Annals of Pharmacovigilance & Drug Safety

Review Article
Published: 15 Jul, 2019

Biochemistry of Hormones that Influences Feelings

Monica Butnariu and Ioan Sarac*

Banat's University of Agricultural Sciences and Veterinary Medicine, Timisoara, Romania

Abstract

Every emotion triggers hormonal secretions and this without knowing the rational brain. Joy, happiness floods you with a wave of endorphins, while worries and tensions attract you in a whirlwind of stress hormones. The center of all emotions is located in the limbic system (cerebral formation). Here, emotions are decoded biochemically and labeled as pleasant or unpleasant. The reception of emotions is done in the hypothalamus, which then act on the pituitary (conductor of the orchestra of the hormonal system). Following a local or remote order, there is a discharge into the bloodstream of hormones of stress or happiness. The immune system does not get rid of this influence, so the intensity of emotions reverts to physical health. The intense and repeated healing of feelings of jealousy, despair, fear, hatred or violence, causes psychological suffering and as if not enough, organic affection.

Keywords: Hormones; Emotions; Physical condition; Brain; Heart

Introduction

Hormones are chemicals (peptides, proteins, and steroids) produced and secreted by specialized cells that act on the various "target" cells locally or remotely. The specificity of hormonal action is determined by the presence of specific target cell receptors and the cellular response is determined by the particular gene programming of the cell so that the same hormone has different actions on different tissues. Hormones are chemicals produced by the glands that form the endocrine system; released into the bloodstream hormones act specifically on one or more "target organs" to regulate their functionality [1]. The word hormone was formed by deriving the Greek word "hormao" that denotes "stimulate, move".

Depending on the structure, the hormones are divided into 3 groups:

- Peptides (made from several amine acids);
- Steroid (cholesterol derivatives);
- Derivatives of an animated acid (thyroid hormones) [2].

Hormones regulate various functions in the body, including:

- Growth and development;
- Sexual function and reproduction;
- Metabolism;
- Psychological state [3].

Physically everything is related to hormones and neurotransmitters. These chemical messengers of the endocrine and brain systems are what magic means from what we call feelings. The word "hormone" comes from Greek, meaning "stimulate", "impulse", "excite". In the human body, hormones are chemicals secreted by the endocrine glands, acting as messengers, released into the bloodstream to influence physical, physiological, behavioral changes, thus interfering throughout the whole life with increasing roles, sexuality, reproduction, metabolism, sleep, mood, etc. They have continued action to maintain body balance, organ function, and enable continuous adaptation to the environment [4-7].

Secreted by the endocrine glands (senders), the hormones reach the bloodstream and go to the recipient organs. As chemical messengers, their role is to provide communication between the various organs in the body, stimulate or inhibit their activity. Consignors have chosen locations in very distant regions of the body [8-11]. The pituitary is in the cranial cavity, the thyroid in the throat, the thymus in the chest, the ovaries and testicles in the pelvis, the adrenal glands and the pancreas

OPEN ACCESS

Correspondence:
Monica Butnariu, Banat's University of Agricultural Sciences and Veterinary Medicine, "King Michael I of Romania", Calea Aradului 119, Timis, Timisoara, 300645, Romania,
E-mail: monicabutnariu@yahoo.com

Received Date: *26 Apr 2019*
Accepted Date: *05 Jul 2019*
Published Date: *15 Jul 2019*

Citation:
Butnariu M, Sarac I. Biochemistry of Hormones that Influences Feelings. Ann Pharmacovigil Drug Saf. 2019; 1(1): 1001.

in the abdomen. Invest with the function of 'managers'; hormones control fundamental impulses and emotions (sexual impulses, fear, anger, joy and sadness). And it is not limited to just: 'Regulates body temperature, stimulates sexual growth and identity, helps restore tissues' [12-14]. The discovery of endogenous messengers (hormones) is due to English physicists Ernest Henry Starling and William Maddock Bayliss, who in 1902 identified secretin, the substance produced by the mucous membrane of the duodenum. During experiments on live animals, they discovered that the body's functions were regulated by other factors, besides nerve impulses. They separated the nerves that led to the pancreas and noted that the organ was functioning and continued to secrete digestive substances when the small intestine membrane came into contact with the gastric acids [15-17]. In 1904, Starling proposed that the substances that activated the organs should be called "hormones". Starting this time, scientific advances in the field have advanced rapidly. Because they are located in some parts of the cell, called "receptors," the hormones carry information and activate the cells towards a genetically programmed metabolic process. Some work independently, others interact [18]. The center of the hormonal system is the hypothalamus (a part of the large brain) and the pituitary (pituitary) located at the base of the brain. In 1921, Frederick Grant Banting, a Canadian physician, made an epochal discovery related to the treatment of diabetics, finding that the patients' pancreas did not produce enough insulin, the hormone responsible for the processing of blood sugar. Banting isolated insulin from the pancreas of live animals and injected it into diabetic patients [19-21].

