

Bridges: A History of the World's Most Spectacular Spans

Pharmacology is the scientific study of the effects of drugs and chemicals on living organisms where a drug can be broadly defined as any chemical substance, natural or synthetic,

which affects a biological system. Pharmacology may involve how organisms handle drugs, identification and validation of new targets for drug action, and the design and development of new drugs to prevent, treat and cure disease.

Pharmacology research is also a critical component in the development of modern 'personalized medicine'.

There are many sub-specialties within the general discipline of pharmacology. Pharmacodynamics is the study of the effects of drugs on biological systems and specifically addresses the chemical properties and physiological and behavioral effects of drugs arising from their interaction with molecular targets such as receptor proteins or enzyme systems. In contrast, pharmacokinetics is the study of what biological systems do to the drug and encompasses investigations of drug absorption, distribution, biotransformation and excretion, essential information for the design of drug treatment schedules in different patient populations and experimental animals, and for the prediction of drug-drug interactions that may enhance or compromise the effectiveness and safety of t

therapeutic agents.

Pharmacologists require sound basic knowledge of physiology, biochemistry, cell biology and molecular biology upon which to build their specialized knowledge and experimental

approaches for the investigation of novel aspects of drug action. Such studies may occur at various levels, including molecular interactions, cellular and subcellular signal transduction processes, tissue and organ regulation, as well as integrated physiological or behavioral responses in intact organisms. The knowledge acquired facilitates the development of new drugs and contributes to rational therapeutics that involves the safe and effective use of drugs for therapeutic benefit. Also, this interdisciplinary knowledge offers pharmacologists a unique perspective on a wide range of biomedical issues and enhances employment opportunities in many areas of scientific investigation.

While pharmacologists are trained as laboratory researchers, pharmacists usually work in a hospital or retail pharmacy and are concerned with the preparation, dispensing, dosage, and the safe and effective use of therapeutic agents.

Reference

[Engineering in the Confederate Heartland](#)

[Engineering Eden: A Violent Death, a Federal Trial, and the Struggle to Restore Nature in Our National Parks](#)