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Bio 2312

Wednesday 2:30pm

Urine Analysis Lab

Introduction:

The urinary system is one of the many systems in the body that are essential to life. The urinary system's function is to filter approximately 180 liters of blood a day and to produce urine as a waste product. There are four major organs in the urinary system, which include the kidneys, the ureters, urinary bladder, and the urethra. The kidney is responsible for producing urine, the ureters makes sure to transport the kidneys to the bladder. The urinary bladder is a storage for the urine and lastly, the urethra is responsible for eliminating the urine. The kidneys are made up of small units called nephrons and each nephron is made up of both a renal corpuscle and a renal tubule. The renal corpuscle is composed of a glomerulus, which are small blood capillaries and they allow 1200ml of blood to pass through per minute. The renal tubule is a small tube within the nephron, together the glomerulus and the renal tubule help in transporting the urea to the kidneys.

Once the urine reaches the two ureters its narrow tubes carry the urine from the kidneys to the bladder. The ureter walls are constantly contracting and relaxing to force the urine away from the kidneys to prevent backflow. If urine backs up there is a likelihood that an infection can occur. After the urine reaches the bladder it is stored here for a short period of time. The bladder is a hollow organ in the lower abdomen. Just like the ureter walls, the bladder expands and relaxes to store urine and contracts to empty the urine into the urethra. When urination occurs two sphincters valves open to allow the urine to flow into the urethra which then allows urine to flow out the human body. In a male body, the urethra is 8 inches whereas, in females the urethra is only 1.5 inches.

Like any system in the human body there are many diseases that can come along the way. One of the many diseases that occur in the urinary system are urinary tract infections (UTIs). According to <https://www.livescience.com/27012-urinary-system.html>, UTIs occur when bacteria enter the urinary tract and it can affect many organs within the urinary system including the urethra, bladder, and the kidneys. Kidney stones is another disease that can occur in the urinary system. Kidney stones cause blockage of the urine and can be extremely painful. Chronic kidney disease is a severe disease where the kidneys are damaged and can no longer do its job properly. This disease is common in those who suffer from diabetes, heart disease, and high blood pressure. In CKD, the kidneys no longer do their job therefore blood is no longer being filtered daily the way it is supposed to, which lead into bigger problems. In order to test for problems in urine, a test called urinalysis is done.

Urinalysis is a urine sample test done to patients that may present conditions such as diabetes, urinary tract infection, kidney disease, and liver disease. In order to examine the urine a doctor will usually use a microscope or a dipstick. The microscope method allows the examiner to visually see infectious bacteria, abnormalities in blood cells, and signs of kidney stones. The dipstick test is a chemically infused reagent stick that changes colors when a substance is present and if the levels are normal. According to <https://www.healthline.com/health/urinalysis> the dipstick test can test for bilirubin, protein, specific gravity, sugar, blood, and pH in urine samples. An increase level of these substances can indicate dehydration, diabetes, kidney issues and urinary tract issues. The objectives of this lab activity are to be able to analyze a Multistix dipstick and be able to interpret the results using the Multistix 10 strip chart. If the Multistix strips are dipped into the urine samples then we will be able to differentiate normal with

abnormal results of each substance. With these results one can determine issues presented by urine and analyze normal results and abnormal results.

The purpose of this lab activity was to examine a normal sample of urine and two unknown samples of urine. All these samples were going to be tested using the dipstick method.

Materials and methods:

To begin this activity gloves were used and were properly disposed after the entire activity was completed. In order to test for pH, protein, glucose, ketones, hemoglobin, leukocytes, urobilinogen, bilirubin, specific gravity, and nitrites in each urine sample, a combination stick called Multistix was dipped into each sample. To analyze the results a Multistix 10 strip chart was used to interpret the results.

Results/ Data:

Title: Urine Sample Analysis

Table 1. Results of Multistix test. Normal sample was tested normal, while abnormal sample 1 and 2 were positive for high glucose level.

Samples/ Substances	Glucose	Bilirubin	Ketone	Specific Gravity	Blood	pH	Protein	Urobilinogen	Nitrite	Leukocytes
Normal Urine Sample	Negative	Negative	Negative	1.025	Negative	6.5	Negative	0.2	Negative	Negative
Abnormal	2,000 or more	Negative	Negative	1.030	Negative	6.0	2000 or more	0.2	Negative	Negative

Urine Sample 1										
Abnormal Urine Sample -2	1000	Negative	Trace 5	1.005	Large	8.5	2000 or more	0.2	Negative	Negative

Discussion/ Conclusion:

Based on the three strips tested, all the samples came back negative for bilirubin, nitrite and leukocytes and negative for urobilinogen. Strip 2 with the abnormal urine sample-1 was tested high for glucose at 2000 or more. Ketone and blood came back negative, the specific gravity was tested for 1.030 which can indicate a mild dehydration. The pH in this abnormal sample was tested to be a bit under the normal range. In the abnormal urine sample -2 glucose was tested at a high rate of 1000, ketone came back as trace 5, the specific gravity came back at a normal rate of 1.005. There was a large amount of blood in this sample which could indicate many diseases, including urinary tract infection and kidney stones. Furthermore, the pH in this sample was very alkaline testing for 8.0. Both abnormal samples had a high protein level of 2000 or more which can indicate signs of diabetes, chronic kidney disease, etc. The experiment went as planned, three urine samples were tested and by using the chart it was evident which substances resulted normally or abnormally. The hypothesis can be accepted since the results were interpreted and were able to trace back to potential diseases. One thing I learned that was special was how essential a simple Multistix can be. With this dipstick method it was easily

visible to the examiner what substances were displayed and overall, the importance each of these positively tested substances can be.

List of references:

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