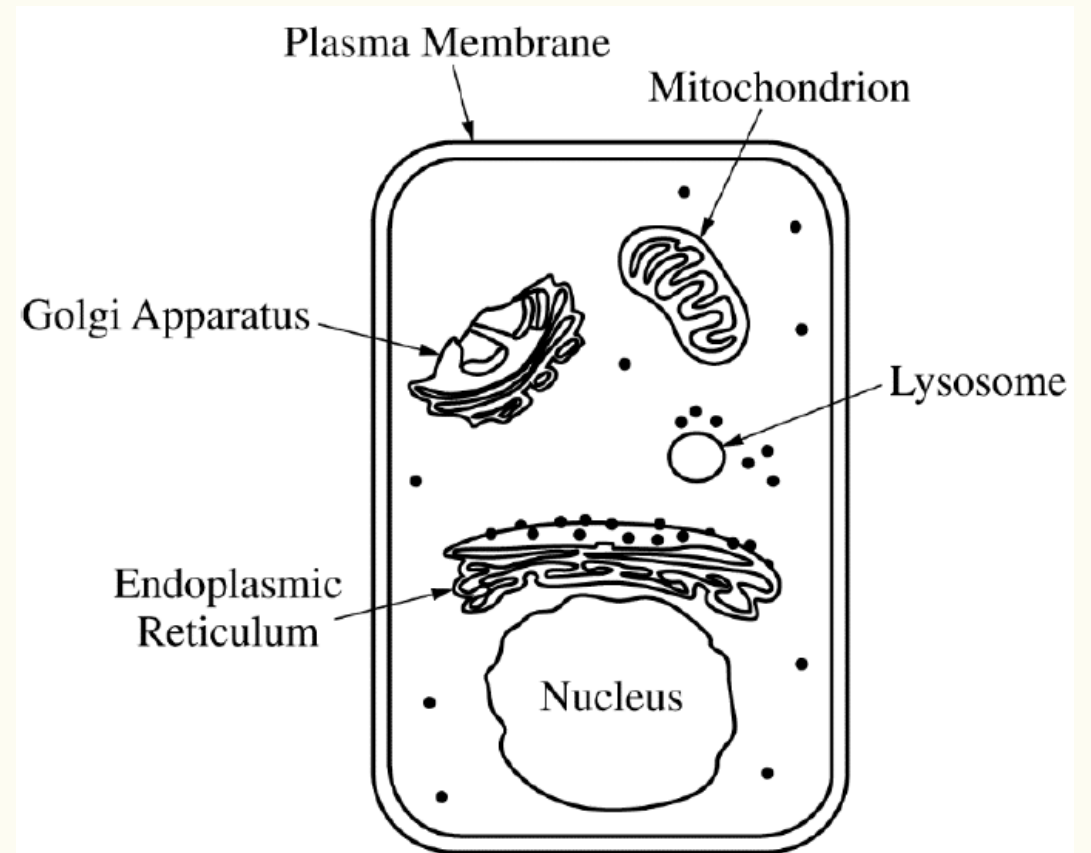
(a) In the provided model of a cell, **draw** arrows to describe the pathway for production of a normal **CFTR** protein from gene expression to final cellular location.



Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

(b) **Identify** the most likely cellular location of the ribosomes that synthesize **CFTR** protein.



