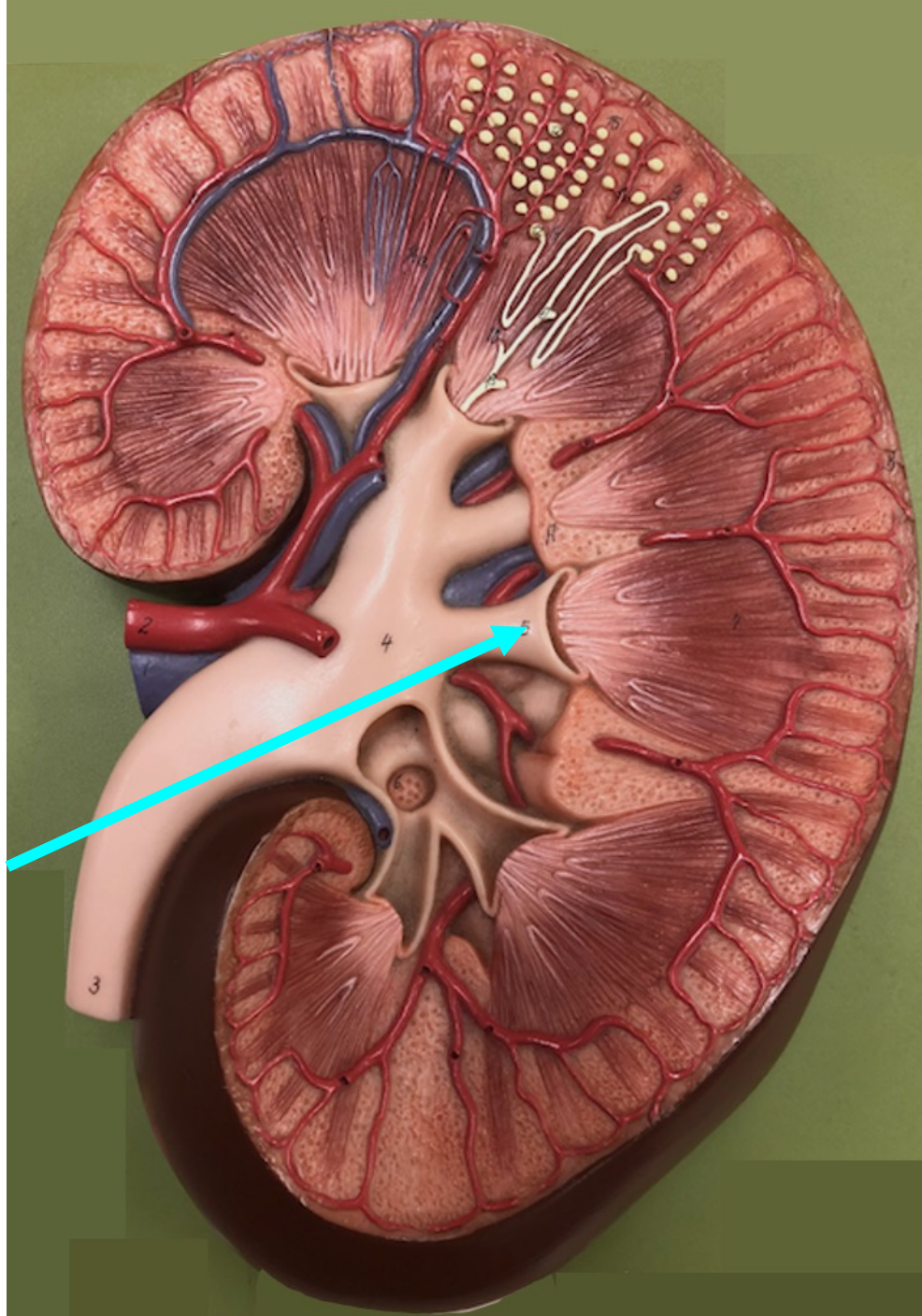
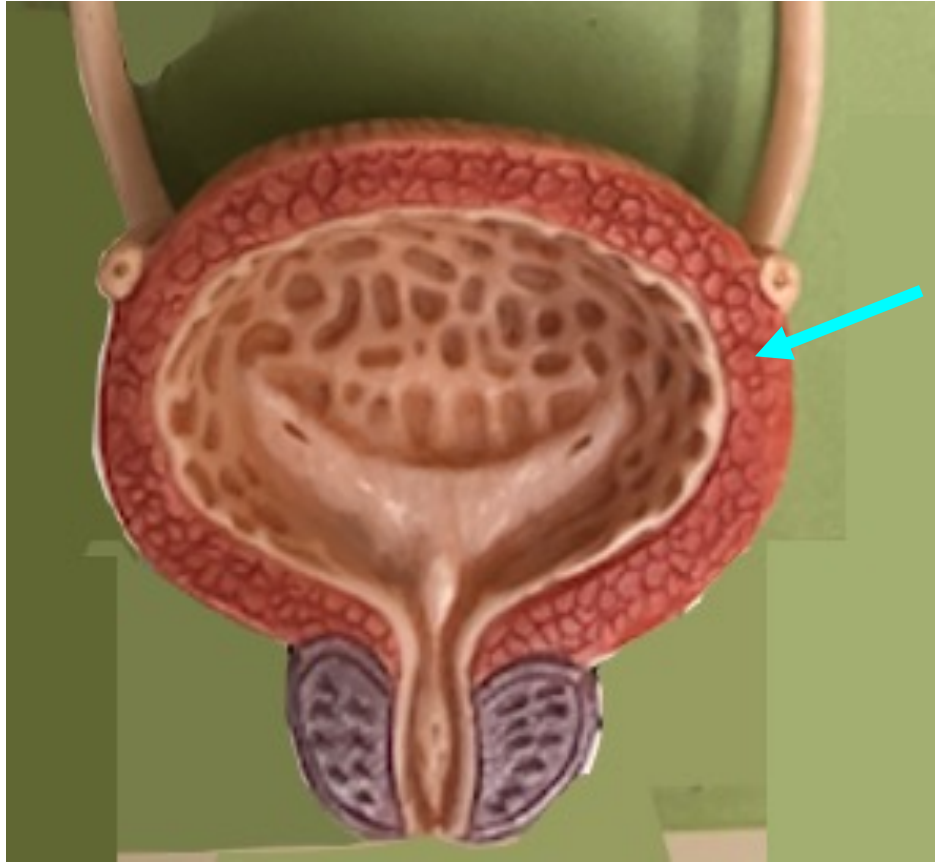


