

**Urinalysis Lab Report**

By: Sabrina Albert

Human Anatomy and Physiology II

Bio 2312 OL57

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## **Introduction:**

The urinary system is crucial in getting rid of the “metabolic waste produced by the body’s cells” (Martini et al., 977). The urinary system's function is to filter blood and create urine as a waste by-product. However, the urinary system is not this simple and is actually quite complex.

The urinary system consists of the kidneys, renal pelvis, ureters, bladder, and urethra. “The kidneys are bean-shaped organs that remove urea, a waste product formed by the breakdown of proteins, from the blood through small filtering units called nephrons”(Zimmermann, 2018). Urea, together with water and other waste substances, forms the urine as it passes through the nephrons and down the renal tubules of the kidney. From the kidneys, urine travels down two thin tubes, called ureters, to the bladder. The bladder stores urine until the brain signals the bladder that the person is ready to empty it. To prevent leakage, circular muscles called sphincters close tightly around the opening of the bladder into the urethra, the tube that allows urine to pass outside the body.

In this lab experiment, we will be conducting a urine analysis. An urinalysis is a test used to examine the content of a urine sample and is used to check for signs of diseases such as kidney and liver disease, used as a part of pregnancy checkup, or before getting surgery. There are 3 ways to analyze urine: visual exam, microscopic exam, and the dipstick test. The visual exam checks the urine’s color and clarity, while the microscopic exam checks for things that are too small to be seen such as bacteria, red blood cells, white blood cells, and crystals. “The dipstick test uses a thin plastic strip treated with chemicals which is dipped into your urine, and the chemicals on the stick react and change color if levels are above normal. Things the dipstick test can check for include: **Acidity, or pH-** if the acid is abnormal, you could have kidney stones,

a urinary tract infection (UTI), or another condition; **Protein**- this can be a sign your kidneys aren't working right. Kidneys filter waste products out of your blood; **Glucose**-a high sugar content is a marker for diabetes; **White blood cells**- these are a sign of infection or inflammation, either in the kidneys or anywhere else along your urinary tract; **Nitrites**-this means that there is an infection with certain kinds of bacteria; **Bilirubin**- if this waste product, which is normally eliminated by your liver, shows up, it may mean your liver isn't working properly; **Blood in your urine**- sometimes this is a sign of infections or certain illnesses"(WebMD, Urinalysis(Urine Test)).

### **Objective:**

The purpose of this lab activity was to compare and analyze 3 urine samples and determine their abnormalities and what they denote.

### **Materials and Methods:**

Three different urine samples were compared and analyzed in this experiment. All samples were handled with disposable gloves being worn. Three multistix strips were used, each one containing 10 chemical strips. Each strip was tested for the presence and/or concentration of one of the following: leukocytes, nitrate, urobilinogen, protein, pH, blood, specific gravity, ketone, bilirubin, and glucose. Each multistix was inserted in each of the urine samples for 60 seconds. One multistix was dipped into the normal urine artificial sample. The multistix was then set down develop in front of the sample bottle. The second multistix was dipped into the abnormal urine-1 artificial sample and then set down to develop in front of the sample bottle. The third multistix was dipped into the abnormal urine-2 artificial sample and then set down to

develop in front of the sample bottle. Once all 3 multistix strips developed, observations of the color on the strips were interpreted with the use of a chart describing what each color represented. Results and observations were then recorded.

### **Results/Data:**

Sample Type	Leukocytes	Nitrate	Urobilino gen	Protein	pH	Blood	Specific Gravity	Ketone	Bilirubin	Glucose
Normal Urine Artificial	Negative	Negative	0.2 mg/dL	Negative	6.5	Negative	1.025	Trace 5 mg/dL	Negative	Negative
Abnormal Urine-1 Artificial	Negative	Negative	0.2 mg/dL	100 mg/dL ++	6.0	Negative	1.030	Negative	Negative	2,000 mg/dL or more
Abnormal Urine-2 Artificial	Negative	Negative	0.2 mg/dL	300 mg/dL +++	8.0	Large +++	1.005	Trace 5 mg/dL	Negative	1,000 mg/dL

### **Discussion/Conclusion:**

All three urine samples that were tested yielded different results. These results will indicate the condition it came from; if the samples had come from an actual person rather than being made artificially. The first thing the samples were tested for was leukocytes. All 3 samples were negative for leukocytes, as well as negative for the presence of nitrites, which is a normal indication. If leukocytes and nitrites had been present, it would have meant that the body is battling an infection in the urinary tract. Next, the samples were tested for urobilinogen. It is

normal for urobilinogen to be found in urine and all 3 samples had a normal amount of it.

According to MedlinePlus, high amounts of urobilinogen in urine could indicate a problem with liver function and diseases such as hepatitis and cirrhosis. When the samples were tested for protein, the normal urine sample came up negative, which is normal for a healthy person.

Abnormal Urine-1 had a presence of 100 mg/dL of protein in it while Abnormal Urine-2 had 300 mg/dL present. Protein should never be found in urine as protein molecules are too large to “pass through the glomerular filtration barrier” (Nursing Times). The protein present in these 2 samples can indicate many things, whether it is hypertension, kidney damage, or diabetes. The pH of the samples was tested next. The normal pH range for urine is 4.5-8 and all 3 samples fell into the range, although Abnormal Urine-2 was on the high-side of the sample. If the urine were anymore acidic or basic, it could indicate urinary stones or a bacterial infection. When urine is tested for blood, it should always come up negative. While the Normal Urine and Abnormal Urine-1 samples came up negative for blood, Abnormal Urine-2 tested positive for large amounts of blood. This could indicate several things such as “trauma, smoking, infection” (pdf) and so much more. As for specific gravity, the normal range is 1.001-1.035. The specific gravity of the 3 samples fell right into the normal range. Ketones are not usually found in urine. Their presence indicates things such as diabetes, starvation, and even pregnancy. Abnormal Urine-1 came up negative for ketone, while the Normal Urine and Abnormal Urine-2 samples showed a trace amount of ketone. This trace amount should be analyzed further but does not indicate anything serious as of yet. The test for bilirubin came up negative for all 3 samples, which is good sign. If bilirubin was present in the urine, it could indicate liver disease, biliary tract infection, or obstructive jaundice, according to Aci Health. Glucose was the last thing that was tested. While the Normal Urine sample came up negative for glucose, Abnormal Urine-1 sample had 2,000

mg/dL and Abnormal Urine-2 sample had 1,000 mg/dL. Glucose does not occur naturally in urine. Its presence means the kidneys reached their renal threshold of glucose and now must excrete it through urine to decrease blood concentration. This is indicative of several conditions including diabetes, pregnancy, and the presence of certain medications. With the use of a dipstick we are able to perform a urinalysis that can tell us a lot about an individual just by using a few milliliters of urine. While these dipstick tests might not be accurate all the time, they are very helpful for shedding light on conditions with minimal testing as a start. They are easy to administer at home and may help many people before seeing a doctor. They are also very efficient for testing multiple things at once, which is very helpful and convenient.

## **Works Cited**

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