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Outline

- 1) Automatically marked assessments
- 2) Manually marked assessments
- 3) Lessons learned

1) Automatically marked assessments

- Multiple choice questions
- Maths and statistics assessment using MyLab

Multiple Choice Questions

- Progress test in 2nd year Bioscience module.
- Available for 90 min during a 24 hour window.
- Questions randomly shuffled.
- Only one question displayed at a time and once answered, could not be accessed again.

Test statistics

Quiz summary

Section Filter ▾

Student analysis

Item analysis

Ⓜ Average score

77%

🏆 High score

100%

📉 Low score

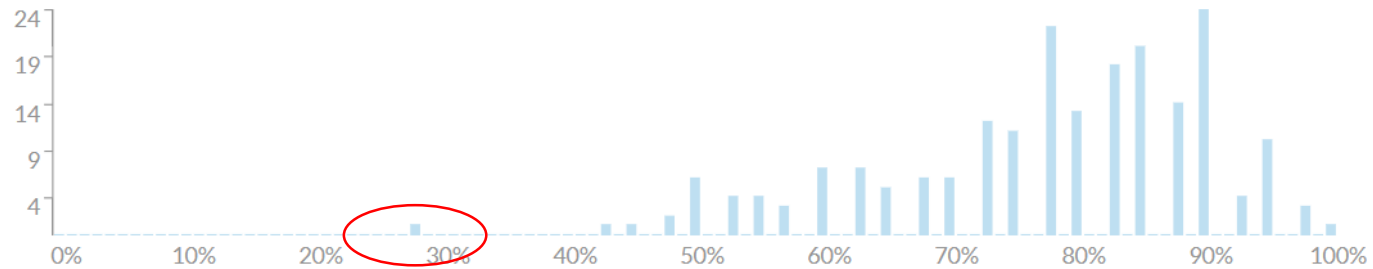
28%

⌚ Standard deviation

5.24

🕒 Average time

58:41



A question from an in-class test may not be suitable for online assessment

How many connexins will form a hemi-channel?

4		0%	
6	202 respondents	99%	✓
8		0%	
10		0%	
12	3 respondents	1%	

-0.01

Discrimination Index [?]

99% answered correctly

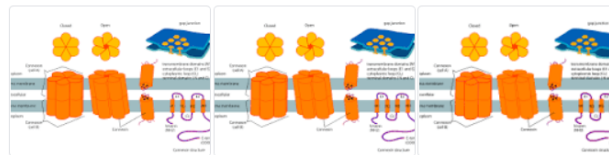


How many connexins will form a hemi-channel?



All News Shopping Images Videos More Settings Tools

About 114,000 results (0.47 seconds)



six proteins







In biology, a **connexon**, also known as a **connexin hemichannel**, is an assembly of six proteins called **connexins** that **form** the pore for a gap junction between the cytoplasm of two adjacent cells. This **channel** allows for bidirectional flow of ions and signaling molecules.

en.wikipedia.org › wiki › Connexon


[Connexon - Wikipedia](#)

Questions should test understanding

Hedgehog spines are harder than wool due to a higher content of:

calcium	5 respondents	2 %	
collagen	5 respondents	2 %	
cysteines	49 respondents	24 %	
glycines	1 respondents	0 %	
keratin	144 respondents	70 %	
No answer	1 respondents	0 %	

+0.48

Discrimination Index 

24% answered correctly

Questions should require application of knowledge to a specific situation

You are purifying a protein with an isoelectric point 7.0 using ion exchange chromatography on agarose beads linked to carboxymethyl groups. You could use the following combination of buffers:

pH 6 for binding and pH 8 for elution	120 respondents	59%	✓
pH 7 for binding and pH 6 for elution	13 respondents	6%	
pH 7 for binding and pH 7 for elution	16 respondents	8%	
pH 7 for binding and pH 8 for elution	28 respondents	14%	
pH 8 for binding and pH 6 for elution	28 respondents	14%	

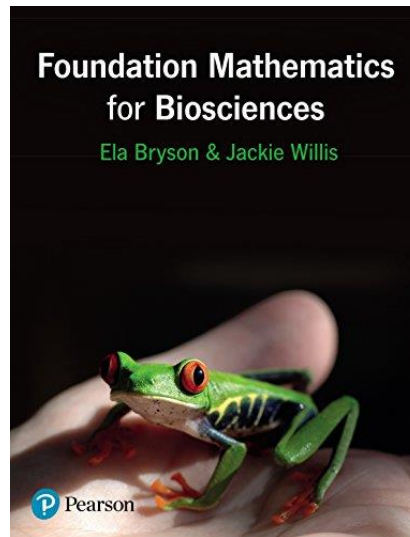
+0.56

Discrimination Index (?)

