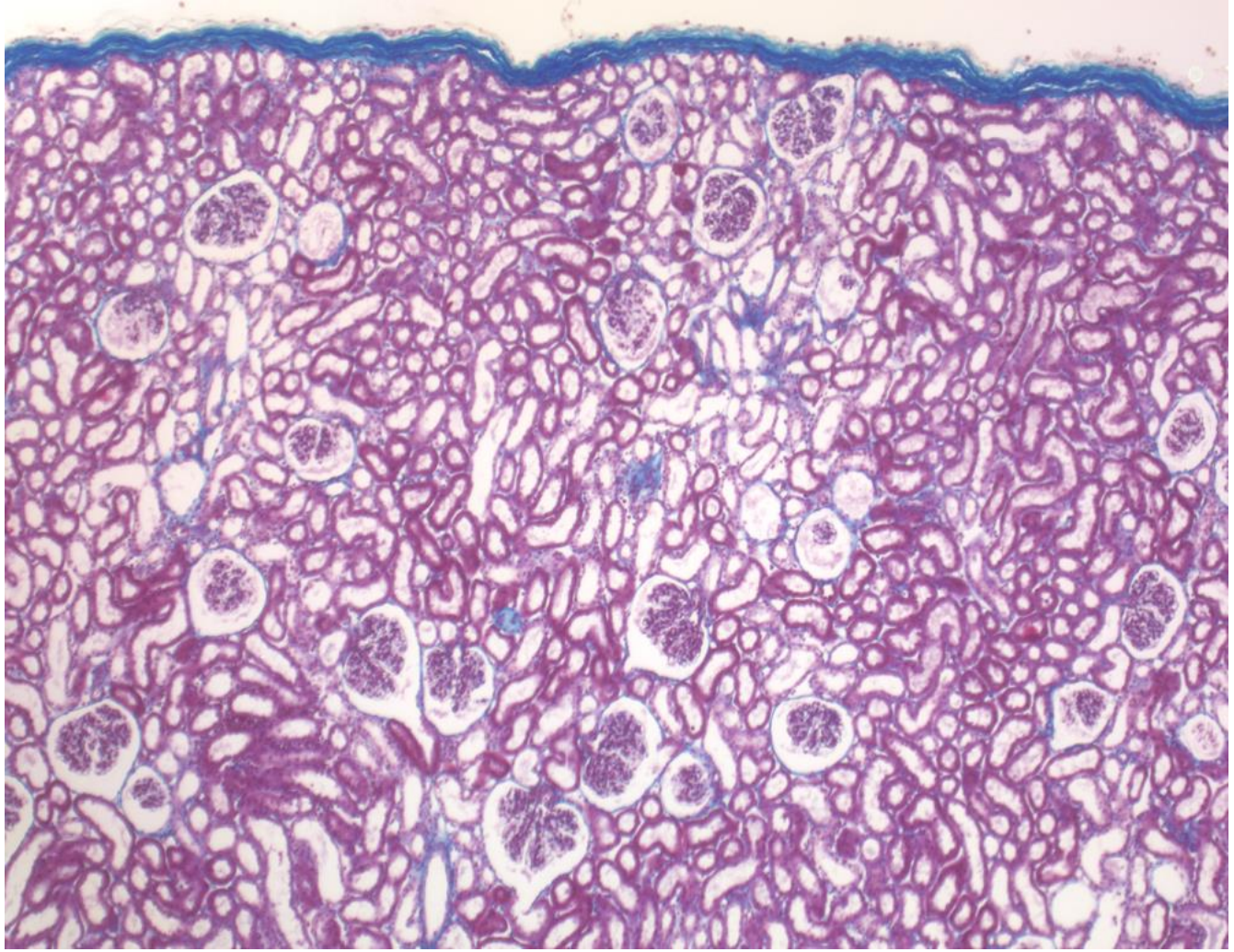
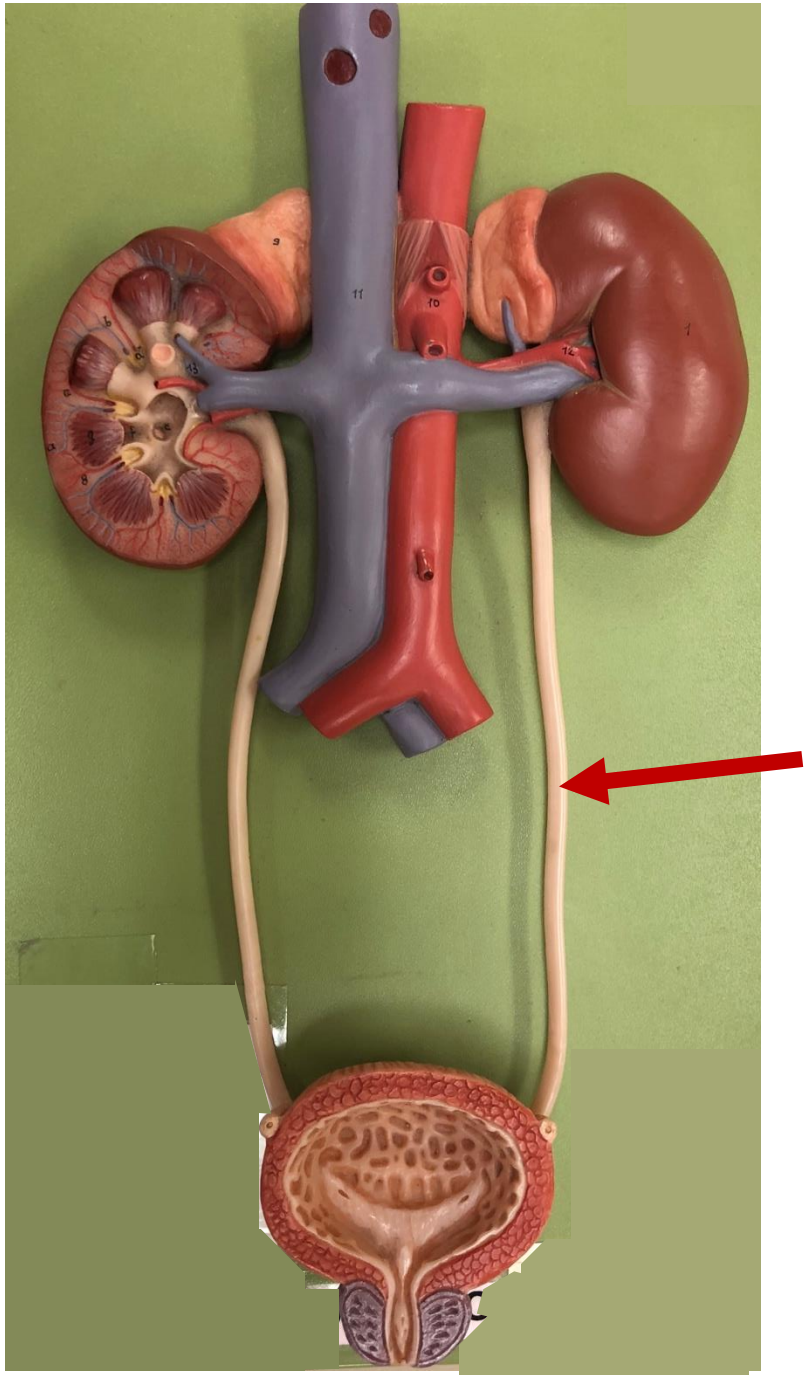
Quiz Section Test 5-AC
Answers are given in red.



