

Bao kha

Lab Partner: Noah, Harry, Titan.

Using Lab Microscopes

Honor Code: On my honor, I have neither received nor given any unauthorized aid on this assignment. –Kha

Introduction:

According to *Info Please*, 'A compound microscope is a microscope that consists of two or more double lenses that is fixed in a hollow cylinder.' A compound microscope has knobs to move the stage and a long tube to look at the cell. A compound microscopes use light to show the image of the cell. According to *History of Microscopes*, 'A man during the 1590's named Zacharias Jansen invented the first microscopes by putting three magnifying glasses together in a tube. Even though it was the first magnifying glass, it was still blurry and it can only focus to 9x. It was until Anton Van Leeuwenhoek (1632-1723) that the compound microscope became better. He achieve this by grinding and polishing five hundred and fifty lenses to make his new lenses which has a magnifying power of 270x.' There are 11 microscopes (not counting the compound microscope), according to *National Microscope Exchange*, 'The stereo microscope is an optical microscope that can magnify up to 100x and can view 3 dimensional views of the specimen. The Confocal Laser scanning microscope can assemble the data to make 3d images. The electron microscope uses electron to look at cells and other small objects. The reflection electron microscope can detect electrons that are scattered. The scanning electron microscope has a lower magnifying powers, but can make 3 dimensional views of objects. The x-ray microscope uses x-ray beams to create a 3D image. This type of microscope can look at the cell structures. Scanning Helium Ion Microscope (SHIM or HeIM): uses a beam of Helium ions beams to generate images. Scanning acoustic microscope (SAM uses focused sound waves to generate an image. Neutron Microscope: Still under an experimental stage, Neutron microscope generates a high resolution image Scanning Probe Microscopes: Scanning Probe Microscope helps visualize individual atoms. These specialized microscopes provide high image magnification to observe three dimensional specimen.'

Materials:

1. Undulated Water
2. Methylene blue
3. Onion
4. Onion Root
5. Yogurt
6. Compound Microscope
7. Cover Slip
8. Glass Slide
9. Tooth Pick
10. Bunsen Burner Flame
11. Forceps (tweezers) or a dissection probe with wooden back

Procedure:

Reminder: *Put on your gloves, safety goggles and lab coat on before you perform any steps or procedures listed below.*

Onion Cell: 1) Use a forceps (tweezers) or a dissection probe with wooden back to cut a piece of onion. 2) Put that piece on the glass slide. 3) Put the cover slip on the glass slide. 4) Put the glass slide on the compound microscope (on the stage). 5) Adjust the microscope until you can see the specimen clearly (start on 4x first before going to 10x, 40x, or 100x).

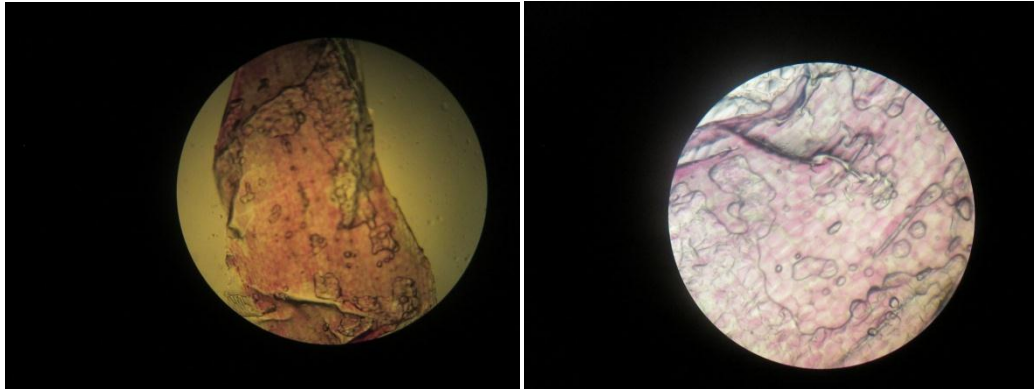
Onion Root Cell: 1) Use a forceps (tweezers) or a dissection probe with wooden back to cut a piece of onion root. 2) Put that piece on the glass slide. 3) Put the cover slip on the glass slide. 4) Put the glass slide on the compound microscope (on the stage). 5) Adjust the microscope until you can see the specimen clearly (start on 4x first before going to 10x, 40x, or 100x).