Hormones Start the Emotions and the Intelligence

Almost all hormones are involved in emotions, just as any ingredient in food is involved in digestion. Emotional self-regulation cannot be achieved without hormones. The same can be said about thirst, hunger, sex, aggressiveness in neuroscience. In the human brain were identified 50 different neuromediators that act on behaviour [22-24]. These chemicals released by the nerve cells have the power to influence the activity of other cells. And everybody knows what he has to do. Acetylcholine increases your ability to learn and memorize. Dopamine helps you develop your projects, make decisions, explore novelty and coordinate your movements. In addition, it stimulates the desire and the sensation of pleasure. Noradrenaline supports you in long-term projects. Decreased norepinephrine level frequently has a depressive state. The hormone of calm and patience, serotonin, allows for frustration and limitation of aggression [25-27]. The heart is a source of intelligence. In the heart muscles you have discovered about 40,000 neurons capable of controlling emotions 50 to 60 times more powerful than those managed by the brain. The key to emotional intelligence would be the relationship between the heart and the emotional brain (limbic system). Learning some heart control techniques will help you get your emotional brain back (and *vice versa*). Following sports performance studies, it was concluded that the heart is capable of providing intelligence to instantly adapt to situations. The heart communicates biochemically with the rest of the body and emits a hormone capable of counteracting stress hormones. Even though your life is mostly governed by hormones, reason can balance these hormonal secretions with your heart [28-31].

Brain Chemistry-Some Examples of Hormones

The brain is a place where there are innumerable chemical reactions that change our emotions, behavior, and even the way we think. Neurotransmitters (neurotransmitter chemicals), neuromodulators (which control neurotransmitter release and increase or diminish certain sensations such as pleasure or pain) and hormones have the essential role [32,33]. Hormones that affect brain activity are chemicals (peptides, proteins, steroids) secreted by the endocrine glands. As they circulate through the bloodstream, the hormones come in contact with all the organs of the body, exercising their control over metabolism, growth and reproduction, sleep, mood and more. Any hormonal imbalance is followed either by a physical affection or by an emotional manifestation. The brain is the place where multiple chemical reactions occur that change our emotions, behavior, and even the way we think [34-36]. One of the key roles in this regard is attributed to hormones, of which we list the most important:

Adrenaline

It is released into the blood in case of demanding situations requiring high energy consumption, implying an acceleration of heart rhythm, an increase in blood pressure, hypoglycemia, muscle tension, bronchial and pupillary dilation. It gives the body extra energy in critical or urgent situations. In combination with a high level of dopamine and norepinephrine, adrenaline is responsible for the states we go through when we love. Adrenaline is secreted as a response to a stressful state or is related to a demanding physical activity, the need to cope with a danger, a situation out of the ordinary, involving an acceleration of the heart rate, an increase in blood pressure, hypoglycemia, a dilation of the bronchi and pupils. This gives the body extra energy in critical or urgent situations. Adrenaline is secreted by the central nervous system and by the adrenal glands and has a short period of action (about two minutes). From a medical point of view, in the injectable form, adrenaline is used for anaphylactic (allergic) shock or cardiopulmonary arrest [37,38].

Cortisol

It is a steroid hormone released under stress, to provide energy. When we are stressed and anxious, cortisol is present in a high level in the brain, and this will make us look safe, which is why we will not get out of the comfort zone. Cortisol is a hormone released under the effect of stress to provide energy, as is the case with adrenaline. The maximum level is reached early in the morning, and at least at night and at the beginning of the afternoon, which explains the diminution of physical and mental abilities at this time. The state of loneliness amplifies, according to experts, the dose of cortisol in the body [39-41].

