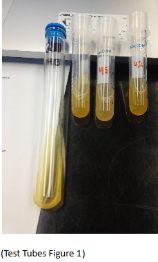
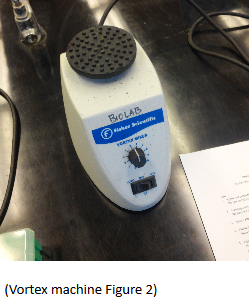
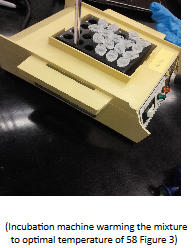
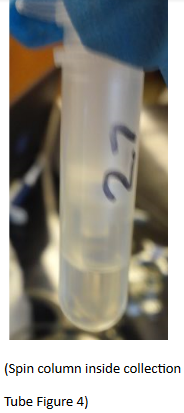
Deoxyribonucleic Acid aka DNA, a molecular compound that contains codes in it’s construction which dominate one’s inheritable trait, are the essential to all organism as it determines almost everything about them and even sometimes how they are going to survive. This statement couldn’t have been more true for a specific type of organism in which its DNA determine almost every aspect of its life and chances of survival, the bacterial species. This is why in this current week, the lab as a group set out to extract DNA from isolated bacteria grown in liquid culture to further analyze it.

As a recap, this entire project’s purpose is to obtain more knowledge on the which bacteria in the Koala digestive system functions in the metabolism the toxic tannin acid from eucalyptus and see how susceptible they are to the antibiotic given to Koala as a treatment.

Students in the lab was assigned a certain amount of test tubes (Figure 1) containing bacteria who have been isolated to hopefully being the desired type. With the test tubes students was in charge of extracting its DNA. First objective in the extraction was to separate the nutrient rich broth from the bacteria as the nutrient rich broth will interfere with the extraction process. This was performed by shaking up the broth containing bacteria via a vortex machine (Figure 2) and transferring the well shaken broth containing the bacteria in a 1.5mL tube followed by centrifugation that condenses the bacteria in pellet for easier removal of the nutrient rich supernatant broth. Once nutrient broth was removed, solutions in the following order was added PBS (Phosphate Buffered Saline), Proteinase K (for breaking open cell), and AL buffer all working together to allow a maintained condition where the cells break open releasing its content containing DNA. For this mixture to efficiently break open the cell releasing its content the mixture was put through an incubation process (Figure 3) set to the optimal temperature (58C) for 10 minutes allowing comprehensive lysis of the cells. As the cell lysis it releases the desire content of DNA that builds up in concentration in the water. The DNA in the solution is soluble or in another word dissolved in the solution and thus cannot be separated by physical means. This is similar to a person not being able to separate the salt in seawater. To separate the DNA it can instead be isolated from the solution via the chemical reagent of alcohol, specifically ethanol, that causes the DNA to form a solid and precipitate out of the solution. 

( Fun Fact: The pecipitation of DNA using ethanol has a lot to do with physics that you might think click on the link to see <http://physiology.med.cornell.edu/faculty/mason/lab/zumbo/files/ETHANOL_PRECIPITATION.pdf>)

To further isolate the DNA the mixture containing the precipitated DNA and solution was transferred to a spin column that is inserted into a collection tube (Figure 4) for further centrifugation. This centrifugation process allows the DNA to stick on to the spin column separating it from the solution thus allowing for a washing process of clearing out impurity. The DNA was washed in respective order with the buffer AW1 (this denature protein allowing it to pass through the filter) and the buffer AW2 (washes out salt). Both washed are done for the same purpose of simply washing away compounds that are not DNA. After the final wash the spin column was transferred to a centrifuge tube where it go through an elution process where the DNA will be separated from the filter and thus be collected via the tube. A buffer AE (composed of 10mM of Tris-HCL and 0.5 mM EDTA at pH 9) was added to the spin column and after a wait of 1 minute it was centrifuge allowing for the collection of pure DNA and thus concludes the activity of this week’s lab.

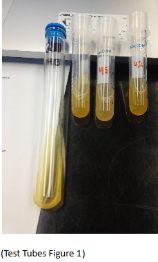
Although the lab’s protocol for this week was very straightforward, the most challenging part can surely be associated with the tedious repetition of pipetting. From this experience it is clear to see why many research laboratory prefer to use machinery when it comes to the process of pipetting. However, looking past the mechanics of this lab it is interesting to see how many of this process works when it comes to extraction and isolation of DNA molecules especially the physic that does behind the precipitation of DNA via ethanol (more information of hyperlink above). As I did the lab I found myself thinking of the incorporation of knowledges that went into each and every step in this protocol which made it easy to find myself in utter appreciation and amazed that the protocol simple nature is yet due to truly complex backbone of knowledge and studies.

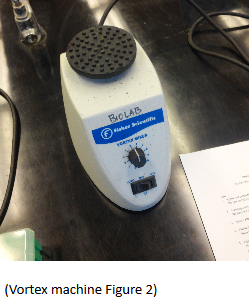
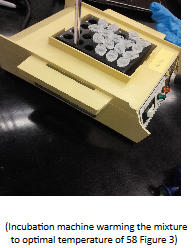
The learning process of these. ~~O~~You know that once a week the class meets to work in the lab to perform various experimental methods and procedures used in the field of Biological sciences. For this week the lab has truly put our pipetting skills to the test. DNA extractions can be quite stressful because you have to be precise with every step given, and if done right, at the end of your hard work it shall produce great results. This class is always busy; in this week’s lab everyone works on their own extractions but also in collaboration as a team. Each group shared pipets, took turns to using chemical reagents, and compared their results upon completion of each step. This truly helps if you happened to miss something, which sadly enough happened to me after finishing my first steps and a classmate had to point out the different buffers that were available. To my disgrace, since I was confused about the buffers my extractions unfortunately w~~as~~ere ruined. However, this didn't discourage me to continue as I was able team up with a classmate and help him finish his extractions. In the end, although my samples were ruined, I was fortunate enough to help others finish theirs and learn a lot in the process..

The science community is always experimenting. Imagine how many DNA extractions have been put aside from the others because they were contaminated at some point. Although, a scientist gets to learn something from his or her mistakes it is not always pleasant when it happens. It is true that sometimes mistakes also give answers, and that not all that hard work it's lost when mistakes do happen. Now for the science community, what is your consideration of an efficient and organized way of going about this method of DNA extraction to reduce mistakes?

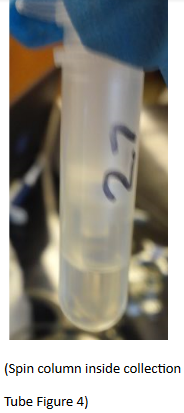
Looking ahead at next week we will be amplifying DNA collected in this week’s lab. This will be very interesting as it will allow many students the opportunity to have hands on experience with PCR (polymerase chain reaction). Hopefully, with the success of this lab we can further ou~~r~~t the progress on the project this lab is about.

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