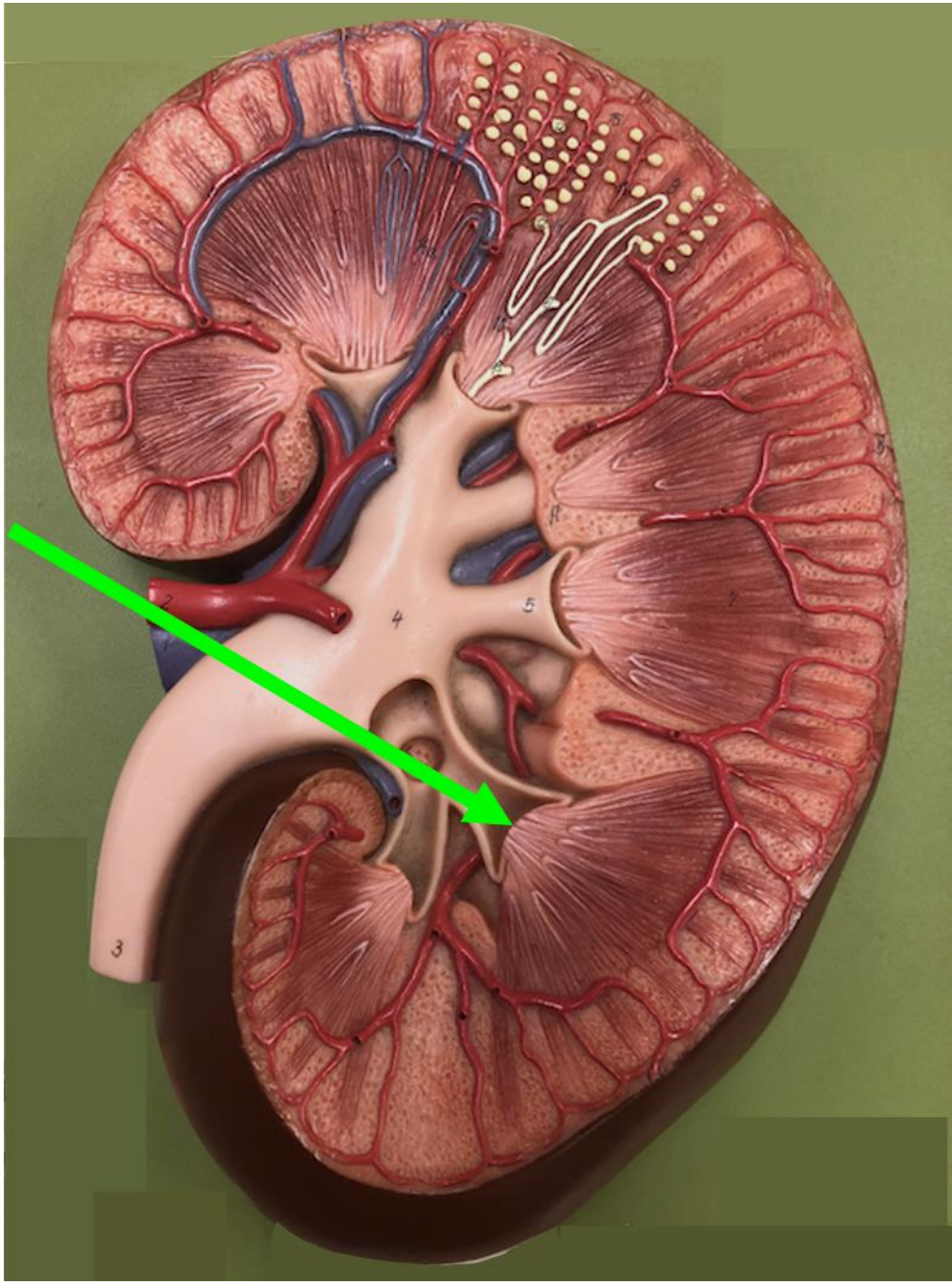
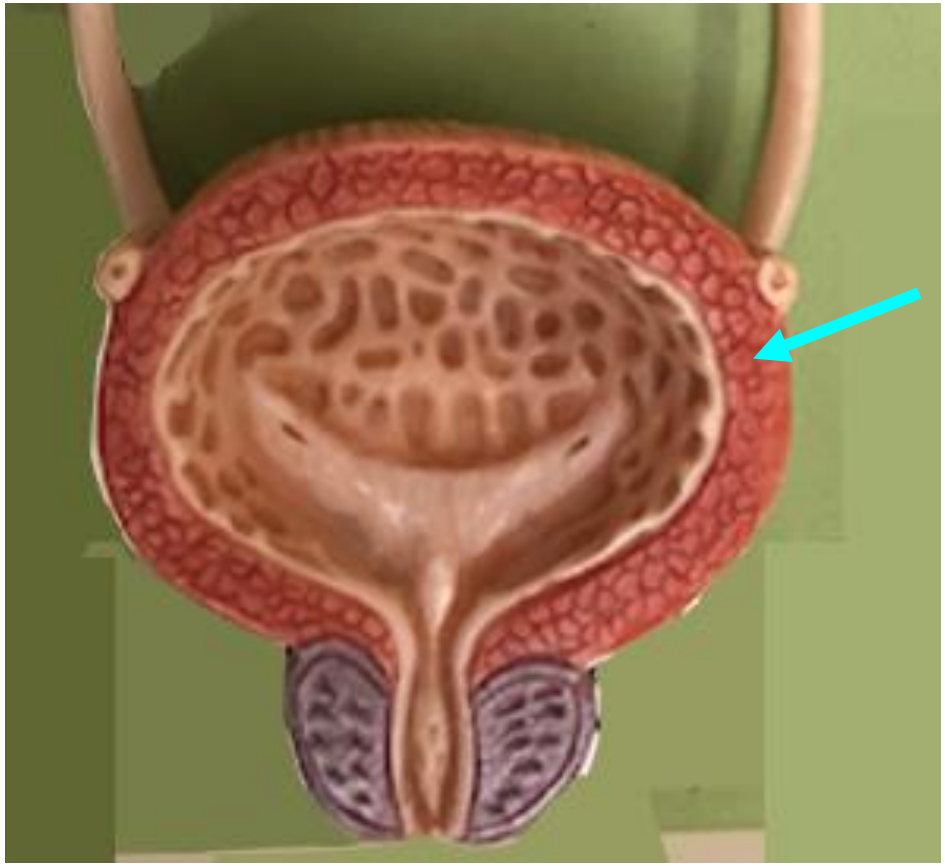
Quiz Section Test 5-AA
Answers are given in red.