Dopamine

It is the "happiness" hormone, so when synthesized in larger amounts, the positive state is dominant. Dopamine influences mood, being involved in the control of emotions, movement, and the appearance of pleasure. Dopamine is also on the move, with Parkinson's disease also characterized by a deficiency of this hormone. Short-term memory also feeds dopamine, synthesized from proteins. Caffeine and chocolate, as well as sports, favor synthesis of dopamine. The level of dopamine in the brain differs in adolescents and adults, the first being much more sensitive to the seemingly "pleasant" effects of alcohol, nicotine and drugs, which creates a certain state of "good" momentum [5,42]. Endorphin is the hormone produced by the pituitary gland. It reduces the intensity of pain and anxiety, stimulates the immune system, and intervenes in the process of learning or adapting to light or darkness. It acts antipain, the amount

produced by the body continues to be lifted after a physical exercise of about 30 min, so an intellectual activity, after physical effort, has a better return [7,22].

Melatonin

It is the "youth" hormone is related to the intensity of natural light. Melatonin is secreted by the epiphysis (pineal gland) with the evening coming. Melatonin secretion is peak between 22:00 and 3:00 in the morning, being responsible for regulating circadian rhythm. An inadequate amount of melatonin generates apathy, malaise, depression. An inadequate amount of melatonin generates apathy, ailment, depression (it is also the cause of hibernate depression, which many people complain). Sufficient exposure to natural daylight is recommended during the day, avoiding neon lights and diminishing evening light sources to transmit the signal to the body as the night approaches. Teenagers generally have low melatonin levels, which explain their desire to go to bed late and to wake up late [8,43].

Serotonin

It has an important role in sleeping, in mental and affective processes, in motor functions, in thermoregulation, in regulation of blood pressure, in the act of vomiting, in hormonal functions. In the wake-up hours, serotonin levels are naturally high, and serotonin levels decrease over the course of the day. Serotonin has an important role in regulating mood. A low level of serotonin is linked to anger and inclination towards violence. It is a neurotransmitter and a neuromodulator with multiple effects. Research has shown that it is found in weak quantities in the delinquent body and in significant quantities to leaders. A low level of serotonin is linked to anger and inclination towards violence. Factors that cause decreased serotonin levels are loss of a loved one, separation, absence of social, sexual, negative thoughts, etc. It contributes to increasing the number of serotonin active lives, harmonious couple relationships, sports, healthy nutrition- raw vegetables, bananas, plums, white meat, etc. [15,44].

Oxytocin

It is the "tendon hormone" is especially present in the body of women and is favored by sexual intercourse, pregnancy, active social relationships. Oxytocin stimulates milk secretion in breastfeeding women, but also contractions during delivery, while at the same time producing maternal sentiment. Oxytocin acts as a neurotransmitter, playing an important role in social interactions, reproduction, in the formation of the mother-child relationship and stimulation of lactation, in the development of empathy and generosity, but also in balancing the inter-human ties. Often, oxytocin has been called the hormone of love, association being made by the fact that its levels increase when we manifest our affection towards someone, strengthening the bonds between people. Oxytocin also stimulates the feeling of trust and is often the antidote to feelings of anxiety or depression, but also plays important roles in other processes such as birth or lactation. However, oxytocin has other effects, taking into account the complex social nature of man and the way in which the bonds between people are strengthened. Although viewed as an element that facilitates social interactions, especially among individuals with common characteristics, oxytocin also determines the division and birth of feelings such as subjectivism or the perception of differences that create the idea of individuality, separation, and familiarity. This selection mechanism determines that individuals belonging to a group show favoritism or preference for the group to which they belong, and separation or prejudices related to individuals who are outside or do not possess characteristics common to their group. Continuous research into the role and action of oxytocin reminds us that biological processes are closely related to psychological processes, forming an interdependent and complex mechanism where only one element can have only positive superlatives, as in the case of the "love hormone". Since oxytocin influences the entire universe of relationships and associated feelings, and dreams, especially those taking place in the REM sleep cycle, focus primarily on social interactions with close people, but also with strangers, the experiences we experience in their time being partly attributed to oxytocin. Higher levels of oxytocin can also be found in situations where we have to deal with interpersonal difficulties when we experience anxiety and a lower level of tolerance for others, demonstrating that oxytocin is still a stress marker [35,42].

Vegetables- Sources of Natural Hormones

Vegetable hormones also have the power to influence emotional moods. For example: Maca (which is a very protein- and mineral-rich tuber, has long been used by peoples of the Andes as a high-altitude crop), a rare vegetable in the Andes Mountains. Tuberculosis contains substances that act directly on the hormonal system of both sexes. The outcome? It is an excellent aphrodisiac, increases sexual and reproductive capacity diminishes the effects of menopause (hot flushes, libido and memory problems, fatigue). Fortunately, Maca is not the only source of plant hormones. The green garlic, banana, in addition to being a reducible anticancer food, contains plant hormones that play a role in endocrine equilibration. Soy is a source of natural hormones of great importance in the prevention of breast cancer. Hormones with beneficial effects on the body are found in buds of trees and shrubs (fir buds, for example, contain growth hormones). Dairy seeds have a supportive stimulant effect on sex hormone production. The same effect, but also bland, is also the seeds of celery, anise and cumin [16,45].