Cheek Cell: 1) Use a toothpick and scrape the inside of your mouth (where your cheek is).
2) Take the toothpick out and smear the toothpick on the glass slide. 3) Let it dry for 3 minutes.
4) Sway the glass slide over the Bunsen Burner Flame (sway 2-3 times; be careful of your hands)
5) **WEAR GLOVES**-Put Methylene blue on the glass slide and close it with the cover slip. 6)
Adjust the microscope until you can see the specimen clearly (start on 4x first before going to
10x, 40x, or 100x).

Yogurt (Undulated): 1) Mix the yogurt and the undulated water together. 2) Get a toothpick and
put the toothpick in the undulated yogurt 3) Smear the undulated yogurt on the glass slide 4) Let
it dry for 3 minutes. 5) Sway the glass slide over the Bunsen Burner Flame (sway 2-3 times; be
careful of your hands) 6) **WEAR GLOVES**-Put Methylene blue on the glass slide and close it
with the cover slip. 7) Adjust the microscope until you can see the specimen clearly (start on 4x
first before going to 10x, 40x, or 100x).

Yogurt (Undulated): 1) Get a toothpick and put the toothpick in the yogurt 2) Smear the yogurt
on the glass slide 3) Let it dry for 3 minutes. 4) Sway the glass slide over the Bunsen Burner
Flame (sway 2-3 times; be careful of your hands) 5) **WEAR GLOVES**-Put Methylene blue on
the glass slide and close it with the cover slip. 6) Adjust the microscope until you can see the
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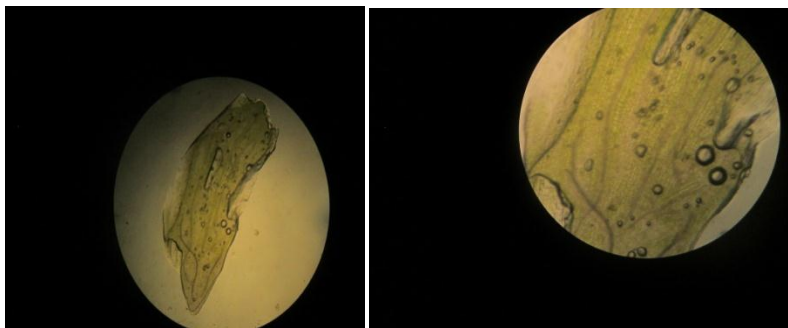
Data and Results:



Onion Cell 4x

Onion cell 10x

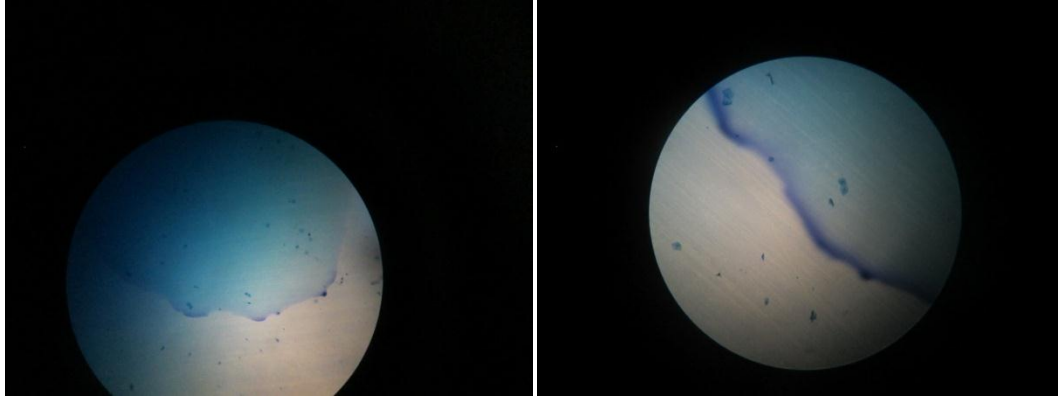
In the onion cell 4x, we can see that the onion looks like muscle tissues. Also, there seems to be white bubbles and white tissues. On the picture (the onion cell 10x), we can get a closer look at the onion cell structure. The structure seems to be more stretched out with more white tissues and bubbles than the red lines (or tissue). We can see in both pictures that the onion cell seems like it have a rough surface. We could not get a picture of the onion cell 100x.



