

Quiz 1- The Cell Cycle & Mitosis

Due Jan 22 at 11:59pm **Points** 11 **Questions** 8
Available until Jan 23 at 2am **Time Limit** 60 Minutes
Allowed Attempts 2

Instructions

This quiz asks questions about the cell cycle and mitosis. The relevant pages in the course e-text are in Chapter 12, particularly sections 12.1 and 12.2.

You have two attempts at this quiz. The highest mark counts. You have 60 minutes to complete this quiz. NEW: The quiz will be due at 11:59 pm on Sunday, January 22nd.

Correct answers should be visible on Monday, January 23rd @ noon.

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Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	28 minutes	11 out of 11

⚠️ Correct answers will be available Jan 23 at 12pm - Feb 7 at 9am.

Score for this attempt: **11** out of 11

Submitted Jan 18 at 10:19am

This attempt took 28 minutes.

Question 1

1 / 1 pts

In mitosis, a parent cell divides to form two genetically identical daughter cells. For mitosis to take place:

- ☐ the parent cell must first be fertilized.
- ☐ the parent cell must reproduce its DNA during telophase.



the parent cell must divide its DNA in half so each daughter cell gets only the genes needed to carry out its functions. In this way, differentiation occurs.



the parent cell must replicate its entire genome prior to mitosis.

Correct. The parent cell must replicate its DNA in order to produce two genetically identical daughter cells.

Question 2

1 / 1 pts

At the end of mitosis, each G_1 daughter cell has



twice the cytoplasm and the same amount of DNA as the G_1 parent cell.



twice the DNA and half the cytoplasm of the G_1 parent cell.



half the DNA and half the cytoplasm of the G_1 parent cell.



identical DNA to that of the G_1 parent cell.

Correct, the daughter cells should be identical to the parent cell.

Question 3

1 / 1 pts

Metaphase occurs prior to the splitting of centromeres. It is characterized by

- ☐ cytokinesis.
- ☐ disassembly of the nuclear envelope.
- ☐ duplication of centrioles.
- ☒ aligning of chromosomes on the equator.

Question 4

1 / 1 pts

A haploid (1N) cell undergoes a mitotic nuclear division followed by cytokinesis. This results in:

- ☐ A single cell with a diploid nucleus.
- ☐ A single cell with two genetically identical haploid nuclei.
- ☒ Two genetically identical haploid cells.
- ☐ Two genetically distinct diploid cells.
- ☐ Four genetically identical haploid cells.

A mitotic nuclear division produces two nuclei identical to the original nucleus. During cytokinesis the nuclei are partitioned into separate cells. The result is two identical cells with the same number of chromosomes as the parent cell.

Question 5

1 / 1 pts

What is the ploidy and haploid number of chromosomes in the metaphase cell shown in the figure below?



☐ Diploid; 4

☐ Diploid; 2

☒ Haploid; 4

☐ Haploid; 2

☐ Tetraploid; 1

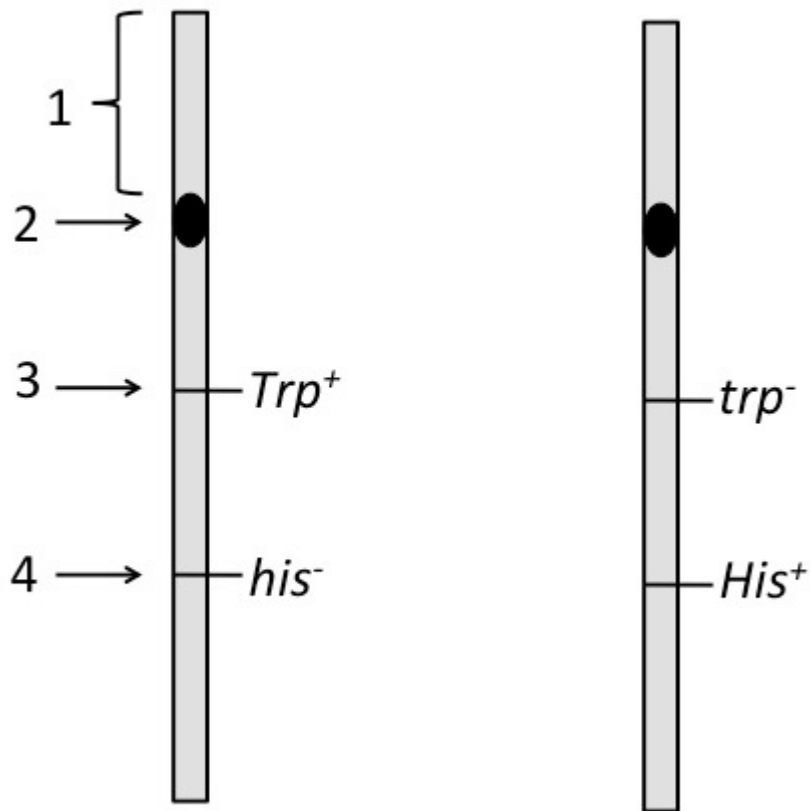
The cell shown in the figure is haploid meaning it has one copy of each kind of chromosome (each chromosome is a different size and/or has a different shape or centromere location). The haploid number is 4, meaning there are four kinds of chromosomes.

