

Bölüm 8

ÜRİNER SİSTEMİN FİZYOLOJİSİ

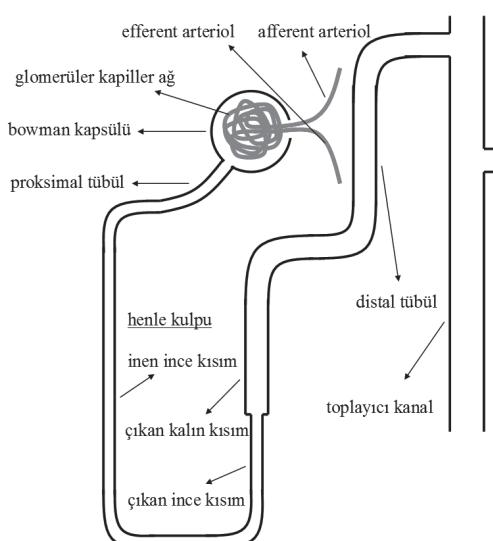
Tanju KETEN¹
Güven ERBAY²

RENAL FİZYOLOJİ

Kalp debisinin yaklaşık %20'sini alan böbreklerin temel görevi idrar oluşturmaktır. İdrar ile vücutta dışarıdan alınan veya metabolizma sonucu vücutta oluşan artık maddeler uzaklaştırılırken vücutun su ve elektrolit dengesi de düzenlenir (1).

Böbreklerin idrar üretiminin yanında, renin salgılayarak arteriyel kan basıncının düzenlenmesi, eritropoietin salgılayarak eritrosit yapımının uyarılması, D vitamininin aktif formuna dönüştürülmesi ve glukoneogenez gibi endokrin fonksiyonları da bulunmaktadır (2,3,4).

Böbreklerde idrarın üretildiği en küçük fonksiyonel üniteye **nefron** adı verilir. İki böbrekte toplam iki milyon nefron bulunmaktadır. Her bir nefron; glomerül, proksimal tübül, henle kulpu, distal tübül ve toplayıcı kanallardan oluşur (Şekil-1: Nefronun yapısı).



Şekil-1:Nefronun yapısı

¹ Operatör Doktor, Niğde Ömer Halisdemir Üniversitesi Tıp Fakültesi Üroloji Kliniği, e-mail: tanjuketen@gmail.com

² Operatör Doktor, Niğde Ömer Halisdemir Üniversitesi Tıp Fakültesi Üroloji Kliniği, e-mail: drguven85@hotmail.com