Onion Root Cell 4x

Onion Root Cell 10x

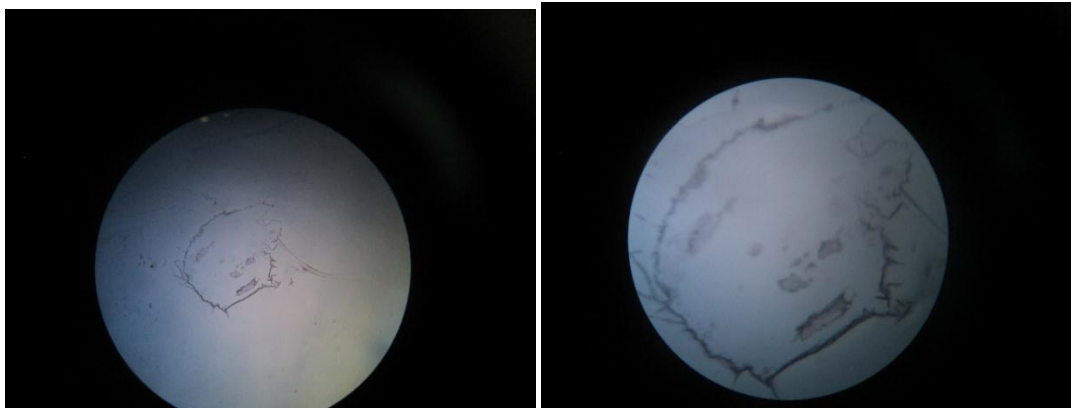
The onion root cell 4x looks nearly like a plant cell with holes all around it's green body. In the onion root cell 10x, we can get a closer look that the cell seems to be stretched or pulled apart, thus crating holes around the body. We could not get a picture of the onion root cell 100x.



Cheek Cell 4x

Cheek cell 10x

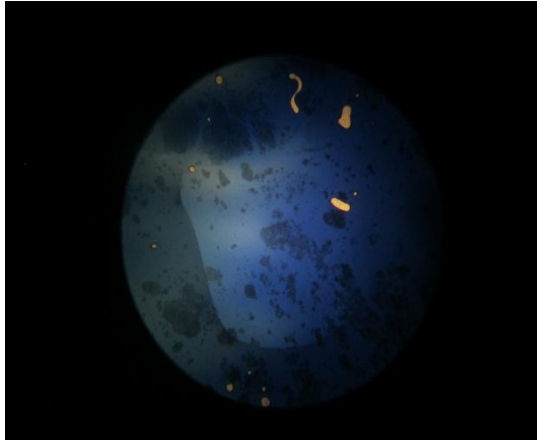
The cheek cell 4x seems to be blue because of the Methylene blue, but we can also see a blur image that there are spots of blue scatter around. In the cheek cell 10x, we can see much clearer that there is spots scatter around the big cell.



Yogurt (Undulated) 4x

Yogurt (Undulated) 10x

In the undulated yogurt 4x, we can see a small white cell in the middle of the Methylene blue. We can also see that there seems to be scratched on the cell. In the undulated yogurt 10x, we can see that the cells have big and deep scratches on the cell's surface. We could not get an image for undulated yogurt 100x.