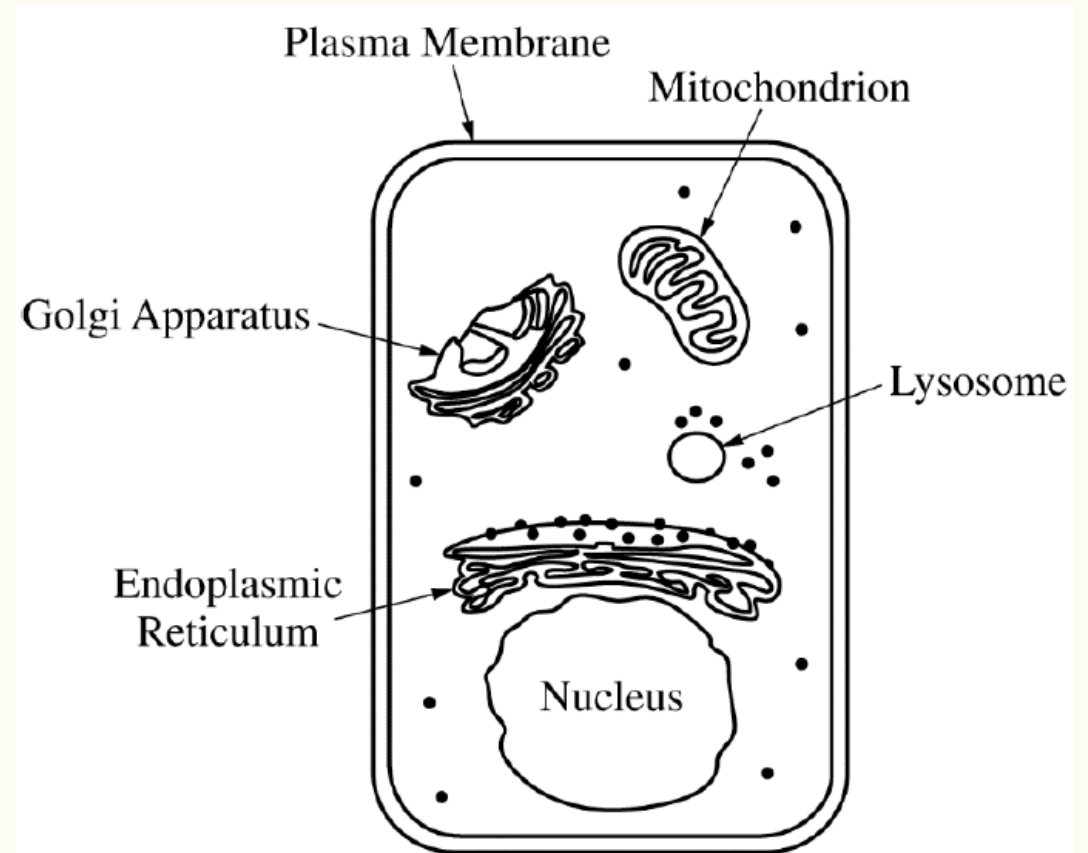
Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

(b) **Identify** the most likely cellular location of the ribosomes that synthesize **CFTR** protein.

Identification (1 point)

