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Perspective

What is Neuropharmacology?

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DESCRIPTION

Neuropharmacology is a field of research dealing with drugs that affect the nervous system. It focuses on the development of compounds that may benefit individuals suffering from neurological or psychiatric disorders. Therefore, this area requires in-depth knowledge of how the nervous system functions, how each drug acts on neural circuits, changes the behavior of cells, and ultimately the behavior of living organisms. Neuropharmacology itself only appeared 50 years ago, and before that, there were only four neuropathy drugs: morphine, caffeine, nitrous oxide, and aspirin. Over the next 50 years, new drugs such as antihistamines, barbiturates, and opioid analogs have emerged. With modern knowledge of the molecular basis of the action of many drugs and the availability of current research methods, research is being conducted to understand how the brain functions at the molecular and cellular levels. This includes understanding drug delivery to the brain and the role of genetic variation in drug responses between individual patients to achieve personalized treatment of nervous system disorders.

KEY POINTS

• To understand the effects of drugs in the brain, we need to integrate our knowledge of the effects of drugs on molecules and cells with their effects on brain circuits

• The clinical effects of drugs in the brain are often due to neuroplasticity, the long-term adaptation of neurons to the sustained short-term effects of the drug.

• The binding of a drug to a particular target is usually saturable and stereoselective.

• The specific binding of a drug to a target is quantified according to its affinity for the target and is expressed as the dissociation constant (Kd) and the total amount of binding (Bmax).

• Drug efficacy represents the strength of the bond between the drug and its target. Efficacy represents the greatest biological effect that a drug exerts by binding to its target.

• Drugs can be classified as agonists, partial agonists, inverse agonists, partial inverse agonists, or antagonists.

• Modern neuropharmacology utilizes tools in molecular biology, genetics, and cell biology, as well as combinatorial chemistry used to create new molecules that can function as new drugs.

• Functional genomics and proteomics help identify new drug discovery targets.

• Pharmacogenomics guides drug treatment choices based on a person's genetic constitution.

APPLICATIONS OF NEUROPHARMACOLOGY

Drugs that act on the nervous system have the following effects:

• Fighting depression

• Anti-convulsant effect

• Antihypertensive effect

• Antispasmodic effect

• Anti-Parkinson's effect

• Neuromuscular blockers used as anesthetics

• Adrenalinergic agonist and antagonist effects that provide a variety of excitatory and inhibitory effects on the cardiovascular system through direct and indirect actions on Receptors

HISTORY OF NEUROPHARMACOLOGY

Neuropharmacology only appeared in the field of science in the early 20th century when scientists gained a basic understanding of how the nervous system and nerves communicate with each other. Prior to this discovery, drugs with certain effects on the nervous system were discovered. In the 1930s, French scientists began working on a compound called phenothiazine in the hope of synthesizing a drug that could fight malaria. Although the drug has little hope of being used in people infected with malaria, it has been shown to have sedative effects as well as seemingly beneficial effects for patients with Parkinson's disease. This black box method, in which researchers administer a drug and examine the response without knowing how the effect of the drug is related to the patient's response, will be identifiable by scientists in the late 1940s and early 1950s. Until then, it was the main approach in this area. Specific nerves such as norepinephrine (involved in narrowing of blood vessels and elevated heart rate and blood pressure), dopamine (chemical deficiency associated with Parkinson's disease), serotonin (which will soon be recognized as deeply associated with depression) Transmitter [requires citation]).

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In the 1950s, scientists were also able to better measure the levels of certain neurochemicals in the body and correlate those levels with behavior. [3] The invention of the voltage clamp technique in 1949 made it possible to study ion channels and action potentials. With these two major historical events in neuropharmacology, scientists are not only about how information is transmitted from one neuron to another, but also how that neuron transfers that information within itself. I was able to study how to process it.