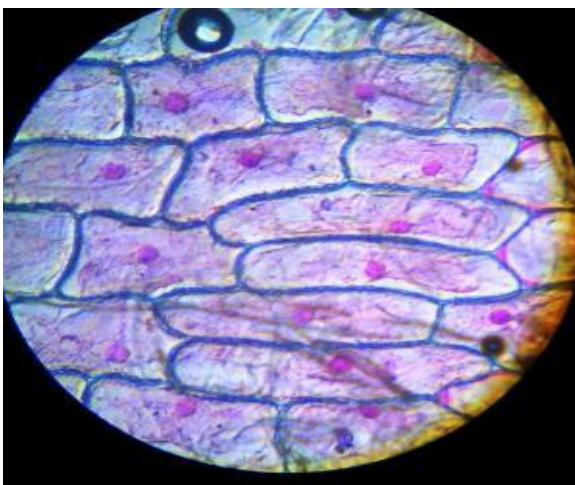
Undululated Yogurt 4x



Undululated Yogurt 10x

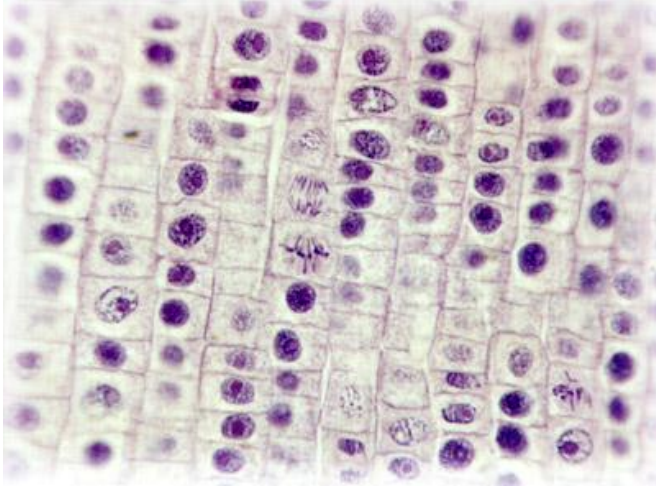
The undululated yogurt 4x seems to be full of micro-organisms or bacteria. In the image, we can see many dark blue spots and some white spots. In the undululated yogurt 10x, we can get a closer look at the dark blue spot that seems to be bacteria. These bacteria look like cylinders and some of them seems to be attached to each other. We could not get an image of the undululated yogurt 100x.

Discussion:

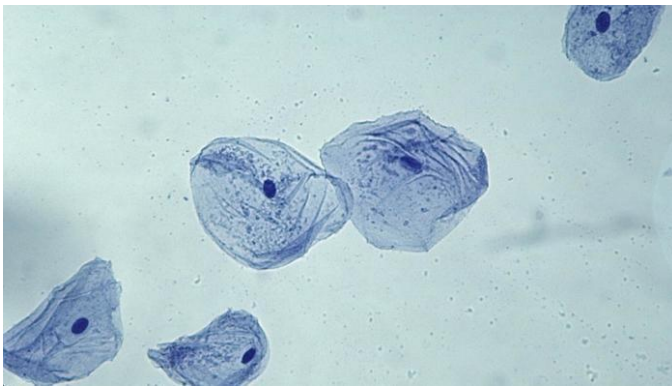


The onion cell in the picture looks like a brick wall. Quoting the *Online Labs*, “An onion is a multicellular (consisting of many cells) plant organism. As in all plant cells, the cell of an onion peel consists of a cell wall, cell

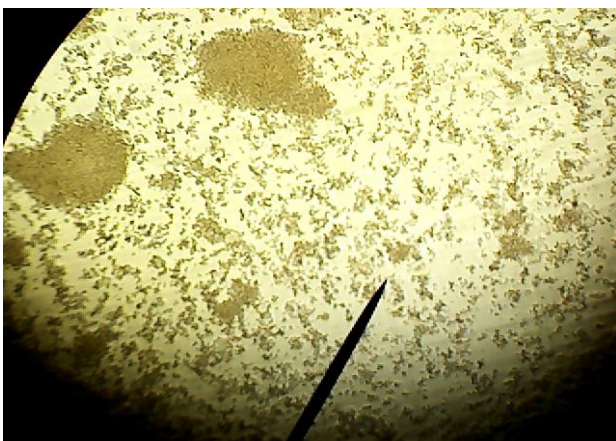
Onion Cells (Biology Learning)



Onion Root Cell (Biology Corner)



Cheek Cell (Reference.com)

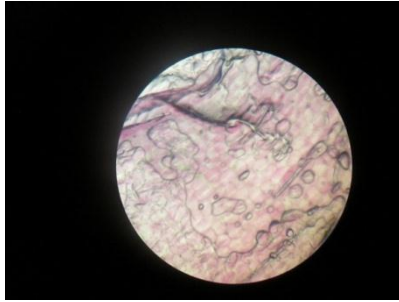


Undistilled Yogurt Cell (South 7th Science)

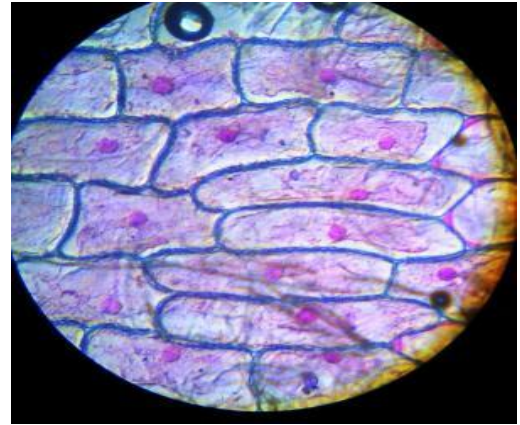
The onion root cell seems to have little black dots in the center of each strand or block of the cell. Quoting *Instuction. Green River*, “The black dots at the left are in interphase. The material inside the nucleus is largely chromatin(C) which consists of the chromosomes stretched out so that individual chromosomes are not visible.”