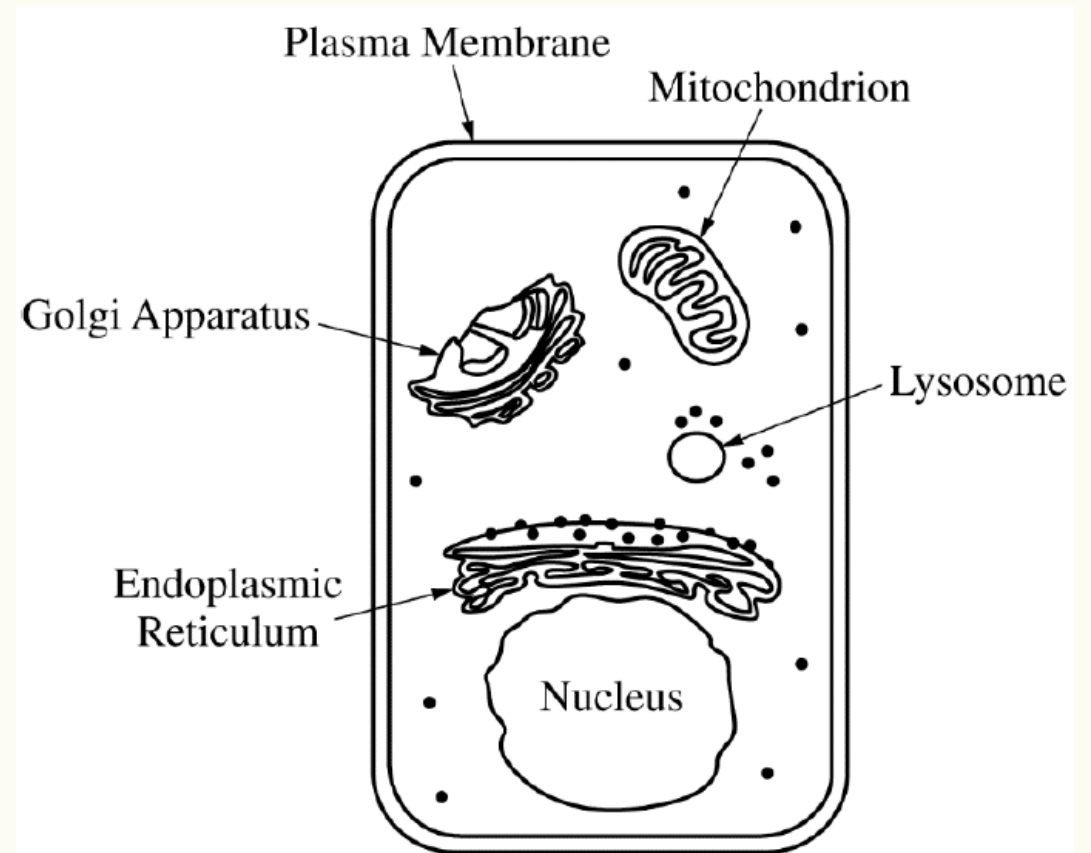
- (Rough) Endoplasmic Reticulum/ER



Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

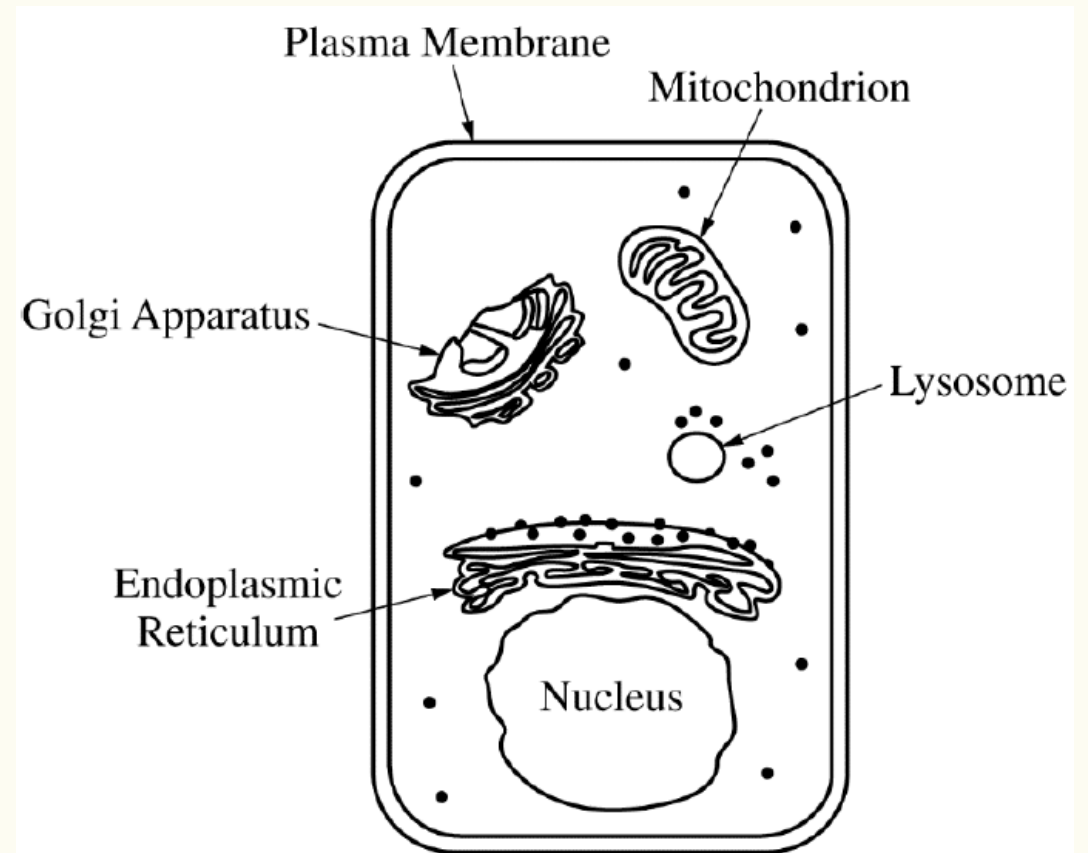
(c) **Identify** the most likely cellular location of a mutant **CFTR** protein that has an amino acid substitution in the **ATP** binding site.



