**Excrement Lab: Analysis of Urine & Stool**

*Background Information:*

*Urinalysis*

Tests on urine can provide clues to many diseases and information about your overall health. A routine urine screening test may be done to help find the cause for many types of symptoms. The kidneys remove waste material, minerals, fluids, and other substances from the blood for elimination in the urine. Therefore, urine can contain hundreds of different bodily waste products. Many factors (such as diet, fluid intake, exercise, and kidney function) affect what is in urine.

A urine test may be done as part of a routine physical examination to screen for a disease or infection of the urinary tract. Symptoms that may lead to a urine test include discolored or foul-smelling urine, pain during urination, difficulty urinating, flank pain, or fever. Urine tests are also performed to monitor the treatment of certain conditions such as diabetes, kidney stones, a urinary tract infection, hypertension, or some types of kidney or liver disease.

Macroscopic examination requires only that the observer has a sense of sight and smell. The most cost-effective device used to screen urine chemistry is a plastic dipstick. This microchemistry system has been available for many years and allows qualitative and semi-quantitative analysis within a few minutes by simple but careful observation. The color change occurring on each segment of the strip is compared to an established color chart to obtain results. Microscopic urinalysis can also be done and requires only a relatively inexpensive light microscope.

*Stool Analysis*

A stool analysis is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the digestive tract. These conditions can include infection (such as from parasites, viruses, or bacteria), poor nutrient absorption, or cancer.

For a stool analysis, a stool sample is collected in a clean container and then sent to the laboratory. Laboratory analysis includes microscopic examination, chemical tests, and microbiologic tests. The stool will be checked for color, consistency, amount, shape, odor, and the presence of mucus. The stool may be examined for hidden (occult) blood, fat, meat fibers, bile, white blood cells, and sugars called reducing substances. The pH of the stool also may be measured. A stool culture is done to find out if bacteria may be causing an infection.

*Stool analysis is used to:*

* Help identify diseases of the digestive tract, liver, and pancreas
* Help find the cause of symptoms affecting the digestive tract, including prolonged diarrhea, bloody diarrhea, an increased amount of gas, nausea, vomiting, loss of appetite, bloating, abdominal pain and cramping, and fever.
* Screen for colon cancer by checking for hidden blood.
* Look for parasites
* Look for the cause of an infection, such as bacteria, a fungus, or a virus.
* Check for poor absorption of nutrients by the digestive tract

(WebMD: <http://www.webmd.com/digestive-disorders/stool-analysis>)

*Purpose:*

The purpose of this activity is to preform an analysis on a variety of urine and stool samples in order to understand the procedure and purpose of these tests in the health care world.

*Materials:*

* Multipurpose urine testing strips (1 per urine sample)
* Urine samples
* Small test tubes (1 per urine sample)
* Test tube rack
* Stop watch
* Safety glasses
* Latex gloves
* Lab coat
* Stool samples
* Probes

*Procedure:*

1. Read through the whole procedure before starting the lab.
2. Obtain the materials necessary to complete the lab activity and put on your safety equipment.
3. Complete the macroscopic analysis of your urine samples. You will only need your eyes for this step. Please refer to the notes given regarding these tests. These will be a necessity when filling out the data table.
4. Complete the test strip analysis of your urine samples. Be very careful that you follow the procedure below; if not, this could affect your results.
   1. Swirl your urine sample
   2. Remove lid of reagent container.
   3. Lift 1 strip out of the container without contaminating it. This means do not touch any of the reagent pads with your fingers.
   4. Close reagent container.
   5. Dip strip into urine; covering all reagent bars without touching the rim of the urine container.
   6. Remove strip after 1-2 seconds. Tap against side of container to remove excess urine.
   7. Start stop watch immediately.
   8. Read regent strip at correct time and record results:
      1. Glucose, Ketones and Protein: 1 minute
      2. pH: 10 seconds
   9. Discard strip immediately.
   10. Repeat this process for as many urine samples as you have.
5. Complete the macroscopic analysis of your stool samples. You will only need your eyes for this step. Compare the consistency of the stool to the Bristol Stool Chart and identify any foreign materials present in the fecal matter.
6. Clean work area with disinfectant. Wash and put away all materials as directed by your instructor. Remove safety goggles and gloves, and then wash hands.

*Data:*

Table 1: Macroscopic Urine Analysis

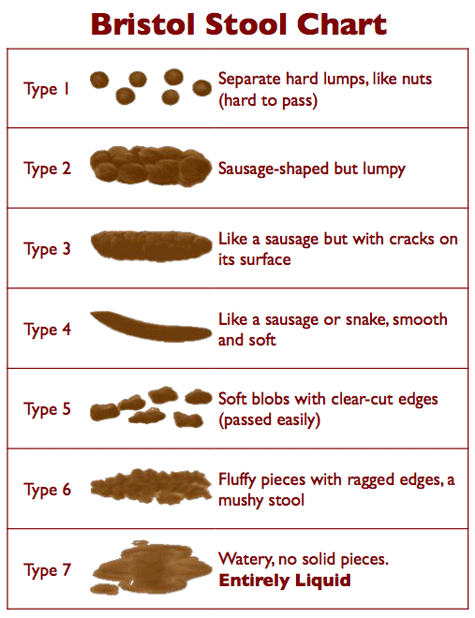
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Urine Sample | Characteristic | Normal Range | Measured Results | Abnormal results? (y or n) |
| **1** | color |  |  |  |
| turbidity |  |  |  |
| **2** | color |  |  |  |
| turbidity |  |  |  |
| **3** | color |  |  |  |
| turbidity |  |  |  |

Table 2: Chemical Urine Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Urine Sample | Characteristic | Normal Range | Measured Results | Abnormal results? (y or n) |
| **1** | pH |  |  |  |
| Protein |  |  |  |
| Glucose |  |  |  |
| Ketones |  |  |  |
| **2** | pH |  |  |  |
| Protein |  |  |  |
| Glucose |  |  |  |
| Ketones |  |  |  |
| **3** | pH |  |  |  |
| Protein |  |  |  |
| Glucose |  |  |  |
| Ketones |  |  |  |

Table 3: Macroscopic Stool Analysis

|  |  |  |
| --- | --- | --- |
| Stool Sample | Bristol Stool Chart Classification | Additional Observations & Abnormalities |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |



*Discussion Questions:*

1. How can water intake be judged by the color of urine? (1)
2. What is the normal value for glucose in urine? (1)
3. Is it ever “normal” to find protein in urine? Why or why not? (2)
4. The presence of ketones is often high in the urine of both diabetics and peoples who suffer from anorexia. What characteristics would these two groups have in common that would cause this to happen? (2)

*Conclusion:*

Write a paragraph that summarizes your results and relates back to your purpose. This is where you have a chance to analyze the results you observed in the lab. For example, if a sample had a positive protein and ketone result…what does that mean? Conduct independent research in order to identify some of the pathologies or conditions that could cause the abnormalities that you observed in both the urine and stool samples.