The cheek cells look like jellyfish with the nucleus inside each cell. The outside rim of the cell is actually the membrane. Quoting the *Online Labs*, “As in all animal cells, the cells of the human cheek do not possess a cell wall. A cell membrane that is semi-permeable surrounds the cytoplasm. Unlike plant cells, the cytoplasm in an animal cell is denser, granular and occupies a larger space.”

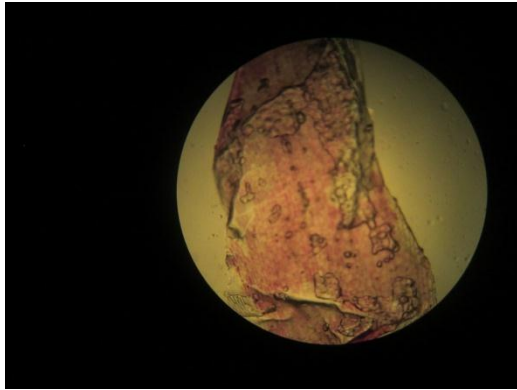
The image show that the yogurt cells are teeming (full) of bacterias. According to *Animal Smart*, ‘The bacteria inside a yogurt are *Streptococcus thermophilus* and *Lactobacillus bulgaricus*. These species eat the sugars in milk. These bacteria eat milk sugars, which would then produce something called lactic acid.’



Onion cell 10x

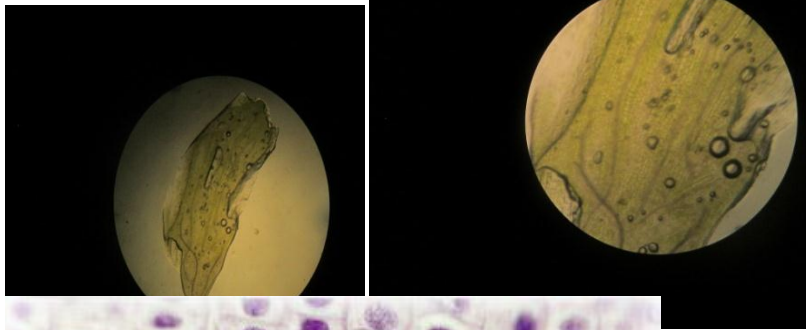


Onion Cells (Biology Learning)

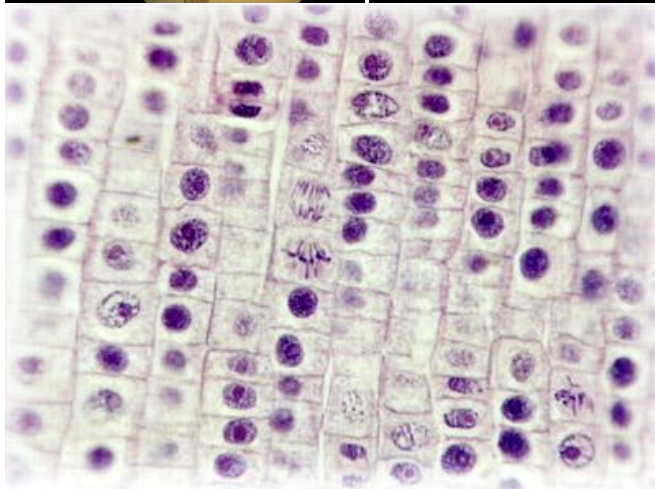


Onion cell 4x

Both cells are pink, but on the internet, the cell seems to form a wall while in my own onion cell, it seems to be like a tissue,

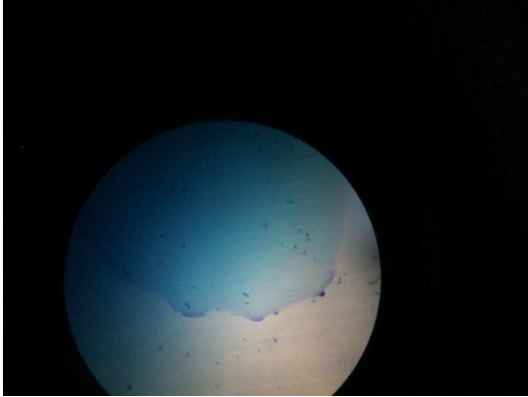


Onion Root Cell 4x and 10x

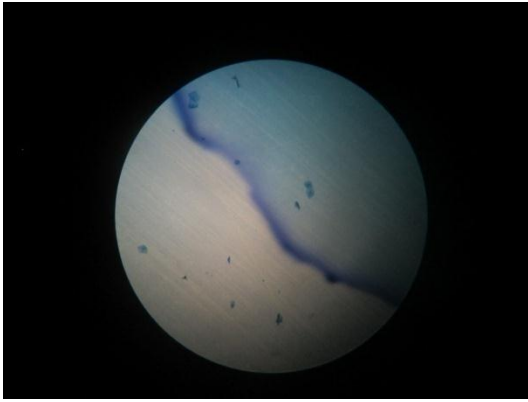


Onion Root Cell (Biology Corner)

