

# DIURETICS AND DRUGS AFFECTING RENAL FUNCTION, WATER AND ELECTROLYTE METABOLISM (5.0)

## Subcommittee:

<u>NAME</u>	<u>SCHOOL</u>
Jack W. Strandhoy (Chair)	Wake Forest Univ. Sch. of Med. <a href="mailto:jstrand@wfubmc.edu">jstrand@wfubmc.edu</a>
C. Paul Bianchi	Thomas Jefferson Univ. Sch. Med.
David Loose-Mitchell	Univ. of Texas Med. Sch. at Houston

## 1. Review of Renal Physiology/Biochemistry (2)

## 2. Diuretics (2)

### a. Principles and knowledge objectives:

- 1) List the major transporters and ion channels involved in renal electrolyte transport. Describe their locations on the nephron and changes that occur when specific diuretic drugs inhibit each one.
- 2) Explain the importance of the organic anion transport system and protein binding to the renal action of diuretics. Provide examples of how other drugs or diseases can interfere with the effects of diuretics.
- 3) Describe the renal and extrarenal mechanisms by which diuretics are useful in treating hypertension and edema due to cardiac, endocrine, hepatic, pulmonary or renal dysfunction. List appropriate drugs to be used in each condition, including contraindications and limitations. Explain when using combined diuretics may be useful.
- 4) Explain the consequences of diuretic therapy on alterations in glucose, lipids, urate, calcium, magnesium and potassium. Where possible, describe the underlying mechanism causing the adverse effect.
- 5) Explain the mechanism by which the thiazide and loop diuretics can cause a metabolic alkalosis.
- 6) Explain how dopamine and mannitol increase renal blood flow and urine flow. Describe their role in the prevention and treatment of acute renal failure and toxic nephropathy.
- 7) Describe the clinical consequences of interactions between diuretics and drugs such as cardiac glycosides, oral hypoglycemics, uricosurics, aminoglycosides, amphotericin B, NSAIDs and ACE inhibitors.

### 3. Agents Affecting the Renal Conservation of Water (1)

#### a. Principles and Knowledge Objectives:

- 1) Describe the roles of vasopressin, aquaporins,  $V_1$  and  $V_2$  receptors, cyclic AMP, and prostaglandins in regulating renal epithelial water permeability. Provide examples by which drugs interact with these components to affect water reabsorption.
- 2) Compare and contrast the therapy of central and nephrogenic diabetes insipidus.
- 3) Describe the mechanisms by which demeclocycline and lithium carbonate interfere with renal water permeability. Describe the treatment of water intoxication due to the syndrome of inappropriate ADH secretion.
- 4) Explain how diuretic therapy can lead to hyponatremia.
- 5) Outline the extrarenal uses of vasopressin.