Phcy 402: Foundations of BioMolecular Sciences II

School of Pharmacy

This course is the second semester of a two-semester sequence that integrates the underlying principles of medicinal and natural products chemistry, pharmacology, and toxicology required to develop a detailed understanding of disease processes, natural products and natural product-based drug discovery, chemotherapeutic treatment options for infectious disease, drug associated side effects, and related drug and toxicological considerations. This second semester presents an overview of natural product drugs that derive from natural sources, provides detailed coverage of antimicrobial chemotherapy for the treatment of bacterial and fungal infections, describes important aspects of herbal medicine and alternative medical practices, and introduces principles in pharmaceutical and environmental toxicology. This course integrates the following aspects of biomolecular sciences: Basic Biomedical Sciences Molecular Biology/Genetics Relate the action of antibiotics to processes involved in replication, transcription, and translation of genetic information, describing the basis for selective inhibition of microbial processes over mammalian processes. Genetic factors in microbial resistance to antibiotics Pharmaceutical Sciences Medicinal Chemistry Physico-chemical properties of drug molecules in relation to drug absorption, distribution, metabolism, and excretion (ADME) of antimicrobial agents Chemical basis of antibiotic pharmacology and therapeutics Structural and chemical features of antimicrobial agents to enhance their effects in otherwise antibiotic resistant microbes Pharmacology Principles of antimicrobial therapy Mechanism(s) of action of drugs in various categories Role of pharmacology in drug choice and the treatment of infectious disease Mechanisms of microbial resistance to antimicrobial agents Adverse effects and side effects of anti-infective agents Antibiotic drug-target interactions Antimicrobial synergism and antagonism Drug-drug, drug-food, drug-lab test interactions Natural product and antimicrobial drug discovery and development Pharmacognosy and Alternative and Complementary Treatments Concepts of crude drugs, semi-purified, and purified natural products Variability of occurrence of pharmacologically active substances in plants and impact on regulatory aspects of herbal products Overview of classes of pharmacologically active natural products Natural and synthetic anti-infective agents Dietary supplements and probiotics 2 Alternative medical treatments Evaluation of alternative and complementary medicine (i.e., herbals and botanical dietary supplements) purity, bioavailability, safety, and efficacy Herbal (botanical)-drug interactions Dietary Health Supplement and Education Act and impact on regulation of dietary supplements and herbal products Pharmaceutical and Environmental Toxicology Drug-induced mitochondrial dysfunction and mitochondrial liability in drug development Overview of occupational and environmental toxicology Toxicity of lead, mercury, and heavy metals Utilization of chelators Managing poisoned patients

3 Credits

Prerequisites

- Pre-Requisite: 24 Earned Hours

Instruction Type(s)

- Lecture: Lecture for Phcy 402

Subject Areas

- Pharmaceutical Marketing and Management

Related Areas

- Clinical and Industrial Drug Development (MS, PhD)
- Industrial and Physical Pharmacy and Cosmetic Sciences (MS, PhD)
- Medicinal and Pharmaceutical Chemistry
- Natural Products Chemistry and Pharmacognosy (MS, PhD)
- Pharmaceutical Sciences
- Pharmaceutics and Drug Design (MS, PhD)
- Pharmacoeconomics/Pharmaceutical Economics (MS, PhD)
- Pharmacy (PharmD - USA - PharmD, BS/BPharm - Canada)
- Pharmacy Administration and Pharmacy Policy and Regulatory Affairs (MS, PhD)
- Pharmacy, Pharmaceutical Sciences, and Administration, Other