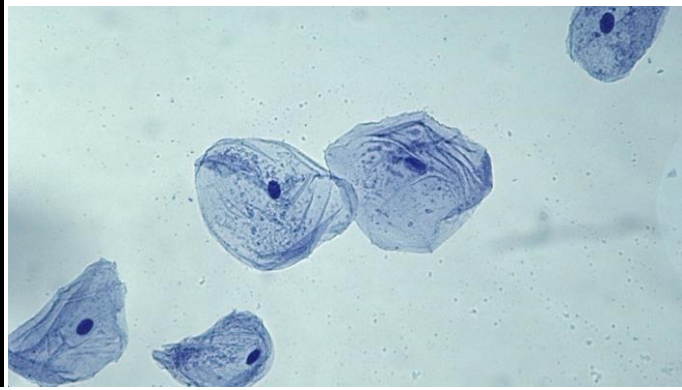
Both pictures seem to be totally different. On the internet, we could see that there are nucleus in the cell while in my onion root cell, we can only see that the cell is green and looks like a leaf tissue rather than blocks that form a wall like on the internet.



Cheek Cell 4x



Cheek cell 10x



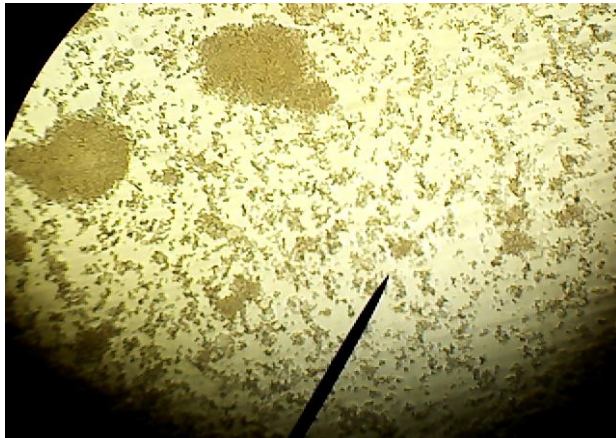
Cheek Cell (Reference.com)

In my picture, we can only see the Methylene blue, and could not see the membrane or the nucleus like on the internet.



Undululated Yogurt 4x

Undululated Yogurt 10x



Undistilled Yogurt Cell (South 7th Science)

Both pictures look the same. They both are full of micro-organisms, the only difference is that in my picture, it is blue because of the Methylene.

We could not get any picture for the 100x and I could not find an undululated yogurt image.

After doing the lab, I learned many new techniques like how to use a microscope. Some of the techniques include: Turning the coarse focus knob to make the stage move upwards or downwards. Turn the fine adjustment knob to make the image clearer. Lastly, always start with 4x first before moving to other magnifying lenses. The skills that I develop after I went to the lab is that I should always follow the safety rules and I should handle things in the lab carefully. In the future, I should be more patient and careful so I could get a better result.

Research Questions:

Methylene blue is used in preparation of the human cheek cell and yogurt slides because it helps us see clearer. Without the Methylene blue, we could only see the cheek cell and the yogurt cell as transparent. Basically, Methylene blue highlights the cells for us to see. Methylene blue could be dangerous because quoting the *Every Day Health*, “Methylene blue will most likely cause your urine or stools to appear blue or green in color. This is a normal side effect of the medication and will not cause any harm. Call your doctor at once if you have a serious side effect such as severe vomiting or stomach pain, pain in your chest or behind your breastbone, pale or blue skin, high fever, fast or pounding heartbeats, trouble breathing, confusion, or feeling like you might pass out.”

According to *FLINSCI*, ‘A clear image is only possible if all the light available is directed into the eye of the viewer, because of this, the oil immersion is needed.’ To apply oil to the glass slide: 1) Rotate the lenses away so that it will not hit the glass slide. 2) Apply oil on the glass slide (put a single drop on the slide). 3) Slowly turn the 100x lenses back and adjust the fine adjustment knob to make the image clearer.

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