Neurotransmitter

Chemical substances or molecules which aid in message transmission between neurons.

Communication at the synapses between neurons relies on chemicals called neurotransmitters. Secreted from a part of one neuron (the axon) into the synaptic gap between two others, neurotransmitters diffuse across this space and combine with specific proteins on the surface of the receiving cell, triggering an electrochemical response in the target cell. Afterward, neurotransmitters are either destroyed or reabsorbed back into the neuron for storage and reuse. The release of neurotransmitters by a neuron has three main functions: 1) exciting a second neuron, thus causing it to depolarize; 2) inhibiting a second neuron, which prevents it from depolarizing; and 3) stimulating a muscle fiber to contract.

More than 50 different neurotransmitters have been identified, and more are constantly being discovered. Researchers have proposed that almost all drugs work through interaction with neurotransmitters. Important neurotransmitters include acetylcholine (ACh), which is used by motor neurons in the spinal cord; the catecholamines (including norepinephrine and dopamine), which are important in the arousal of the sympathetic nervous system; serotonin, which affects body temperature, sensory perception, and the onset of sleep; and a group of transmitters called endorphins, which are involved in the relief of pain. In recent years, it has been recognized that biochemical imbalances in the brain play an important role in mental illness. Low levels of norepinephrine characterize some varieties of depression, for example, and an imbalance of dopamine is considered a factor in schizophrenia.

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Further Reading


Further Information


Nightmares

A frightening dream that occurs during REM (rapid eye movement) sleep.

Nightmares—frightening dreams—are experienced by most everyone at one time or another. Nightmares are thought to be caused by a central nervous system response, and are related to other parasomnias such as sleepwalking.

In children, nightmares begin between the ages of 18 months and three years and increase in frequency and intensity around the ages of four and five years. Children this age have an exceptionally vivid fantasy life that carries over into their sleep. Their nightmares are typically characterized by feelings of danger and helplessness and often involve fleeing from monsters or wild animals. It is not unusual for a normal child this age to have nightmares as often as once or twice a week. The increase in nightmares among preschoolers reflects not only their capacity for vivid fantasy but also the fact that as they become increasingly active, their daily lives hold more opportunities for frightening experiences, and growing interaction with peers and siblings produces added potential for conflict and tension. Separation anxiety and exposure to frightening programs on television are additional sources of emotional turbulence.

The American Psychiatric Association’s Diagnostic and Statistical Manual (DSM-IV) recognizes an anxiety disorder characterized by persistent, severe nightmares (nightmare disorder, formerly dream anxiety disorder). Generally, nightmare disorder is found only in children who have experienced severe psychological stress.

Adults also occasionally experience nightmares. The average college student has between four and eight nightmares per year, and this figure generally drops to one or two in adults. Adults who experience excessive nightmares may be dealing with other issues, and may benefit from professional counseling.
Night terrors

Also referred to as pavor nocturnus, a childhood sleep disorder featuring behavior that appears to be intense fear.

Night terrors, known medically as pavor nocturnus, are episodes that apparently occur during the non-dreaming stages of sleep in some children. Episodes of night terrors are most common in the preschool and early school years. Night terrors usually occur within an hour or two after the child has fallen asleep, and generally do not recur with any frequency or regularity. Many children experience only one episode of night terrors, and few experience more than three or four such episodes over the whole course of childhood. A parent or caregiver witnessing an episode of night terrors, which usually lasts from ten to thirty minutes, will find the behavior unsettling. The child sits up abruptly in bed, appears to be extremely upset, cries out or screams, breathes heavily, and perspires. He or she might also thrash about, kicking, and his or her eyes may bulge out, seemingly in fear of something. The child does not wake during the episode, although his or her eyes will be open, and he or she will be unresponsive to any offers of comfort. The child falls back to sleep, and will have no memory of the occurrence. Night terrors have not been shown to have any link to personality or emotional disorders, although they may be related to a specific feeling of fear that the child has experienced, such as being startled by someone leaping at him or her from behind a chair, or the sight of someone fainting or having an accident.

Further Reading


Further Information

Association of Sleep Disorders Centers (ASDC). 602 Second Street, SW, Rochester, MN 55902 (Professional organization of specialists in sleep disorders; publishes the journal Sleep.)

Normal distribution

The common pattern of numbers in which the majority of the measurements tend to cluster near the mean of distribution.

Psychological research involves measurement of behavior. This measurement results in numbers that differ from one another individually but that are predictable as a group. One of the common patterns of numbers involves most of the measurements being clustered together near the mean of the distribution, with fewer cases occurring as they deviate farther from the mean. When a frequency distribution is drawn in pictorial form, the resulting pattern produces the bell-shaped curve that scientists call a normal distribution.

When measurements produce a normal distribution, certain things are predictable. First, the mean, median, and mode are all equal. Second, a scientist can predict how far from the mean most scores are likely to fall. Thus, it is possible to determine which scores are more likely to occur and the proportion of score likely to be above or below any given score.

Many behavioral measurements result in normal distributions. For example, scores on intelligence tests are likely to be normally distributed. The mean is about 100 and a typical person is likely to score within about 15 points of the mean, that is, between 85 and 115. If the psychologist knows the mean and the typical deviation from the mean (called the standard deviation), the researcher can determine what proportion of scores is likely to fall in any given range. For instance, in the range between one standard deviation below the mean (about 85 for IQ scores) and one deviation above the mean (about