



FACTSHEET

FUNCTION OF KEY BRAIN STRUCTURES

The Hypothalamus

It is hypothesized that Nexalin stimulates the Hypothalamus, which is a collection of specialized cells located in the lower central part of the brain. This vital area is the control center of all autonomic regulatory activities of the body. It has been said that the hypothalamus is the "brain of the brain." It is also: Important emotional center, controlling the molecules that make you feel exhilarated, angry, or unhappy. The hub for automatic (or subconscious) and endocrine homeostatic systems such as cardiovascular, temperature, and abdominal visceral regulation.

Management system for all endocrine hormonal levels, sensory processing, and organizing body metabolism.

The hypothalamus is the primary link between the endocrine and nervous systems; it appears that almost everything the hypothalamus does is related in some way to the management of the brain and body connection. Nerve cells in the hypothalamus control the pituitary gland by producing chemicals that either stimulate or suppress hormone secretions from the pituitary.

The hypothalamus is responsible for maintaining **homeostasis**, the body's regulation of its internal environment so as to maintain a stable, constant condition. To maintain homeostasis, the hypothalamus is constantly adapting to stimuli from the five senses (sight, hearing, touch, taste, smell) as well as feedback from the nervous and endocrine systems.

Once the hypothalamus is aware of a problem, how does it fix it? Essentially, there are two main outputs: neural signals to the autonomic system and endocrine signals to/through the pituitary. Again it is hypothesized that the Nexalin waveform stimulates the Hypothalamus and promotes a movement to 'Homeostasis'.

Neurochemicals

The brain produces more than 50 identified active drugs. Some of these are associated with memory, others with intelligence, still others are sedatives. Some of the neurochemicals believed to be affected by Nexalin Therapy are:

- **Endorphin** - Called the brain's painkiller, it is 3 times more potent than morphine.
- **Serotonin** - An opiate-like chemical that helps maintain a "happy feeling," and seems to help keep our moods under control.
- **Melatonin** - Produced by the pineal gland, regulates behavioral and physiological circadian rhythms. Levels of melatonin in the blood are highest prior to bedtime.
- **Dopamine** - Similar to adrenaline; it affects brain processes that control movement, emotional response, and ability to experience pleasure and pain. The brains of people with Parkinson's disease contain almost no dopamine.
- **Substance P** - In the central nervous system, is associated with the regulation of mood disorders, anxiety, stress, reinforcement, neurogenesis, neurotoxicity and pain.
- **Acetylcholine** - The first neurotransmitter ever identified, it is particularly important in the stimulation of muscle tissue. In high doses, it can cause convulsions and tremors. In deficient levels, it can contribute to motor dysfunction.

The Endocrine System

Although we rarely think about them, the glands of the endocrine system and the hormones they release influence almost every cell, organ, and function of our bodies. The endocrine system is instrumental in



regulating mood, growth and development, tissue function, and metabolism, as well as sexual function and reproductive processes. Even though the nervous system and endocrine system are separate systems, they often work together to help the body function properly.

The foundations of the endocrine system are the **hormones and glands**. As the body's chemical messengers, hormones transfer information and instructions from one set of cells to another. Hormone levels can be influenced by factors such as stress, infection, and changes in the balance of fluid and minerals in blood.

A gland is a group of cells that produces and secretes, or gives off, chemicals. Some types of glands release their secretions in specific areas. Endocrine glands release more than 20 major hormones directly into the bloodstream where they can be transported to cells in other parts of the body. The major glands that make up the human endocrine system are the hypothalamus, pituitary, thyroid, parathyroids, adrenals, pineal body, and the reproductive glands.

The Pituitary Gland

The **pituitary gland** is located at the base of the brain just beneath the hypothalamus and is considered the most important part of the endocrine system. It's often called the "master gland" because it receives instructions from the hypothalamus and then releases hormones that control the thyroid and adrenal glands. The production and secretion of pituitary hormones can be influenced by factors such as emotions and seasonal changes. To accomplish this, the hypothalamus relays information sensed by the brain (such as environmental temperature, light exposure patterns, and feelings) to the pituitary. One of the hormones secreted by the pituitary is endorphins, chemicals that act on the nervous system to reduce sensitivity to pain."

The Pineal Gland

The **pineal body**, also called the pineal gland. The **pineal gland** is a small organ shaped like a pine cone (hence its name) located in the middle of the brain. The pineal gland synthesizes and secretes melatonin, a structurally simple hormone that communicates information about environmental lighting to various parts of the body. The duration of melatonin secretion each day is directly proportional to the length of the night. The light-transducing ability of the pineal gland has led some to call the pineal the "third eye".

The Limbic System

The **limbic system** wraps around the brain stem and is beneath the cerebral cortex. It is a major center for emotion formation, behavior, learning, and memory. The limbic structures are also connected with other major structures such as the cortex, hypothalamus, thalamus, and basal ganglia. The structures of the limbic system are highly interconnected with the rest of the brain, and they likely form a gateway for communication between the cerebral cortex and the hypothalamus. This gateway allows for cognitive processes to modify the affect of the limbic system on hypothalamic functions, which provides a more extensive adaptive mechanism in an effort to normalize.