Conclusions and Recommendations

The harmonious activity of all parts of the body and its relationships with the environment is ensured by the nervous system. The hormonal communication system improves the nervous communication activity inside the body, the endocrine system being an elegant mechanism of "checks and balances" that act through feed-backs that facilitate the normal functioning of the body.

Hormones play an essential role for the human body, care for sleep regulation, influence growth and development, and are responsible for our mental state.

Hormones protect against colds. When the estrogen level decreases, after menopause, the bones become more fragile and more prone to fractures. This is why after menopause women have a higher risk of developing osteoporosis. It is important that the body does not lack calcium and vitamin D. Testosterone is known to help increase the level of dopamine, a neurotransmitter that makes you feel better and improves your concentration. Women with higher levels of testosterone tend to have fewer depressive states, have greater confidence in them, and do not change easily from one state to the next. Hormones are also used to regulate sleep. A low level of progesterone leads to insomnia, restlessness and anxiety, as well as to menstrual cycle disorders.

References

1. Ghaderinia P, Shapouri R. Assessment of immunogenicity of alginate

microparticle containing Brucella melitensis 16M oligo polysaccharide tetanus toxoid conjugate in mouse. Banats J Biotechnol. 2017;8(16):83-92.

2. Jahan S, Chowdhury SF, Mitu SA, Shahriar M, Bhuiyan MA. Genomic DNA extraction methods: a comparative case study with gram-negative organisms. Banats J Biotechnol. 2015;6(11):61-8.
3. Hariri A, Ouis N, Bouhadi D, Benatouche Z. Characterization of the quality of the steamed yoghurts enriched by dates flesh and date powder variety H'loua. Banats J Biotechnol. 2018;9(17):31-9.
4. Hariri Moghadam F, Khalghani J, Moharramipour S, Gharali B, Mostashari Mohasses M. Investigation of the induced antibiosis resistance by zinc element in different cultivars of sugar beet to long snout weevil, Lixus incanescens (Col: Curculionidae). Banats J Biotechnol. 2018;9(17):5-12.
5. Aramesh M, Ajoudanifar H. Alkaline protease producing Bacillus isolation and identification from Iran. Banats J Biotechnol. 2017;8(16):140-7.
6. Ouis N, Hariri A. Antioxidant and antibacterial activities of the essential oils of Ceratonia siliqua. Banats J Biotechnol. 2018;9(17):13-23.
7. Barazesh F, Oloumi H, Nasibi F, Kalantari KM. Effect of spermine, epibrassinolid and their interaction on inflorescence buds and fruits abscission of pistachio tree (Pistacia vera L.), "Ahmad-Aghai" cultivar. Banats J Biotechnol. 2017;8(16):105-15.
8. Vasileva V. Root biomass accumulation in vetch (Vicia sativa L.) after treatment with organic fertilizer. Banats J Biotechnol. 2015;6(11):100-05.
9. Righi K, Assia Righi F, Boubkeur A, Boungab K, Elouissi A, Djendara AC. Toxicity and repellency of three Algerian medicinal plants against pests of stored product: Ryzopertha dominica (Fabricius) (Coleoptera: Bostrichidae). Banats J Biotechnol. 2018;9(17):50-9.
10. Kumar A, Senapati BK. Genetic analysis of character association for polygenic traits in some recombinant inbred lines (ril's) of rice (Oryza sativa L.). Banats J Biotechnol. 2015;6(11):90-9.
11. Georgieva N, Kosev V. Adaptability and Stability of White Lupin Cultivars. Banats J Biotechnol. 2018;9(18):65-76.
12. Dadkhah A, Elhami Rad AH, Azizinezhad R. Effect of pumpkin powder as a fat replacer on rheological properties, specific volume and moisture content of cake. Banats J Biotechnol. 2017;8(16):116-26.
13. Marinova DH, Ivanova II, Zhekova ED. Evaluation of Romanian alfalfa varieties under the agro-environmental conditions in northern Bulgaria. Banats J Biotechnol. 2018;9(18):56-64.