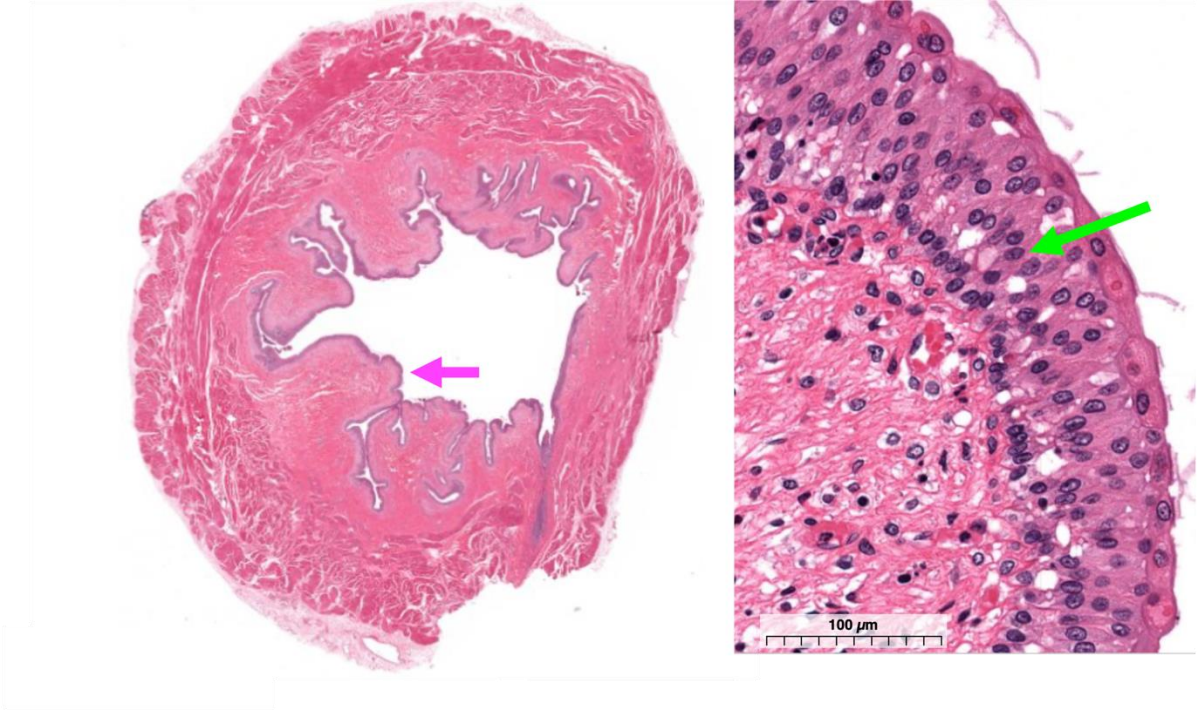
1. Name the region of the kidney shown in the picture above.