59% answered correctly

MyLab

Use of MyLab together with the textbook *Foundation Mathematics for Biosciences* for 5 years at UH.




Each student gets different numbers to work with so students cannot copy answers from each other.

MyLab assessments are time and cost effective

bryson66413

**Maths & Stats for PTS
2019-20**

MyLab Math Global
Sep 25, 2019 – Sep 24, 2020
[Enrolled: 220](#)




10 pieces of homework
10 tests
20×220 students = 4400

bryson96503

**Maths & Stats for BRM
2019-20**

MyLab Math Global
Sep 25, 2019 – Sep 24, 2020
[Enrolled: 198](#)




9 pieces of homework
9 tests
18×198 students = 3564

bryson96503

**Maths & Stats for BRMM
2019-20**

MyLab Math Global
Sep 27, 2019 – Jul 31, 2020
[Enrolled: 35](#)



9 pieces of homework
9 tests
18×35 students = 630

Total of 8594 assignments with detailed individual feedback

Homework: Homework 7 - Measurements in biology

Show completed problem

Save

Score: 0 of 2 pts

4 of 10 (0 complete)

HW Score: 0%, 0 of 15 pts

Problem 7.1.1

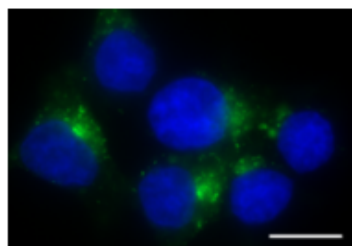
Question Help

Help Me Solve This

Textbook

Human epithelial kidney (HEK) 293T cells were cultured, stained using a blue nuclear dye and observed under a fluorescence microscope. The diameters of the nuclei were measured in images like the one shown below and a mean value of 8.2 μm was obtained. A scale bar measuring 1 μm is shown in the bottom right corner of the image.

- (a) What is the actual mean diameter of the nuclei in HEK 293T cells (in μm) ?
- (b) What is the magnification of the image shown?



- (a) The actual mean diameter of the nuclei in HEK 293T cells is μm .
Write your answer in decimal form rounded to 1 decimal place where necessary.

Enter your answer in the answer box and then click Check Answer.



1 part remaining



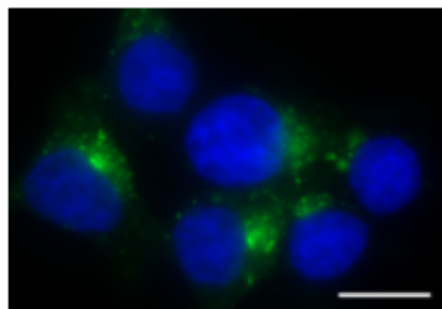
Clear All

Check Answer



Human epithelial kidney (HEK) 293T cells were cultured, stained using a blue nuclear dye and observed under a fluorescence microscope. The diameters of the nuclei were measured in images like the one shown below and a mean value of 8.2 μm was obtained. A scale bar measuring 10 μm in the image corresponds to 5.4 μm .

- (a) What is the actual mean diameter of the nuclei in HEK 293T cells (in μm) ?
- (b) What is the magnification of the image shown?



(a) We can write a proportion:

$$\frac{10 \mu\text{m}}{5.4 \mu\text{m}} = \frac{8.2 \mu\text{m}}{x}$$

where x is the mean diameter of the nuclei in μm .

From this proportion:

$$x = 5.4 \mu\text{m} \times \square \text{ mm} / (\square \text{ mm}) = \square \mu\text{m}.$$

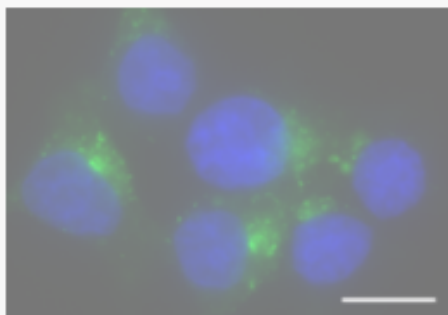
Round the answer in the last box to 1 decimal place where necessary.

Enter your answer in the edit fields and then click Check Answer.



human epithelial kidney (HEK) 293T cells were cultured, stained using a blue nuclear dye and observed under a fluorescence microscope. The diameters of the nuclei were measured in images like the one shown below and a mean value of 8.2 μm was obtained. A scale bar measuring 10 μm in the image corresponds to 5.4 μm .

