Observing mitosis and meiosis on cell specimens essay sample



Synopsis

The purpose of this report is to observe mitosis and meiosis. There two parts in the procedures where first part is the preparation of the onion root while the second part is the observation of the onion root. The five stages of mitosis and the telophase in plant and animal cells were observed and sketched. The major findings are that we have found anaphase on the prepared slides very clearly while the other phases vaguely at both slides. The major problems are that very little amount of time was allowed for hydrochloric acid to immerse inside the specimen moreover the specimen is probably damaged because a lot of pressure was added to the specimen. It is highly recommended that more time should be allowed for the specimen to immerse in the hydrochloric acid solution. (132) words

1. Objective

The main objective of the experiment is to know a staining procedure to identify mitosis using onion root tip. We are also expected to compare and contrast plant and animal and the stages of mitosis and meiosis.

2. Introduction

Mitosis and Meiosis are the two types of nuclear division. The process of mitosis occurs when chromosomes are separated in the cell nucleus, into two different nuclei after that cytokinesis will occur. The M phase of the cell cycle comprises of mitosis and cytokinesis.

Meiosis contained a diploid cell that has two copies of each chromosomes and it produces four haploid cells containing a copy of each chromosomes. Written by M. J. Farabee, Sexual reproduction occurs only in eukaryotes. Eukaryotes: Any of the single-celled or multicellular organisms whose cell contains a distinct, membrane-bound nucleus

Cytokinesis: The division of the cytoplasm and the plasma membrane following the division of the nucleus resulting into two cells, each having its own nucleus and cytoplasm surrounded by a plasma membrane.

Homologous Chromosomes: one of a pair of chromosomes Haploid: The number of chromosomes in a gamete of an organism

3. Theory

Mitosis

According to Oracle Think Quest Education Foundation(2012), Mitosis has several stages: interphase, prophase, metaphase, anaphase and telophase. In the interphase, the DNA has replicated but the condensed structure of chromosome was not formed yet and they remained as loosely coiled chromatin. While in the prophase, DNA molecules shorten and condense rapidly while forming chromosomes. The spindle fibers will attach themselves to the centromeres of the chromosomes and they will align at the equator of spindle in the metaphase. For the anaphase, the spindle fibers will shorten and the centromere will split. The sister chromatids are separated. For the telophse, the chromosomes will arrive at the respective spindles. The nuclear envelop will be formed around both sets and the daughter cells furrow will be formed and the cell will pinched into two.

Meiosis

According to the Biology-Online Organization (2006), Meiosis contained two

https://assignbuster.com/observing-mitosis-and-meiosis-on-cell-specimensessay-sample/ type of phases meiosis I and meiosis II. In the prophase I, homologous chromosomes in the nucleus begin to pair up with one another and then split into chromatids where crossing over can occur. For metaphase I, the chromosomes will align at the equator of the cell. The bivalents are aligned randomly increasing the genetic variation via independent assortment. In the anaphase 1, the homologous chromosomes move to opposing poles from the equator. A new nuclei will be formed around each pole alongside each new chromosomes compliment in the telophase I. For prophase II, the second meiotic division will be initiated and the nuclear membrane will disappear. In the metaphase II, the pair of chromatids will be lined up at the equator. For the anaphase II, via the spindle fibers, each of these chromatids will be moved away from the equator to the poles. Lastly, in the telophase II the four new haploid gametes are created which will thus fuse with the gametes of the opposite sex to form a zygote.

4. Procedures:

4. 1 Preparation of onion root tip slide

Firstly, the onion root tip was obtained. The first one to three millimeter of the root tip was cut off using scalpel. With the use of the forceps, the root tip was placed in the center of the clean slide. Secondly, the root tip was covered two to three drops on of hydrochloric acid. The slide was placed over the hotplate for three to five seconds. In addition, the excess acid was dried off with the use of a paper towel without touching the root tip. Moreover, the root tip was covered with three to four drops of Toluidine Blue solution. The excess stain was dried off and a cover slip was added. The slide was placed between the folded paper towels. Then, place your thumb lightly above the cover slip. On low power on the microscope, the slide was examined. It was then switched to the higher power when the condensed chromosomes were located. The phase which was observed was sketched.

4. 1. 1 Observation of prepared slides: Mitosis in Onion root tip and Whitefish Blastula

With the use of the microscope, the prepared slides provided were reviewed. The low power (times ten) was used to locate the cells and the high power (times forty) was used to change the focus. The differences seen between the animal and plant mitosis was noted and listed.

5. Results

The phases of mitosis observed in onion root tip:

Interphase Figure 1: Interphase of Mitosis (About. com , 2012.) |

ProphaseFigure 2: Prophase of Mitosis (About. com , 2012.)

MetaphaseMetaphase. Figure 3: Metaphase of Mitosis (About. com , 2012.)

AnaphaseFigure 4: Anaphase of Mitosis (About. com , 2012.)|

TelophaseFigure 5: Telophase of Mitosis (About. com, 2012.)|

Telophase in animal and plants cell

Figure 6: Telophase in plant and animal cell (2010)

The three differences between mitosis and meiosis:

Mitosis| Meiosis|

There is no crossing over in the prophase of the mitosis.| Crossing over takes

place between the nonsister chromatids in prophase I.| There is only one

division.| There are two divisions.|

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2 daughter diploid cells are produced.| 4 daughter diploid cells are produced.|

(Buzzle. com 2012)

Based on the results, we have found anaphase clearly on the prepared slide for the Whitefish Blastula. The other phases were not found at first. After repeating the experiment and also with the use of the immersion oil to improve the magnification we are able to see all the phases vaguely including the prophase, metaphase and telophase for the prepared slides Whitefish Blastula. On the other hand, for the onion root tip slide that we prepared ourselves we were only able to see vaguely the metaphase and other phases cannot be seen at all. For the anaphase of the whitefish blastula we can observe from the microscope that it is a line shape and they are being pulled toward the ends of the cell by their centers.

6. Discussion

In the anaphase, the sister chromatids will be separated to the opposite end of the spindle poles. We saw a complete compilation of chromosomes were found at each pole at the end of the anaphase. What we saw at the prophase is that the nuclear envelop will start to break down and the chromosomes would start to coil up at the center. For the metaphase, we were able to see the alignment of the chromosomes at the equator of spindle. The two set of daughter chromosomes have arrived at the spindle poles and the nuclear envelop will be formed followed by cytokinesis forming two haploid cell. The existence of some limitations has caused the results to be less accurate otherwise the phases should be seen more clearly. It can be assumed that the onion root tip was not fully immersed in HCL which as a result thus interrupt the image observed under microscope. A lot of phases can be seen vaguely because the intensity of the toluidine solution used is too low.

Conclusion

In conclusion, we can conclude that our experiment was not very successful as only the anaphase can be seen clearly. After the experiment was repeated a few times, the other phases can be seen vaguely as well with the use of immersion oil. Thus, it was quite hard to compare and contrast the different stages of the mitosis as only the anaphase was seen clearly. However, the onion root tip slide that we prepared ourselves can only been seen vaguely like the metaphase as this can be due a lot of errors and limitations in preparing the slides.

Recommendations

Some of the recommendation that are strongly recommended is to wipe the microscope clean and make sure that there are no immersion oil found on the microscope and also increase the intensity of the blue toluidine solutions. Probably less pressure can be used when pressing out the toluidine solution by pressing your thumb lightly instead. We can also increase the intensity of the blue toluidine solutions. Apart from all of that, we can also lower the cover slip on the slide at angle 45°. This is to ensure that there are not air bubbles that produce the aretefact in the observation.

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