

Biol 373L Lab 4 Urine Analysis of Physical, Chemical, and Sedimentary Properties to Identify Abnormalities

Ahmed Hajjo

20677837

TA: Amy White, Marissa Zago

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Data Analysis

Table 1: Physical and Chemical Analysis of Urine Samples

PHYSICAL	Normal Sample	Sample A	Sample B	Sample C
Volume (may not be available)	Not Available	Not Available	Not Available	Not Available
Colour	Pale Yellow	Light Brown	Light Brown	White
Transparency	clear	clear	clear	Cloudy
Specific Gravity	1.018 @ 20°C $5/3 \times 0.001 = 0.002$ =1.020 @ 15°C	1.001 @ 20°C $5/3 \times 0.001 = 0.002$ = 1.003 @ 15°C	1.018 @ 20°C $5/3 \times 0.001 = 0.002$ =1.020 @ 15°C	1.003 @ 20°C $5/3 \times 0.001 = 0.002$ =1.005 @ 15°C
CHEMICAL*				
Leukocytes (LEU)	Trace	Small	Small	Negative
Nitrite (NIT)	Negative	Negative	Negative	Negative
Protein (PRO)	Negative	100 mg/dL	Trace – 30 mg/dL (15 mg/dL estimate)	Negative
pH (pH)	6.0	6.0-6.5 (6.3 estimate)	6.5	6.0
Blood (BLO)	Negative	Negative	Negative/Trace	Negative
Ketone (KET)	Negative	Negative	Negative	Negative
Glucose (GLU)	Negative	Negative	Negative	2000 mg/dL