1. Name the structure shown by the arrow.

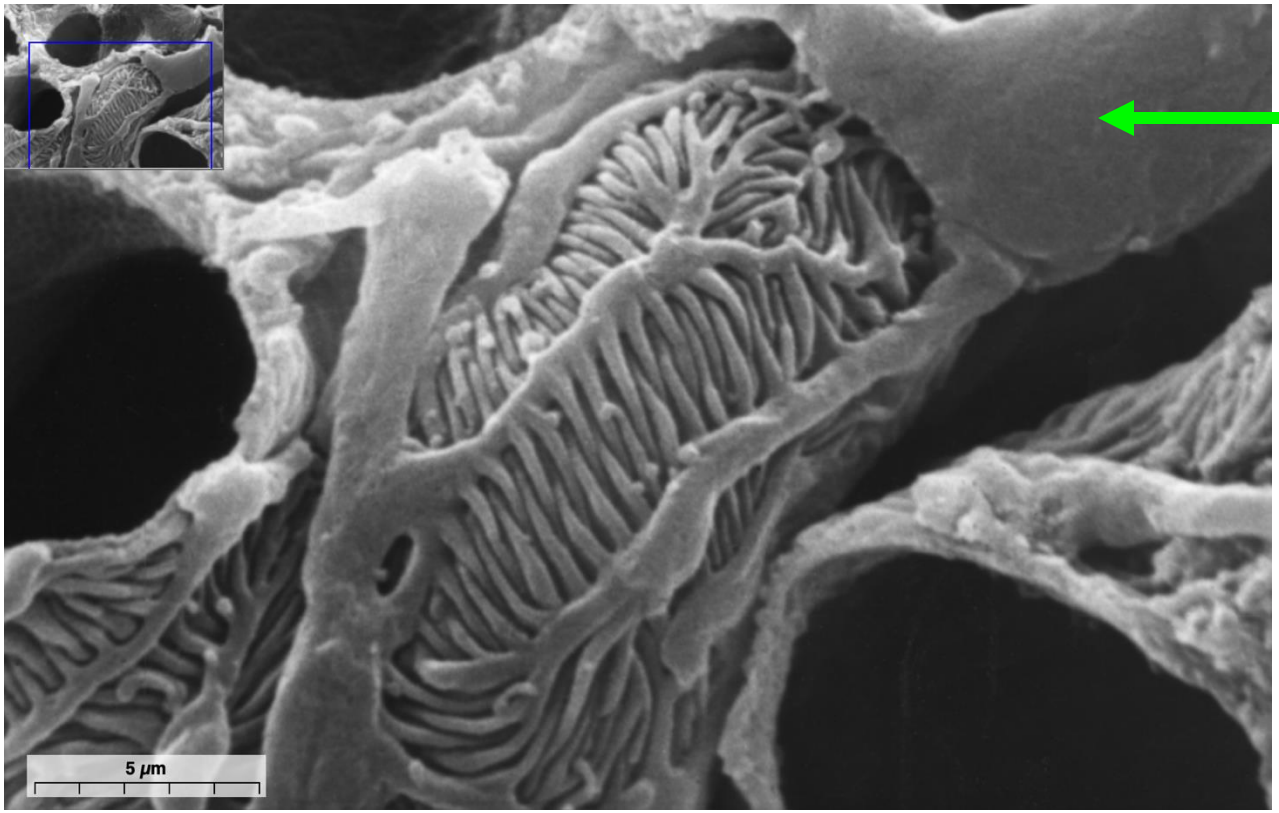
papilla





2. Name the muscle shown by the arrow.

detrusor



3. What is indicated by the arrow?

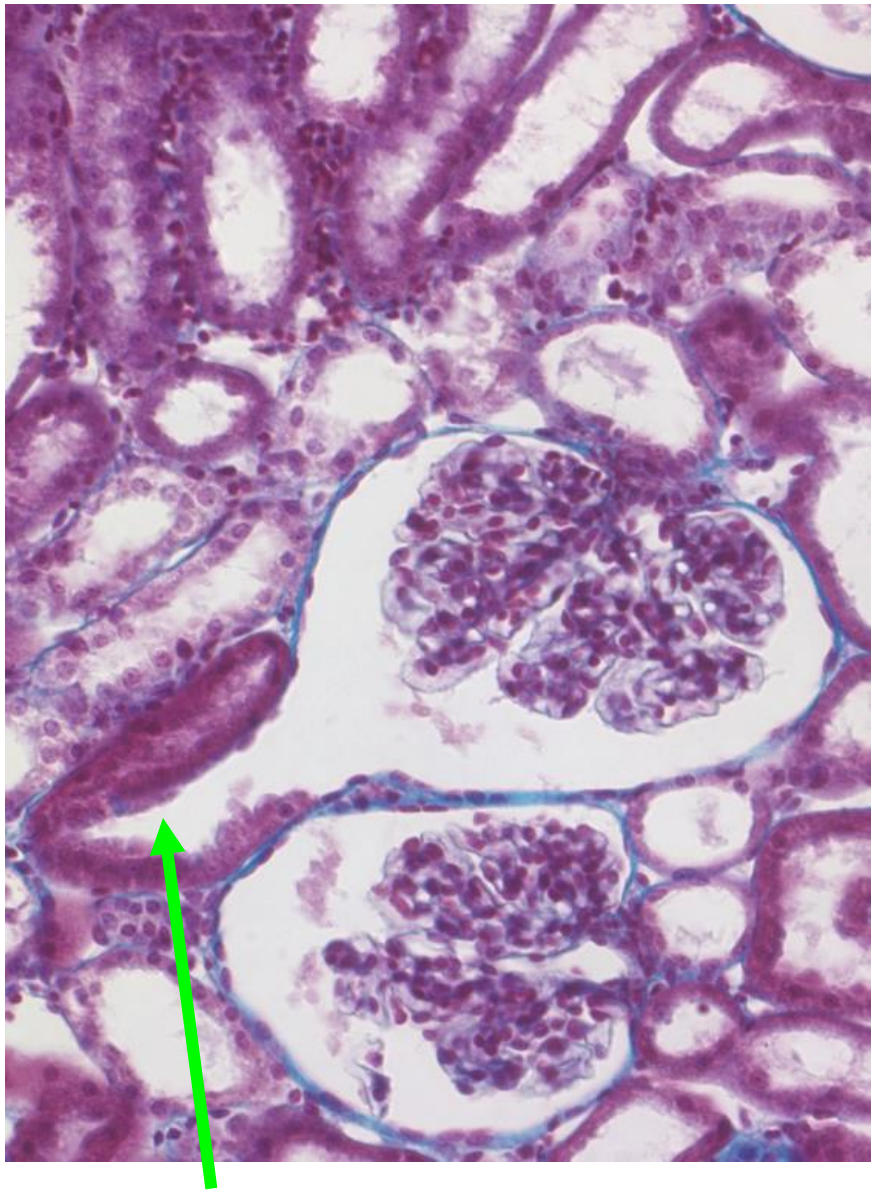
a. proximal tubule

b. podocyte

c. collecting duct

d. distal tubule

e. uroepithelium



4. 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

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.