Past Exam: 2018 #6 - Diagrams

Cystic fibrosis is a genetic condition that is associated with defects in the **CFTR** protein. The **CFTR** protein is a gated ion channel that requires **ATP** binding in order to allow chloride ions (Cl^-) to diffuse across the membrane.

(c) **Identify** the most likely cellular location of a mutant **CFTR** protein that has an amino acid substitution in the **ATP** binding site.



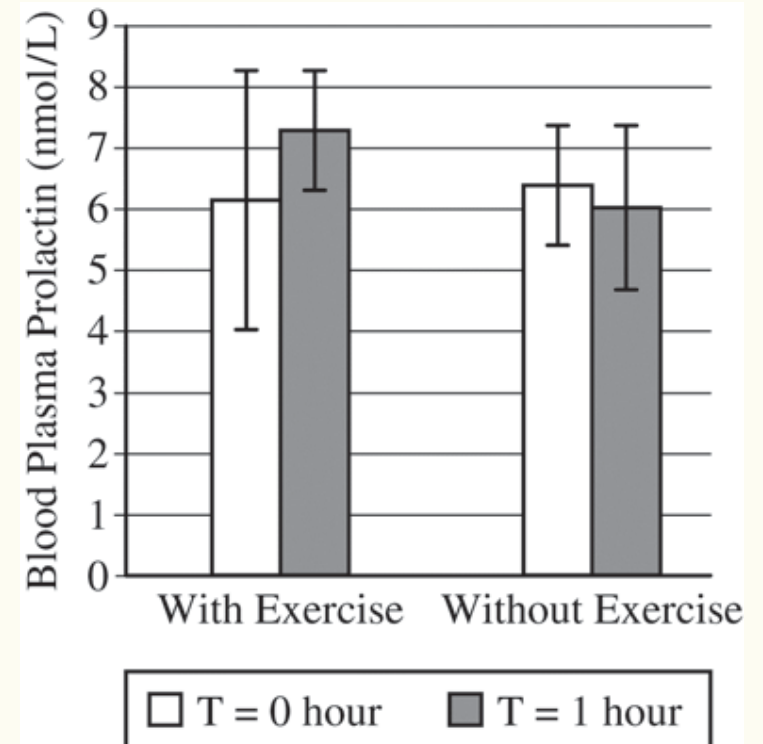
Identification (1 point)

- In the (cellular/plasma) membrane

Past Exam: 2016 #8 - Graphs

8. Researchers conducted a study to investigate the effect of exercise on the release of prolactin into the blood. The researchers measured the concentration of prolactin in the blood of eight adult males before ($T = 1$ hour) vigorous exercise. As a control, the researchers measured the concentration of blood prolactin in the same group of individuals at the same times of day one week later, but without having them exercise. The results are shown in Figure 1.

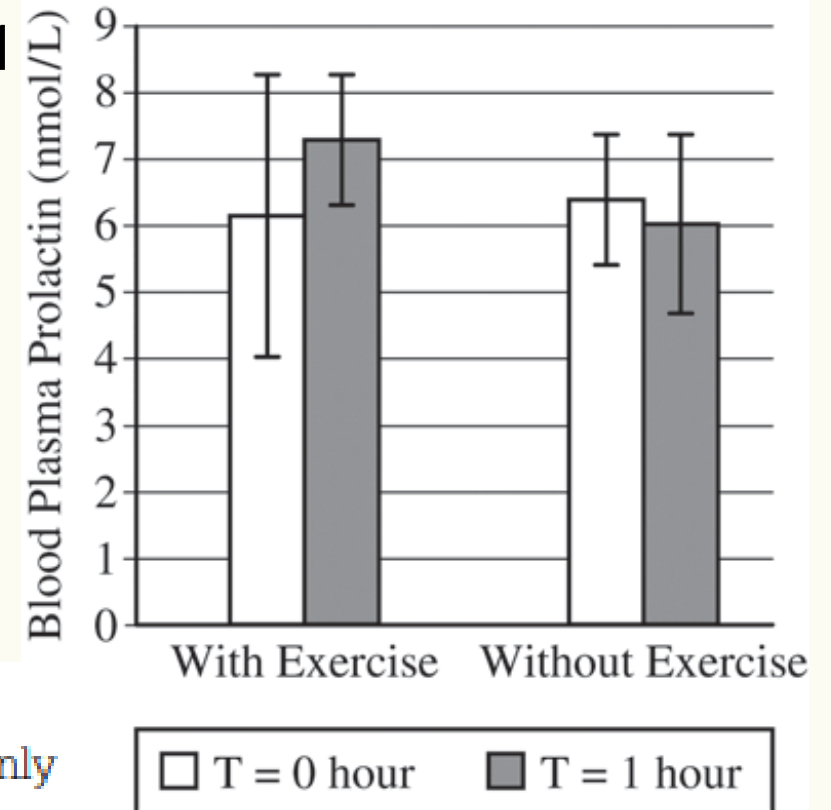
- (a) **Justify** the use of the without-exercise treatment as the control in the study design.
- (b) Using evidence from the specific treatments, **determine** whether prolactin release changes after exercise. **Justify** your answer.