Sediment Analysis

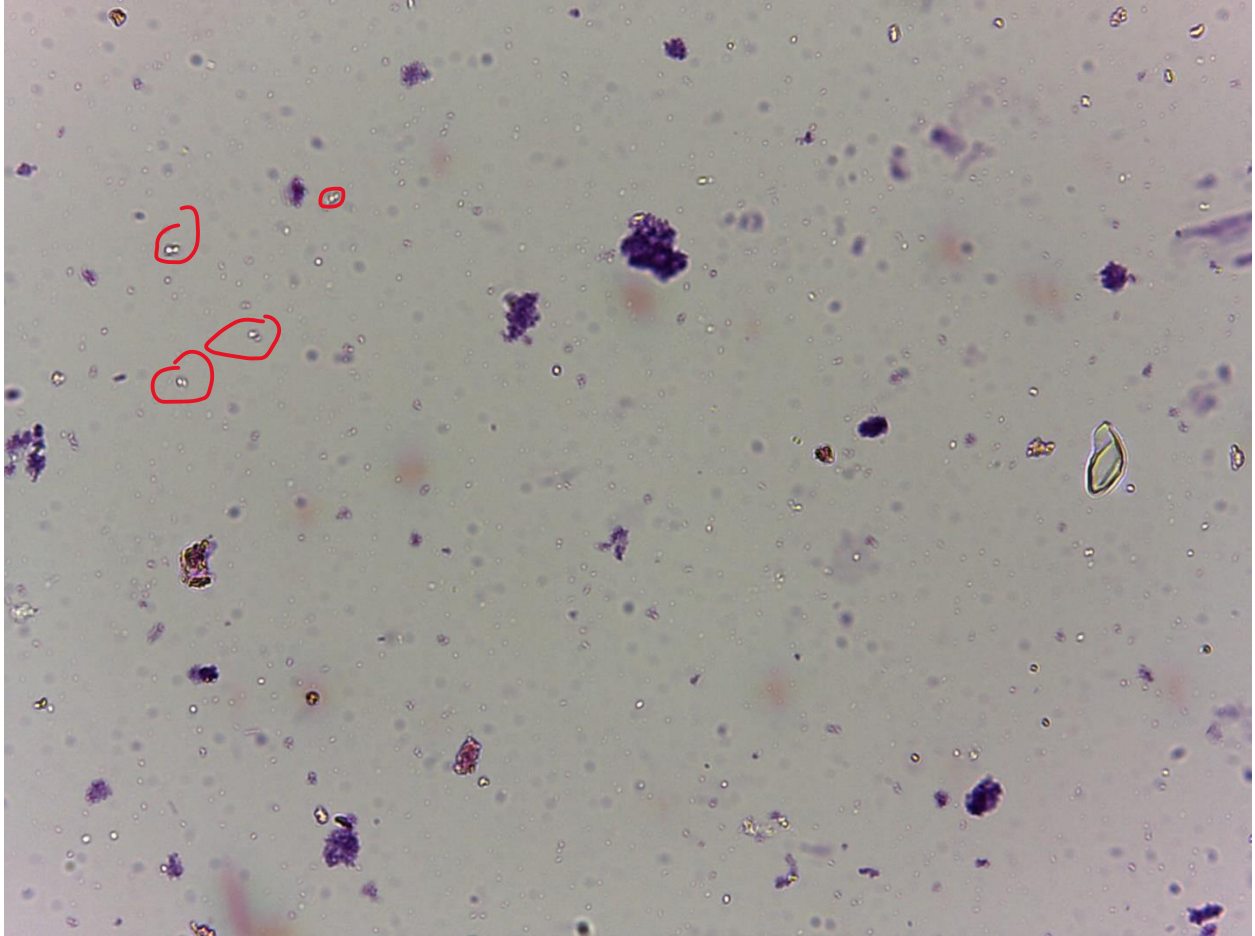


Figure 1: Cow Urine 40x 3 image showing Calcium carbonate in red circles.



Figure 2: Cow Urine 100x 4 image showing Uric acid in red circle.

