

Component I: Core

Module B: Terminology, Anatomy and Physiology

Topic 11: Urinary System

Statement of Purpose

To prepare the learner with basic knowledge of the urinary system.

Student Learning Outcomes

Upon completion of this topic, the learner will be able to:

1. Spell and define key terms.
2. Explain the main functions of the urinary system.
3. Label the structures of the urinary system on an anatomical illustration.
4. Describe the structures of the urinary system.
5. Describe urine production.

Terminology

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|-----------------------------|---------------------|
| 1. Aldosterone | 17. Reabsorb |
| 2. Bladder | 18. Renal corpuscle |
| 3. Bowman's capsule | 19. Renal cortex |
| 4. Detrusor muscle | 20. Renal medulla |
| 5. Distal convoluted tubule | 21. Renal papilla |
| 6. Erythropoietin | 22. Renal pelvis |
| 7. Excrete | 23. Renal pyramid |
| 8. Filter | 24. Renal tubule |
| 9. Glomerular capsule | 25. Renal vein |
| 10. Glomerular filtration | 26. Renin |
| 11. Glomerulus | 27. Retain |
| 12. Hilum | 28. Sphincter |
| 13. Kidney | 29. Ureter |
| 14. Loop of Henle | 30. Urethra |
| 15. Micturition | 31. Uric acid |
| 16. Nephron | 32. Urine |

References

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Websites

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3. www.vivo.colostate.edu/hbooks/pathphys/digestion/
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6. www.stedmanonline.com/index.aspx
7. http://kidshealth.org/parent/general/body_basics/kidneys_urinary.html

Content Outline/Theory Objectives	Suggested Learning Activities
<p>Objective 1 Spell and define key terms.</p> <ul style="list-style-type: none"> A. Review the terms listed in the terminology section. B. Spell the listed terms accurately. C. Pronounce the terms correctly. D. Use the terms in their proper contexts. 	<ul style="list-style-type: none"> A. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman and concentration. B. Administer vocabulary pre-test and post-test. C. Discuss learning gaps and plan for applying vocabulary.
<p>Objective 2 List the main functions of the urinary system.</p> <ul style="list-style-type: none"> A. Filters blood to remove waste products. B. Reabsorbs essential ingredients. C. Maintain fluid and electrolyte balance. D. Assists in maintaining acid base balance. E. Kidneys secrete a hormone, erythropoietin, which stimulates the production of red blood cells. 	<ul style="list-style-type: none"> A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.
<p>Objective 3 Label the structures of the urinary system on an anatomical illustration.</p> <ul style="list-style-type: none"> A. Kidneys <ul style="list-style-type: none"> 1. Renal pyramid. 2. Renal papilla. 3. Hilum. 4. Renal artery. 5. Renal vein. 6. Renal pelvis. 7. Cortex. B. Ureters. C. Bladder. D. Urethra. 	<ul style="list-style-type: none"> A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.
<p>Objective 4 Describe the structures of the urinary system.</p> <ul style="list-style-type: none"> A. Kidneys <ul style="list-style-type: none"> 1. Responsible for removing metabolic waste products from the blood. 2. Secrete a hormone, erythropoietin, which helps to regulate red blood cell production. 3. Secretes the hormone renin, which helps to regulate blood pressure. B. Nephron <ul style="list-style-type: none"> 1. Microscopic functional unit of the kidney, responsible for filtering waste products from the blood. 2. Main structures <ul style="list-style-type: none"> a. Bowman’s capsule. b. Glomerulus. 	<ul style="list-style-type: none"> A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.

<ul style="list-style-type: none"> c. Proximal convoluted tubule. d. Loop of Henle. e. Distal convoluted tubule. f. Collecting ducts. <ul style="list-style-type: none"> 3. There are a million nephrons in each kidney. 4. Funnel shaped with a single coiled tube that twists into various shapes. 5. Bowman's capsule surrounds the glomerulus a group of capillaries responsible for filtering the blood. 	
<p>Objective 5 Describe urine production.</p> <ul style="list-style-type: none"> A. Glomerular filtration <ul style="list-style-type: none"> 1. Blood enters the glomerulus through an afferent arteriole. 2. Flows through glomerular capillaries and leaves through the efferent arteriole. 3. Glomerular filtration depends on filtration pressure which is the amount of pressure of the afferent and efferent arteriole. 4. Filtration pressure is dependent on blood pressure <ul style="list-style-type: none"> a. When blood pressure is too low filtration will not occur. b. When blood pressure is high damage can occur. B. Tubular Reabsorption <ul style="list-style-type: none"> 1. Glomerular filtrate flows into the proximal convoluted tubule. 2. Water, nutrients and ions are needed by the body so these are reabsorbed. 3. Water reabsorption, 99% of filtrate returned to bloodstream. C. Urine composition <ul style="list-style-type: none"> 1. The final solution that reaches the collecting ducts of the kidneys is urine. 2. Urine contains water, urea, uric acid, trace amounts of amino acids and various ions. D. Ureters <ul style="list-style-type: none"> 1. Long muscular tubes that carry urine from the kidney to the urinary bladder. 2. Propel urine toward the bladder through peristalsis. E. Urinary Bladder <ul style="list-style-type: none"> 1. Expandable organ that is located in the pelvic cavity. 2. Lined with muscles. 3. Micturition – urination <ul style="list-style-type: none"> a. Stimulated by the distention of the bladder as it fills with urine. 	<ul style="list-style-type: none"> A. Lecture/Discussion B. Assigned Readings C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.

<ul style="list-style-type: none">b. Detrusor muscle (lining the bladder) contracts.c. Internal urethral sphincter opens.d. When the sphincter opens, a person feels the urge to urinate.e. External sphincter opens voluntarily. <p>F. Urethra is the tube that moves urine from the bladder to the outside the body.</p>	
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