Past Exam: 2016 #8 - Graphs

8. Researchers conducted a study to investigate the effect of exercise on the release of prolactin into the blood. The researchers measured the concentration of prolactin in the blood of eight adult males before ($T = 1$ hour) vigorous exercise. As a control, the researchers measured the concentration of blood prolactin in the same group of individuals at the same times of day one week later, but without having them exercise. The results are shown in Figure 1

(a) **Justify** the use of the without-exercise treatment as the control in the study design.



Justification (1 point)

- Attribute changes in the concentration of blood prolactin to exercise only
- Rule out normal fluctuations in prolactin release/levels

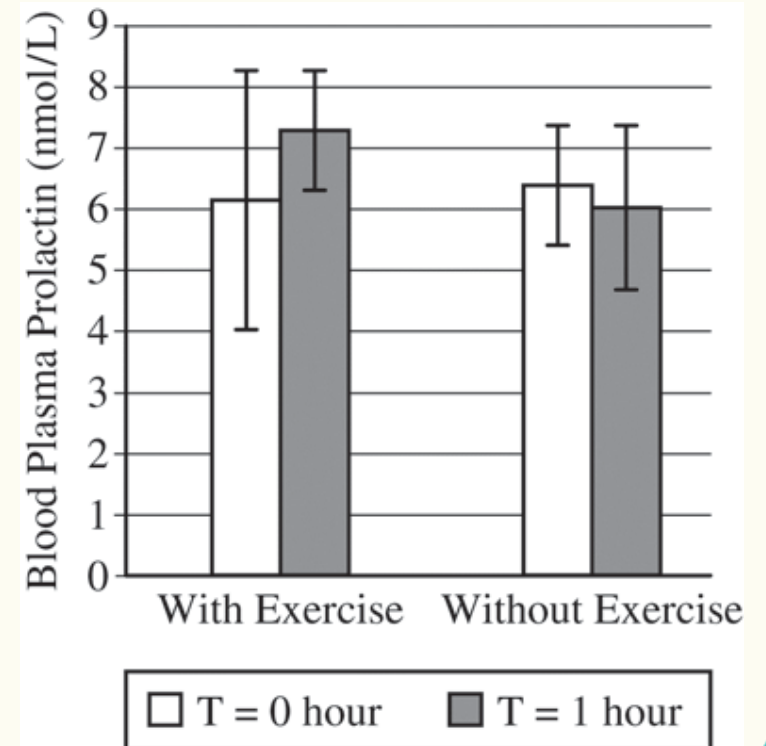
Past Exam: 2016 #8 - Graphs

8. Researchers conducted a study to investigate the effect of exercise on the release of prolactin into the blood. The researchers measured the concentration of prolactin in the blood of eight adult males before ($T = 1$ hour) vigorous exercise. As a control, the researchers measured the concentration of blood prolactin in the same group of individuals at the same times of day one week later, but without having them exercise. The results are shown in Figure 1.

(b) Using evidence from the specific treatments, **determine** whether prolactin release changes after exercise. **Justify** your answer.