Quiz Section Test 5-AA
Answers are given in red.

1. Name the structure indicated by the arrow.

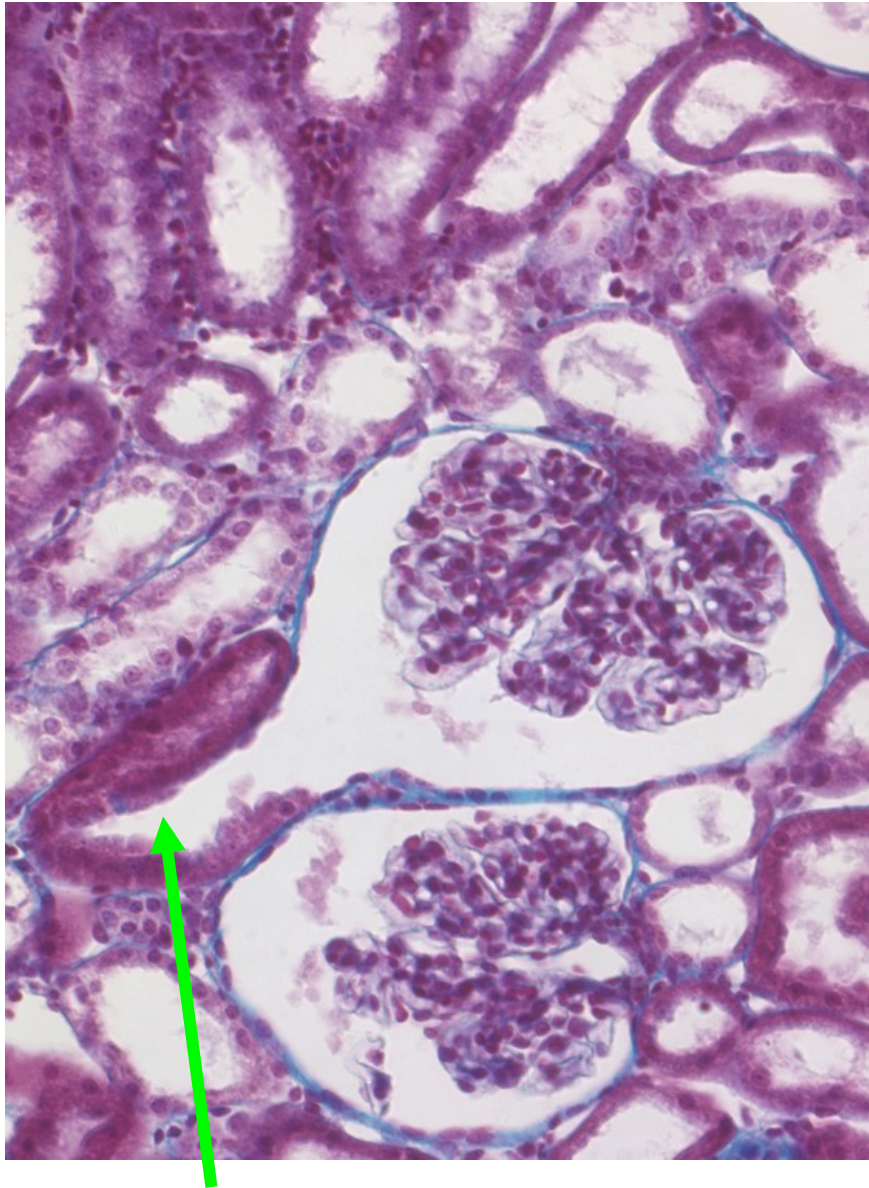
calyx





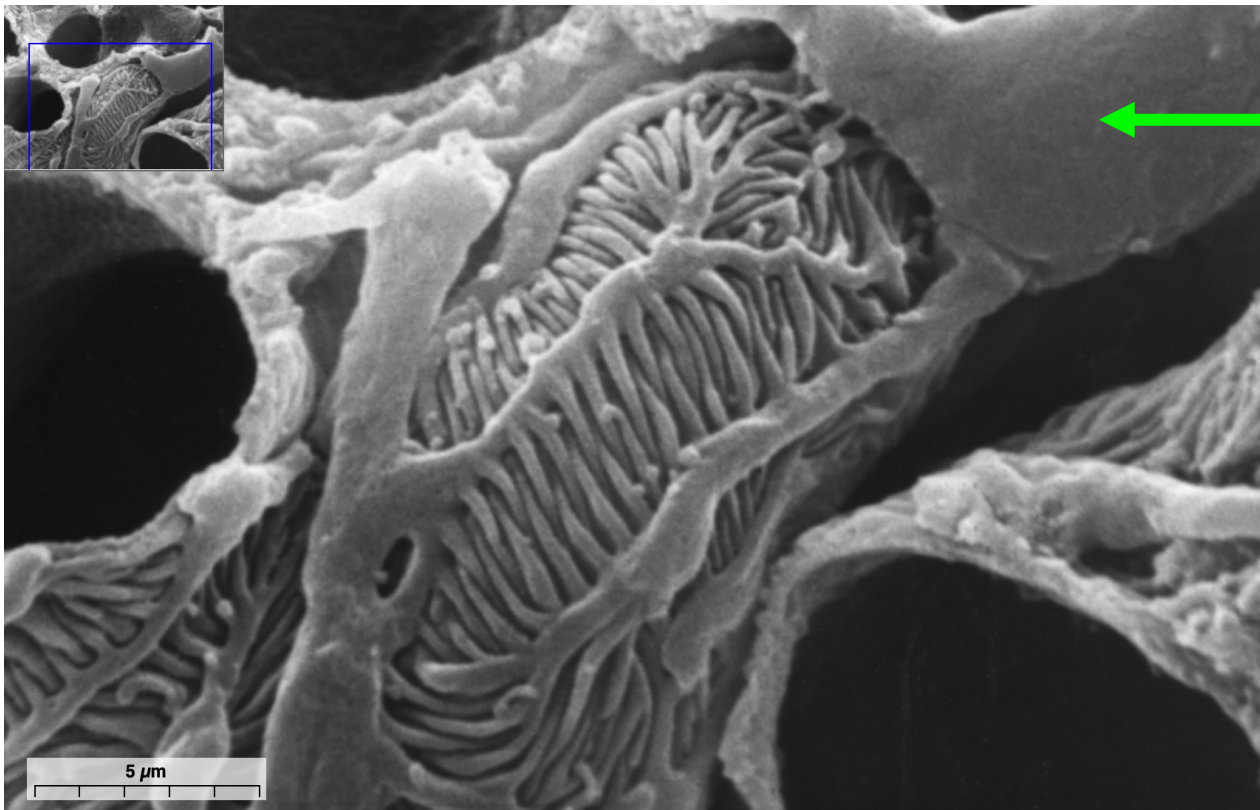
2. Name the muscle shown by the arrow.