KAYNAKÇA

1. Dworkin LD, Sun AM, Brenner BM. (2000). The renal circulations. In Brenner BM (Eds), *Brenner and Rector's The Kidney*, (6th ed., pp. 277–318). Philadelphia: WB Saunders.
2. Monti G., The Renal Control of Hemopoiesis:Erythropoietin. *Policlinico Med.* 1963 Dec;70:307-23.
3. Midgett RJ, Spielvogel AM, Coburn JW, et al. Studies on calciferol metabolism. VII. The renal production of the biologically active form of vitamin D, 1,25-dihydroxycholecalciferol; species, tissue and subcellular distribution. *J Clin Endocrinol Metab.* 1973 Jun;36(6):1153-61.
4. Krebs HA. Renal Gluconeogenesis. *Adv Enzyme Regul.* 1963;1:385-400.
5. Deen WM. What determines glomerular capillary permeability? *J Clin Invest.* 2004 Nov;114(10):1412-4.
6. Osterby R. Structural changes in the diabetic kidney. *Clin Endocrinol Metab.* 1986 Nov;15(4):733-51.
7. Maddox DA, Brenner BM. (2000). Glomerular ultrafiltration. In Brenner BM (Eds), *Brenner and Rector's The Kidney*, (6th ed., pp. 319–374). Philadelphia: WB Saunders.
8. Cupples WA, Braam B. Assessment of renal autoregulation. *Am J Physiol Renal Physiol.* 2007 Apr;292(4):F1105-23.
9. Arendshorst WJ, Navar LG. (1992). Renal circulation and glomerular hemodynamics. In Schrier RW, Gottschalk CW (Eds), *Diseases of the Kidney*. (5th ed., pp 65-117). Boston: Little-Brown.
10. Schuster VL, Seldin DW. (1992). Renal clearance. In Seldin DW, Giebisch G (Eds), *The kidney: physiology and pathophysiology*. (2nd ed., pp. 943-978). New York: Raven
11. Levey AS, Madaio MP, Perrone RD. (1991). Laboratory assessment of renal disease: Clearance, urinalysis and renal biopsy. In Brenner BM, Rector FC (Eds), *The Kidney*. (4th ed., pp 919-968). Philadelphia: WB Saunders.
12. Moe OW, Berry CA, Rector FC Jr. (2000). Renal transport of glucose, amino acids, sodium, chloride and water. In Brenner BM (Eds), *Brenner and Rector's The Kidney*. (6th ed., pp. 375–416) Philadelphia: WB Saunders.
13. Moore LC, Marsh DJ. How descending limb of Henle's loop permeability affects hypertonic urine formation. *Am J Physiol.* 1980 Jul;239(1):F57-71.
14. Rocha AS, Kokko JP. Sodium chloride and water transport in the medullary thick ascending limb of Henle. Evidence for active chloride transport. *J Clin Invest.* 1973 Mar;52(3):612-23.
15. Imbert-Teboul M, Chabardès D, Montégut M, et al. Vasopressin-dependent adenylate cyclase activities in the rat kidney medulla: evidence for two separate sites of action. *Endocrinology.* 1978 Apr;102(4):1254-61.
16. Elalouf JM, Di Stefano A, de Rouffignac C. Sensitivities of rat kidney thick ascending limbs and collecting ducts to vasopressin in vivo. *Proc Natl Acad Sci U S A.* 1986 Apr;83(7):2276-80.
17. Laragh JH, Sealey JE. (1992). The renin-angiotensin-aldosterone system and the renal regulation of sodium, potassium, and blood pressure homeostasis. In Windhager EE (Eds), *Handbook of Renal Physiology*. (pp 1409-1541) New York: Oxford University Press.
18. Edwards RM. Segmental effects of norepinephrine and angiotensin II on isolated renal microvessels. *Am J Physiol.* 1983 May;244(5):F526-34.
19. Hall JE, Guyton AC. Guyton and hall textbook of medical physiology. (12th ed.) New York: WB Saunders.
20. Cogan MG, Rector FC Jr. (1991). Acid-base disorders. In Brenner BM, Rector FC (Eds), *The Kidney*, (4th ed., pp 737-804). Philadelphia: WB Saunders.
21. Lang RJ, Ezintaris B, Teele ME, et al. Electrical basis of peristalsis in the mammalian upper urinary tract. *Clin exp pharmacol physiol.* 1998 May;25(5):310-21.
- 22: McLeod DG, Reynolds DG, Swan KG. Adrenergic mechanisms in the canine ureter. *Am J Physiol.* 1973 May;224(5):1054-8.
23. Dellabella M, Milanese G, Muzzonigro G. Efficacy of tamsulosin in the medical management of juxtavesical ureteral stenoses. *J Urol.* 2003 Dec;170(6 Pt 1):2202-5.
24. Phadnis S, Garg SK, Shah MA, et al. Histamine H₂ receptor mediated relaxation of buffalo (*Bubalus bubalis*) ureter. *Indian J Exp Biol.* 1995 Jan;33(1):41-3.
25. Lowry PS, Jerde TJ, Bjorling DE, et al. Obstruction alters the effect of prostaglandin E2 on ureteral contractility. *J Endourol.* 2005 Mar;19(2):183-7.
26. Burdyga T, Lang RJ. Excitation-Contraction Coupling in Ureteric Smooth Muscle: Mechanisms Driving Ureteric Peristalsis. *Adv Exp Med Biol.* 2019;1124:103-119. doi: 10.1007/978-981-13-5895-1_4.
27. Bonner TI. New subtypes of muscarinic acetylcholine receptors. *Trends Pharmacol Sci.* 1989 Dec;Suppl:11-5.
28. Hegde SS, Choppin A, Bonhaus D, et al. Functional role of M₂ and M₃ muscarinic receptors in the urinary bladder of rats in vitro and in vivo. *Br J Pharmacol.* 1997 Apr;120(8):1409-18.
29. Anderson KE. Pharmacology of lower urinary tract smooth muscles and penile erectile tissues. *Pharmacol Rev.* 1993. Sep;45(3):253-308. Review.
30. Blok BF, Holstege G. Ultrastructural evidence for a direct pathway from the pontine micturition center to the parasympathetic preganglionic motoneurons of the bladder of the cat. *Neurosci Lett.* 1997 Feb 7;222(3):195-8.