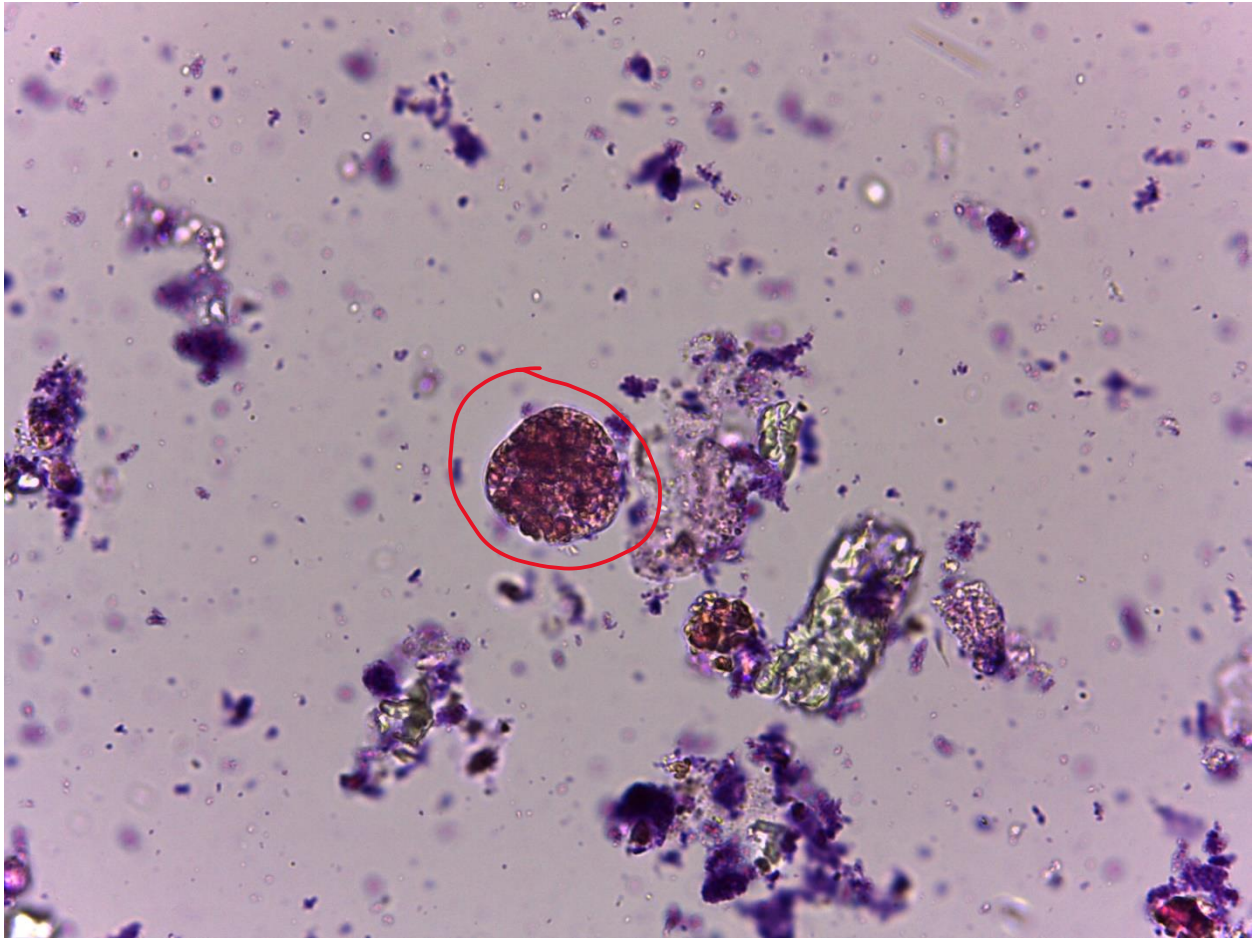


Figure 3: Cow Urine 40x 9 image showing coarsely granular cell in red circle.

Data Interpretation

In case A, the patient is referred by his doctor to get a urine test done after discoloration of urine after a run in with strep throat. According to Mayo Clinic staff, strep throat can “cause complications, such as kidney inflammation” (Mayo Clinic Staff, 2020). Nephritis is an inflammation in the kidney, this inflammation is a common cause of Proteinuria which is the presence of protein in the blood (Waterloo, 2021). The amount measured in the chemical test is 100mg/dL which is very high compared to normal amounts. Also, the specific gravity of sample A is 1.003 which is much lower than the normal of 1.020 which indicated impaired kidney function in its ability to concentrate urine (Waterloo, 2021). With all the information provides, the best guess is the strep throat cause a urinary tract infection which cause an inflammation in the patient’s kidney’s causing impaired function and protein present in the urine indicative of the light brown color. In Sample B, the physical characteristics of the urine are very similar to that of Sample A; light brown color, clear transparency, however there is less actual protein in the urine, A having 100 mg/dL while B had a smaller amount at roughly mg/dL. As well, the specific gravity of protein B is equal to that of the normal protein, what this tells us is that the kidneys are functioning properly, and this patient is specifically coming in for an annual checkup, and based on the fact that she does daily vigorous exercise, it can explain the discoloration in the urine and

the trace/ small amounts of protein in the urine. This is because protein can be found in urine after completing vigorous exercise so based on the lifestyle of the patient this abnormality is of little health detriment (Toblli et al, 2012). Upon examining the physical characteristics of Sample C, the color was white and cloudy with a decreased specific gravity at 1.005 which can be attributed to the increased water intake due to the patients complaint of constant thirst. Chemical property analysis reveals a high glucose content in the urine at 2000 mg/dL known as Glucosuria or presence of glucose in urine being the only abnormality compared to the normal sample (Waterloo, 2021). Judging by the case history of sample C with the patient complaining of constant thirst and unexpected weight loss, Glycosuria appears to be the best guess for the abnormality affecting the patient (Akarsu et al, 2006).

Report Question

1. What is indicated by the presence in the urine of each of the following?

- **Urobilinogen** – Hepatitis, Cirrhosis, Liver damage due to drugs (MedlinePlus, 2020)
- **Ketones** – diabetic ketoacidosis (Marsden & Pickering, 2015).
- **Hemaglobin** – Nephritis, Hematuria, kidney cancer, malaria, sickle cell anemia. (Veerreddy, 2013).
- **Urea** – kidney obstruction (kidney stones), dehydration, heart failure. (Weiner et al, 2005)

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