The need of a uniform drug classification in text books of pharmacology

Sir,

Pharmacology is the study of drugs. A drug can be defined as a chemical substance of known structure, other than a nutrient or an essential dietary ingredient, which, when administered to a living organism, produces a biological effect. Thus, substances such as heroin, marijuana, cocaine, or insecticides can be classified as drugs. However, the term drug commonly means any medication that is used for diagnosing, curing, or treating disease. In its beginnings, before the advent of synthetic organic chemistry, pharmacology concerned itself exclusively with understanding the effects of natural substances, mainly plant extracts. Beginning in the 20th century, synthetic chemistry began to revolutionize the pharmaceutical industry. Many of the drugs that once were obtained from plants and animals are now chemically synthesized in laboratories. The receptor concept and the technologies developed from it have had a massive impact on drug discovery and therapeutics. In addition, advances in molecular biology and gene therapy have generated new types of drugs such as monoclonal antibodies.

As and when a new drug is discovered/invented, the task of every scientist lies in its placement under a class. Drugs are being classified on the basis of:

- Chemical nature of drug: For example, glycoside, alkaloid, steroid
- Symptoms or diseases in which they are used: For example, anti-hypertensive, anti-malarial, anti-tubercular, or anti-epileptic agents
- Organ system affected: Alimentary, cardiovascular, respiratory, nervous, etc.
- Generations: Anti-microbials such as cephalosporins and oral hypoglycemic agents such as sulfonylureas and H1 anti-histaminic drugs
- Receptor theory: Cholinoreceptor agents, adrenoceptor agents, serotonin receptor agents, dopamine receptor agents, etc.
- Duration of action: Ultra-short acting, short acting, intermediate acting, long acting, ultra-long acting agents
- Route of administration: Inhaled beta-agonists, inhaled steroids, oral hypoglycemic agents, etc.

Here I would like to present an example of different ways adopted in classifying “Diuretics” in four standard pharmacology text books [Table 1].

Diuretics are not the only group of drugs being classified in this way. In the Anatomical Therapeutic Chemical classification

Table 1: Classification of diuretics

| Goodman and Gilmans “The Pharmacological Basis of Therapeutics” - 12th edition | Katzung Basic and Clinical Pharmacology - 12th edition | Tripathi “Essentials of Medical Pharmacology” - 7th edition | Sharma and Sharma “Principles of Pharmacology” - 2nd edition |
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| Inhibitors of CA (proximal tubule) Osmotic diuretics (loop of Henle) Inhibitors of Na⁺-K⁺-2Cl⁻ symport (thick ascending limb) Inhibitors of Na⁺-Cl⁻ symport (distal convoluted tubule) Inhibitors of renal epithelial Na⁺ channels (late distal tubule, collecting duct) Antagonists of mineralocorticoid receptors (late distal tubule, collecting duct) | CA inhibitors Loop diuretics Thiazides Potassium-sparing diuretics Agents that alter water excretion (aquaretics) Osmotic diuretics Antidiuretic hormone antagonists[1] | High efficacy diuretics (inhibitors of Na⁺-K⁺-2Cl⁻ co-transport): Sulfamoyl derivatives (loop diuretics) Medium efficacy diuretics (inhibitors of Na⁺-Cl⁻ symport) Benzothiadiazines (thiazides) Thiazide like (related heterocyclics) Weak or adjunctive diuretics CA inhibitors Potassium-sparing diuretics Aldosterone antagonists Inhibitors of renal epithelial Na⁺ channel Osmotic diuretics[2] | Diuretics acting directly on different segments of nephron Those acting on the thick ascending loop of Henle Loop diuretics/high ceiling diuretics Those acting on the proximal (early) part of the distal tubule Thiazide group Chemically related variants Those acting on collecting ducts and tubules K⁺-sparing diuretics Aldosterone Receptor antagonists at distal (later) part of the distal tubule and collecting tubule K⁺-sparing diuretics Diuretics acting indirectly by modifying the contents of urinary filtrate Osmotic diuretics Weak diuretics which mainly have nondiuretic use CA inhibitors[3] |

CA=Carbonic anhydrase

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system, developed by Norwegian researchers in accordance with policies determined by the World Health Organization, diuretics are classified as:

- Low-ceiling diuretics, thiazides
- Low-ceiling diuretics, excluding thiazides
- High-ceiling diuretics
- Potassium-sparing agents
- Other diuretics.

Thus a discrepancy exists in the classification of drugs as adopted by different authors. Information from various available literature sources is reproduced in the text books in the form that is easy to understand. Information in a text book can be more or less dependent upon author’s ability to review the literature. Drug classification is an important component of pharmacology, since it gives a clear, concise introduction to the reader. In a country where students are graded based on their ability to write descriptive answers, students may find it difficult to remember different ways of classifying the same class of drugs. It is therefore suggested that the authors of text books must adopt a uniform universally acceptable method of classification of drugs for better comprehension and recall.

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Conflicts of Interest
There are no conflicts of interest.

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