Determination (1 point)

- Exercise does not affect prolactin release



Past Exam: 2016 #8 - Graphs

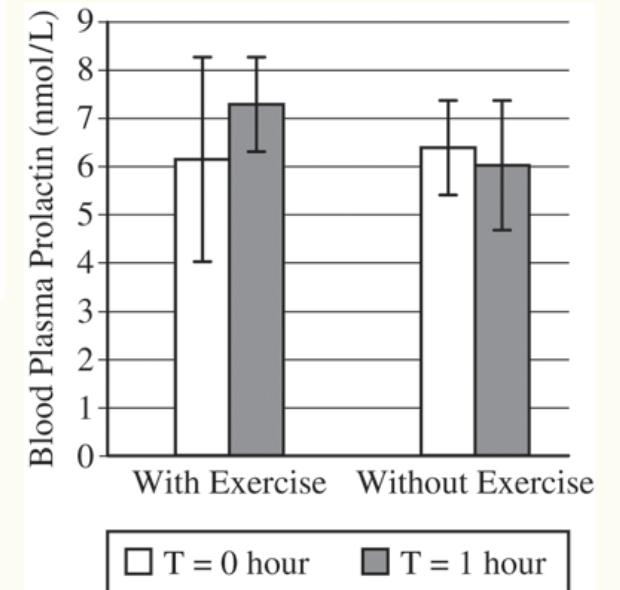
(b) Using evidence from the specific treatments, **determine** whether prolactin release changes after exercise. **Justify** your answer.

Determination (1 point)

- Exercise does not affect prolactin release

Justification (1 point)

- The T=1 hour with-exercise mean and the T=1 hour without-exercise mean are within $\pm 2SE_{\bar{x}}$.
- The $\pm 2SE_{\bar{x}}$ error bars for the T=1 hour with-exercise time point and the T=1 hour time without-exercise point overlap.
- The $\pm 2SE_{\bar{x}}$ error bars for the T=0 and T=1 hour with-exercise time points overlap.
- The T=0 hour with-exercise mean and the T=1 hour with exercise-mean are within $\pm 2SE_{\bar{x}}$.



Past Exam: 2015 #4 – Show What You Know

Both mitosis and meiosis are forms of cell division that produce daughter cells containing genetic information from the parent cell.

- (a) **Describe** TWO events that are common to both mitosis and meiosis that ensure the resulting daughter cells inherit the appropriate number of chromosomes.



Remember: Don't restate the question or give extra examples!

Past Exam: 2015 #4 – Show What You Know

Both mitosis and meiosis are forms of cell division that produce daughter cells containing genetic information from the parent cell.

- (a) **Describe** TWO events that are common to both mitosis and meiosis that ensure the resulting daughter cells inherit the appropriate number of chromosomes.

Description (1 point each; 2 points maximum)

- Spindle elements (microtubules) form/attach to chromosomes
- Chromatin condenses
- Alignment of chromosomes across center of cell prior to chromosome separation
- Separation of chromatids/centromeres to daughter cells
- G2/M checkpoint occurs in both processes
- Replication or synthesis of DNA precedes mitosis/meiosis
- Cytokinesis separates daughter cells after mitosis/meiosis

Past Exam: 2015 #4 – Show What You Know

Both mitosis and meiosis are forms of cell division that produce daughter cells containing genetic information from the parent cell.

- (b) The genetic composition of daughter cells produced by mitosis differs from that of the daughter cells produced by meiosis. **Describe** TWO features of the cell division processes that lead to these differences.

Past Exam: 2015 #4 – Show What You Know

Both mitosis and meiosis are forms of cell division that produce daughter cells containing genetic information from the parent cell.

- (b) The genetic composition of daughter cells produced by mitosis differs from that of the daughter cells produced by meiosis. **Describe** TWO features of the cell division processes that lead to these differences.

Feature	Description (1 point each row; 2 points maximum)	
	Mitosis	Meiosis
Number of divisions/ number of resulting cells	1 division/ 2 cells result	2 divisions/ 4 cells result
Ploidy of daughter cells	<ul style="list-style-type: none">• Same as parent cell• Diploid• $(2n \rightarrow 2n \text{ or } n \rightarrow n)$	<ul style="list-style-type: none">• Half of parent cell• Haploid• $(4n \rightarrow 2n; 2n \rightarrow n)$
Chromatids separate	Occurs	Not in meiosis I/only in meiosis II
Crossing over	Does not occur	Occurs
Homologous chromosomes separate/independently assort	Does not occur	Occurs

See you Sunday 3/26
at 4pm

How to Study for the
AP Bio Exam!



**Subscribe to:
Marco Learning**