cortex



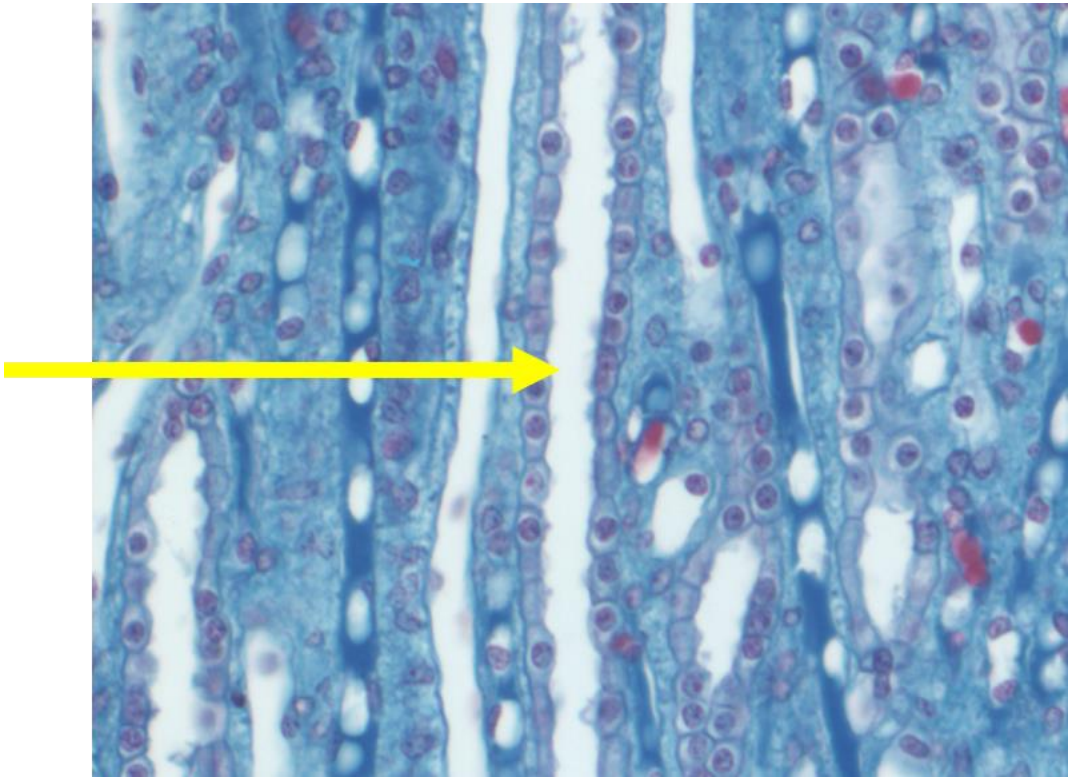
2. Name the structure indicated by the arrow.

ureter



3. The figure on the left shows a cross section through the bladder. The figure on the right is a magnified view of the area indicated by the pink arrow. Which of the following is indicated by the green arrow?

a. loose connective tissue
b. detrusor muscle
c. glomerulus
d. uroepithelium
e. stratified squamous keratinized epithelium



4. Which of the following occurs in the part of the nephron indicated by the arrow?

a. blood flow
b. secretion of vasopressin
c. regulated water reabsorption
d. reabsorption of glucose
e. filtration

5. Which of the following increases the urinary excretion of glucose?

a. hypertension
b. diet soda
c. treatment with desmopressin
d. treatment with an SGLT2 inhibitor
e. diabetes insipidus (AVP-D or AVP-R)

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. Proteinuria indicates damage in which specific part of the nephron?

a. loop of Henle
b. glomerulus
c. collecting duct
d. proximal tubule
e. distal tubule

Calculations

NAME Key - AC

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

DATA for questions #8-10

inulin clearance:	90 ml/min
creatinine clearance:	105 ml/min
amount of urea excreted in urine:	4.5 mg/min
urine flow rate:	1.2 ml/min
plasma urea concentration:	0.08 mg/ml
urine urea concentration:	3.75 mg/ml

8. Using the above data, calculate the **urea clearance**.

$$C_{L_u} = \frac{U_u \cdot \dot{V}}{P_u} = \frac{3.75\ mg/ml \cdot 1.2\ ml/min}{0.08\ mg/ml} = 3.75\ \frac{mg}{ml} \cdot 1.2\ \frac{ml}{min} \cdot \frac{1\ ml}{0.08\ mg}$$

$$= 56.25\ ml/min$$

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

$FL_u = GFR \cdot P_u$; GFR = inulin clearance

$$= 90\ \frac{ml}{min} \cdot 0.08\ \frac{mg}{ml} = 7.2\ mg/min$$

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

FL > amount excreted, ∴ urea is reabsorbed.

amount excreted = FL − amount reabsorbed

amount reabsorbed = FL − amount excreted = $7.2\ mg/min - 4.5\ mg/min$

$$= 2.7\ mg/min$$