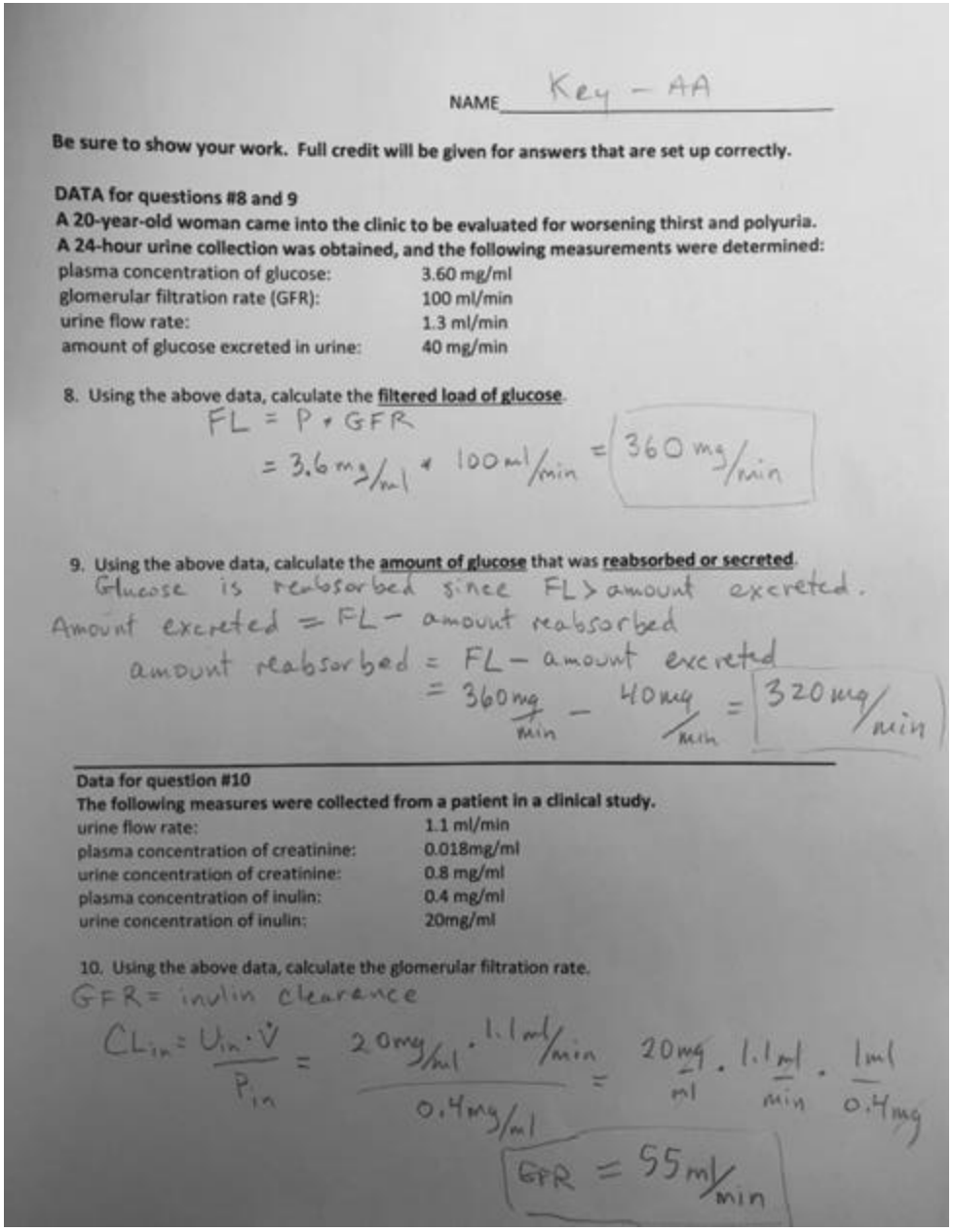
6. Vasopressin is a hormone that is secreted by neurosecretory cells at the posterior pituitary. In what part of the brain are the cell bodies of vasopressin-secreting cells located?

hypothalamus

7. In a patient with chronic kidney disease, which of the following increases?

a. plasma inulin concentration
b. glomerular filtration rate
c. creatinine clearance
d. inulin clearance
e. plasma creatinine concentration

Calculations



NAME Key – AA

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

DATA for questions #8 and 9
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:	3.60 mg/ml
glomerular filtration rate (GFR):	100 ml/min
urine flow rate:	1.3 ml/min
amount of glucose excreted in urine:	40 mg/min

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

$FL = P \cdot GFR$

$= 3.6\ mg/ml \cdot 100\ ml/min = 360\ mg/min$

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

Glucose is reabsorbed since FL > amount excreted.

Amount excreted = FL − amount reabsorbed

amount reabsorbed = FL − amount excreted

$= 360\ mg/min - 40\ mg/min = 320\ mg/min$

Data for question #10
The following measures were collected from a patient in a clinical study.

urine flow rate:	1.1 ml/min
plasma concentration of creatinine:	0.018mg/ml
urine concentration of creatinine:	0.8 mg/ml
plasma concentration of inulin:	0.4 mg/ml
urine concentration of inulin:	20mg/ml

10. Using the above data, calculate the glomerular filtration rate.

GFR = inulin clearance

$$C_{L_{in}} = \frac{U_{in} \cdot \dot{V}}{P_{in}} = \frac{20\ mg/ml \cdot 1.1\ ml/min}{0.4\ mg/ml} = 20\ \frac{mg}{ml} \cdot 1.1\ \frac{ml}{min} \cdot \frac{1\ ml}{0.4\ mg}$$

$GFR = 55\ ml/min$