Mitosis transfer the tips (3-4) in a bijoux

Mitosis in garlic root tipsINTRODUCTION: Mitosis is when the cell (single) divides into two homogeneous cells which are known as cell division. The purpose of Mitosis is for growth, to replace old cells and repair multicellular organisms. By dividing one cell, you are creating two cells that have the same genetic material which is done by undergoing the steps within the cell cycle. Mitosis involves 5 different stages; Interphase, Prophase, Metaphase, Anaphase and Telophase. Each step is vital but interphase is the most important because during this phase, not only does the cell increase in size, but the chromosomes in the nucleus are copied in preparation for mitosis. This is then followed by Prophase where the chromosomes become X-shaped where spindle fibres begin to form, making themselves visible under the microscope and easy to distinguish. The reason behind using garlic root tips and onions is because they are most suitable for these types of experiments simply because they are constantly growing quite fast and are therefore always in the process of mitosis.

Also, they are quite easy to prepare and easy to flatten which allows the chromosomes to be seen clearly under the scope. The aim of this experiment is to identify interphase and the four mitotic stages. MATERIALS AND METHODS: 1. The garlic root tips that were already cut have been put in Ethanol/Acetic acid 2. Now transfer the tips (3-4) in a bijoux with 2ml of 1M hydrochloric acid 3. These need to be put in a water bath at 60 °C for exactly 10 minutes4. You can now remove the tube from the water bath 5. Next step is to move the root tips from the acid into a clear bijoux containing 2mL of water and wash them6.

Transfer the root tips from the water to a different bijoux with 2mL of Feulgen solution and leave them in there for exactly 15 minutes7. As soon as the root tip becomes a dark shade of purple, using tweezers transfer them to a glass slide (avoid touching solution as this may stain)8. Cut the root top roughly 2 mm using a scalpel blade and dispose of the rest of the root that is not stained9. Now cover the tip with a coverslip (if necessary then add water before applying slip)10.

To make sure the slide is on a flat surface, add some filter paper on top of the slip and push hard on the coverslip applying pressure without moving your thumb until it spreads to a diameter roughly no more than 1cmOBSERVATIONS: To observe this, use a 10x microscope with focus to adjust result . Switch to 40x for a clearer image. Regions with long and big shaped cells are probably not undergoing mitosis therefore you must look for the smaller cells that have a higher chance of being in the interphase or any of the other four mitotic stages.

Prophase is the stage where chromosomes begin to form between centromes at the top of the cell. The nucleolus is not visible at this point. Replicated chromosomes can be seen under the microscope and the nucleur membrane breaks up into smaller parts allowing the chromosomes to move freely in the cytoplasm.

Then for Metaphase, chromatids had now lined up in the centre of the cell known as the spindle. Every single centromere had attached to the spindle and were then able to divide. The 3rd mitotic stage visible was Anaphase, and here the sister chromatids had become seperated chromosomes that

had approached the opposite poles of the cell by spindle fibers. The final stage, Telophase, had taken place when the chromosomes had reached the poles of the cell and were much harder to see properly. The spindle fibres no longer exist and a nucleolus had formed.

A clear formation of a cell plate can also be seen as a new cell wall had now become present. Cytokinesis may also take place during telophase. CONCLUSION: The outcome of this experiment was successful experiment with the aim to identify the mitotic stages. The materials used are quite easy to find besides the Feulgen solution and hydrochloric acid, most items can be found easily. Considering the mitotic stages, all were observed and easily distinguishable making them easy to draw. The same practical can be done using onion root tips because both have cell tips that are actively dividing. Using Feulgen for staining is a good option because it can help identify chromosomal substances , but an alternative that is used more often is toluidine blue stain which is specifically for staining chromosomes in tissues for both plants and animals. It is very important that results are accurate and repeating the experiment more than once is vital to achieve reliable results.

Another limitation can be the way the cover slip is handled. The root tips are quite thin which allows us to see the single cell clearly under the scope so making sure the cover slip has been pushed down correctly and gently to avoid damaging the cell. To test the validity of the experiment, place the cover slip carefully to make sure no bubbles are trapped underneath and to avoid staining anything as this could effect the results so any remaining Feulgun solution was cleaned immedietly. The mitotic index for tissues is expressed as the relationship of the number of cells seen in mitosis and the

overall amount of cells being examined which is important to use to measure the cells fast increase in cell division when undergoing mitosis. To conclude, all four mitotic stages were observed and timing this experiement carefully allowed it to be clear that the longer time the cells spent in one phase, the higher the amount of cells dividing. REFERENCES: Giorgio Carboni. 2010. Mitosis in the root tips of garlic and onion.

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