Question 6

4 / 4 pts

Parts of the chromosome are labelled with letters A to D. Match the appropriate letter with the appropriate term.

Chromosomes in G₁ Cell



1

Arm (p arm)

2

Centromere

3

The locus for the Trp gene

4

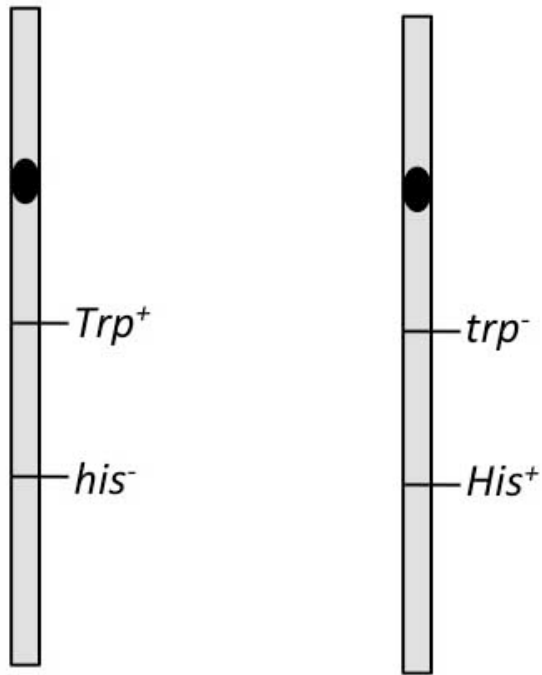
The locus for the His gene

Question 7

1 / 1 pts

Given the image below of a cell in G₁ phase, what do *Trp*⁺ and *trp*⁻ represent?

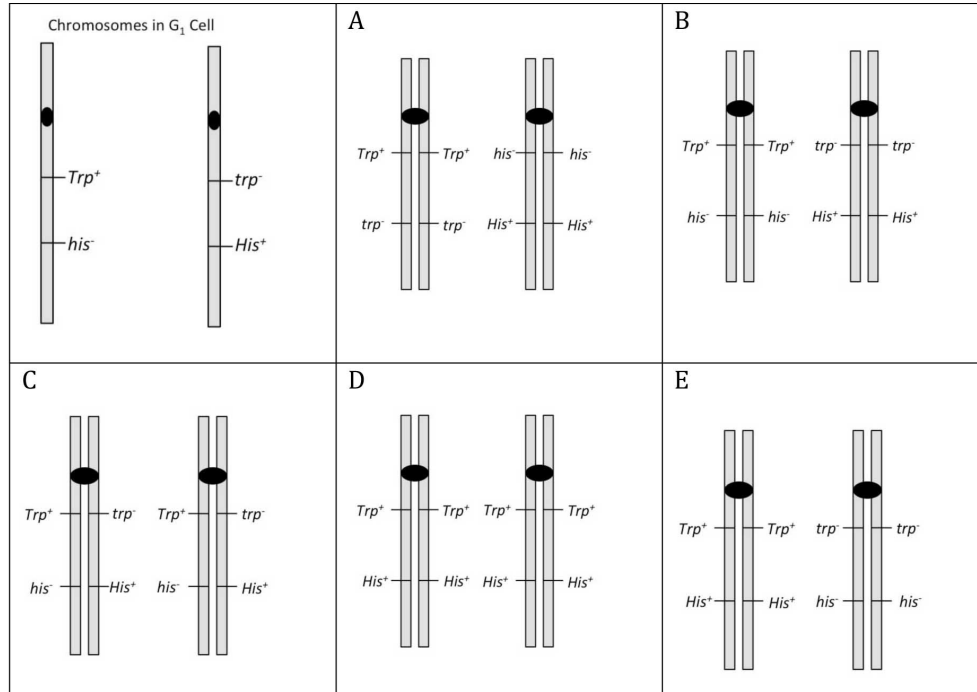
Chromosomes in G₁ Cell



- ☒ Different alleles of the Trp gene.
- ☐ Different Trp genes.
- ☐ Different loci for the Trp gene.
- ☐ Different loci for different alleles of the Trp gene.

Generally gene names are abbreviations of one or a few letters that relate to the gene function of the phenotype produced by a mutation in the gene. In the case of Trp, the gene is part of the pathway involved in biosynthesis of the amino acid tryptophan. Other symbols like "+" and "-", or lower and upper case abbreviations designate different alleles of the gene.

Given the chromosomes present in the G₁ cell (upper left), choose which image or images represents the chromosomes following replication. Sorry that the "+" and "-" symbols are not more clear in the images below; but you can answer this question without seeing these symbols :).



☐ "A"

☒ "B"

☐ "C"

☐ "D"

☐ "E"

Only one image shows the correct arrangement of genes and alleles on the chromosomes following replication. Recall that each chromatid is a double stranded (ds) DNA molecule that is produced by replication of a single dsDNA molecule. The genes and alleles on both chromatids must be identical.

Quiz Score: **11** out of 11