- (a) What is the actual mean diameter of the nuclei in HEK 293T cells (in μm) ?
- (b) What is the magnification of the image shown?



✔ Good job! ✕
OK

(a) We can write a proportion:

$$\frac{10 \text{ } \mu\text{m}}{5.4 \text{ } \mu\text{m}} = \frac{8.2 \text{ } \mu\text{m}}{x}$$

where x is the mean diameter of the nuclei in μm .

From this proportion:

$$x = 5.4 \text{ } \mu\text{m} \times \frac{8.2 \text{ } \mu\text{m}}{10 \text{ } \mu\text{m}} = 4.4 \text{ } \mu\text{m}.$$

Round the answer in the last box to 1 decimal place where necessary.

Enter your answer in the edit fields and then click Check Answer.

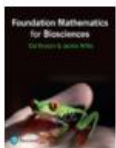


3 parts remaining

Clear All

Check Answer

Close



Foundation Mathematics for
Biosciences
BY BRYSON WILLIS,

Frontmatter



1. Basic arithmetic skills

2. Fractions and decimals

3. Units of measurement

4. Ratios and percentages

5. Logarithms

6. Concentrations and dilutions

7. Measurements in biology

8. Analytical biology

9. Molecular biology

10. Enzyme kinetics

11. Statistical calculations

12. Graphs, trendlines and equations

7 Measurements in biology

When you have completed this chapter, you should be able to:

- determine the sizes of objects viewed under a microscope and calculate image magnification
- calculate the number of cells in cell cultures and carry out other calculations related to cell culture techniques
- calculate selected physiological and pharmacokinetic parameters.

7.1 Cell biology and microbiology

Cells are the basic units of all living organisms, whether it is single celled organisms such as protozoa and bacteria or more complex multicellular organisms such as plants and animals. Cells are very small in size and their study requires the use of a microscope. A microscope can be used qualitatively to examine the structure of cells and their organisation within tissues or to see if cultured cells appear to be healthy and are growing as expected. A microscope can also be used quantitatively to measure the sizes of cells and organelles and to determine the number of cells in cultures.

7.1.1 Microscopy

The sizes of cells and cellular organelles are usually determined using an optical (light) microscope. An optical microscope works in a similar way to a magnifying glass by changing the direction of the light rays travelling from the object under observation so that an enlarged image of the object is seen by the observer. Fig. 7.1.1 shows how such a magnified virtual image is formed by a single biconvex lens of a magnifying glass.

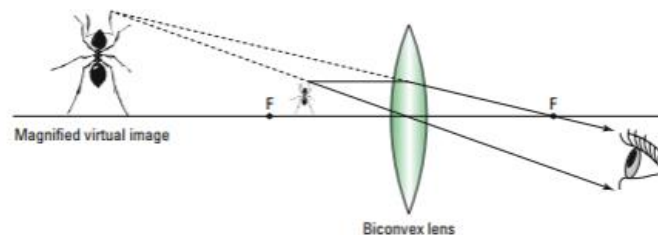


Figure 7.1.1 Magnification of an object by a single biconvex lens. F denotes the focal points of the lens.

The object has to be positioned between the lens and its focal point F. The light rays passing through the centre of the lens do not change direction, whereas the rays parallel to the lens axis are bent so that they pass through the focal point on the other side of the lens. When the rays reach the eye of the observer, they appear to be arriving from a larger object further away, i.e. the observer sees a magnified virtual image.

In an optical microscope, there are usually two biconvex lenses: an **objective** located close to the object and an **eyepiece** located close to the eye of the observer. These two lenses work in tandem to produce a highly magnified virtual image of the observed object as shown in Fig. 7.1.2. You can

2) Manually marked assessments

Assessment	Benefits	Issues
Essays	Students cannot guess answers, it takes less time to create questions.	Plagiarism from internet and collusion between students.
Data interpretation and problem solving questions	Test understanding and application of knowledge as answers cannot be found on the internet.	Collusion between students that is hard to detect and prove in short answers and graphs.
Literature based reports	Assess critical analysis, logical development of argument and drawing of conclusions.	Do not test what the student knows in the same way as a standard exam does.

3) Lessons learned

We can never be certain that what is tested in online assessment is the student's own knowledge.

Strategies that can reduce plagiarism and collusion may include:

- Setting questions that test understanding and application of knowledge to specific situations
- Shuffling of questions
- Limiting time availability of tests
- Drawing questions randomly from a larger databank
- Use of questions with different numbers generated for each student within systems such as MyLab