detrusor muscle



3. What part of the nephron is indicated by the arrow?

- a. collecting duct
- b. distal tubule
- c. Bowman's capsule
- d. proximal tubule
- e. glomerulus



4. What is indicated by the arrow?
- a. proximal tubule
 - b. podocyte
 - c. collecting duct
 - d. distal tubule
 - e. uroepithelium

5. Which of the following best explains why diabetes mellitus might cause glucose to appear in the urine?

- a. Diabetes causes a leaky filtration membrane.
- b. Hyperglycemia causes a high filtered load of glucose that exceeds the capacity for glucose reabsorption.**
- c. Hyperglycemia causes a high filtered load of glucose that disrupts the gradient necessary for glucose reabsorption.
- d. Hyperglycemia inhibits glucose reabsorption.
- e. Hyperglycemia stimulates glucose secretion.

Diabetes insipidus is typically associated with increased thirst in response to rising hypertonicity. If adequate fluids are available, the serum osmolality is rarely substantially higher than the normal range. This patient's serum sodium level and osmolality were quite high (see table above); these findings, combined with a lack of polydipsia, raise concerns about an unusual condition known as **adipsic diabetes insipidus**.

6. Name the sensors that are affected in this patient, causing him to have a lack of thirst and a high serum osmolality.

hypothalamic osmoreceptors

7. Which of the following makes determining inulin clearance more difficult than determining creatinine clearance?
- a. Inulin concentrations in urine are much lower than creatinine concentrations.
 - b. Inulin concentrations in urine are much higher than creatinine concentrations.
 - c. **Inulin is a plant carbohydrate and needs to be injected.**
 - d. Determining the inulin concentration in urine requires a 24-hour urine collection.

Calculations

NAME Version AA

Be sure to show your work. Full credit will be given for answers that are set up correctly.

DATA for questions #8-10

A 20 year old woman came into the clinic to be evaluated for worsening thirst and polyuria.

A 24-hour urine collection was obtained and the following measurements were determined:

plasma concentration of glucose:	360 mg/dL
glomerular filtration rate (GFR):	100 ml/min
urine flow rate:	1.2 ml/min
plasma concentration of creatinine:	0.8 mg/dL
creatinine clearance:	118 ml/min
amount of glucose excreted in urine:	40 mg/min

8. Using the above data, convert the **plasma concentration of glucose** to **mg/ml**. (2 points)

$$360 \text{ mg/dL} \cdot \frac{1 \text{ dL}}{100 \text{ ml}} = \boxed{3.6 \text{ mg/ml}}$$

9. Using the above data, calculate the **filtered load of glucose**.

$$FL_{\text{glu}} = \text{GFR} \cdot P_{\text{glu}} \\ = 100 \text{ ml/min} \cdot 3.6 \text{ mg/ml} = \boxed{360 \text{ mg/min}}$$

10. Using the above data, calculate the **amount of glucose** that was **reabsorbed or secreted**.

$$\text{amount excreted} = \text{FL} - \text{amount reabsorbed}$$

$$\text{amount reabsorbed} = \text{FL} - \text{amount excreted}$$

$$= 360 \text{ mg/min} - 40 \text{ mg/min}$$

$$= \boxed{320 \text{ mg/min}}$$