14. Ouis N, Hariri A. Phytochemical analysis and antioxidant activity of the flavonoids extracts from pods of Ceratonia siliqua L. Banats J Biotechnol. 2017;8(16):93-104.
15. Olufeagba SO, Okomoda VT, Okache W. Growth performance of all male tilapia (Oreochromis niloticus) fed commercial and on-farm compounded diet. Banats J Biotechnol. 2016;7(13):70-6.
16. Bakari M, Yusuf HO. Utilization of locally available binders for densification of rice husk for biofuel production. Banats J Biotechnol. 2018;9(18):47-55.
17. Jasim RK. Isolation and molecular characterisation xylanase produced by sporolactobacilli. Banats J Biotechnol. 2016;7(14):30-7.
18. Nikolova I, Georgieva N. Effect of biological products on the population of aphids and chemical components in alfalfa. Banats J Biotechnol. 2018;9(18):38-46.
19. Eed AM, Burgoyne AH. Tissue culture of Simmondsia chinensis (Link) Schneider. Banats J Biotechnol. 2015;6(11):45-53.
20. Rahimian Y, Akbari SM, Karami M, Fafghani M. Effect of different levels of Fenugreek powder supplementation on performance, Influenza, Sheep red blood cell, New Castle diseases anti-body titer and intestinal microbial flora on Cobb 500 broiler chicks. Banats J Biotechnol. 2018;9(18):29-37.
21. Hassan SA, Soleimani T. Improvement of artemisinin production by different biotic elicitors in Artemisia annua by elicitation–infiltration method. Banats J Biotechnol. 2016;7(13):82-94.
22. Saidi A, Eghbalnegad Y, Hajibarat Z. Study of genetic diversity in local rose varieties (Rosa spp.) using molecular markers. Banats J Biotechnol. 2017;8(16):148-57.
23. Zerkaoui L, Benslimane M, Hamimed A. The purification performances of the lagooning process, case of the Beni Chougrane region in Mascara (Algerian N.W.). Banats J Biotechnol. 2018;9(18):20-8.
24. Hariri A, Ouis N, Bouhadi D, Ould Yerou K. Evaluation of the quality of the date syrups enriched by cheese whey during the period of storage. Banats J Biotechnol. 2017;8(16):75-82.
25. Bozhanska T. Botanical and morphological composition of artificial grassland of bird's–foot–trefoil (Lotus Corniculatus L.) treated with lumbrical and lumbrex. Banats J Biotechnol. 2018;9(18):12-9.
26. Belkhodja H, Belmimoun A, Meddah B. Chemical characterization of polyphenols extracted from different honeys. Banats J Biotechnol. 2017;8(15):78-82.
27. Mahmoodi M, Afshari KP, Seyedabadi HR, Aboozari M. Sequence analysis of 12S rRNA and 16S rRNA mitochondrial genes in Iranian Afshari sheep. Banats J Biotechnol. 2018;9(18):5-11.
28. Menkovska M, Damjanovski D, Levkov V, Gjorgovska N, Knezevic D, Nikolova N, et al. Content of B–glucan in cereals grown by organic and conventional farming. Banats J Biotechnol. 2017;8(16):39-47.
29. Nair MSV, Williams ES. Comparative study of 2–phenoxy ethanol and clove oil on its efficiency as anesthetics in anesthetizing Hypselobarbus Kurali. Banats J Biotechnol. 2015;6(12):15-22.
30. Satimehin FP, Tiamiyu LO, Okayi RG. Proximate and phytochemical changes in hydrothermally processed rubber (Hevea brasiliensis) leaf meal. Banats J Biotechnol. 2017;8(16):12-7.
31. Semnani SN, Hajizadeh N, Alizadeh H. Antibacterial effects of aqueous and organic quince leaf extracts on gram–positive and gram–negative bacteria. Banats J Biotechnol. 2017;8(16):54-61.
32. Ayadi Hassan S, Belbasi Z. Improvemnet of hairy root induction in Artemisia annua by various strains of agrobacterium rhizogenes. Banats J Biotechnol. 2017;8(15):25-33.
33. Dlilali B, Ahmed H, Zouaoui B, Fatima S, Karima OY. Kinetic of batch production of lactic acid from carob pods syrup. Banats J Biotechnol. 2017;8(15):57-65.
34. Egu UN, Okonkwo JC. Effect of gonadotrophin (diclair®) on semen characteristics, hormonal profile and biochemical constituents of the seminal plasma of mature balami rams. Banats J Biotechnol. 2017;8(15):90-7.
35. Danilchuk YV. Selective crystallization of maltose by isopropanol and acetone from glucose–maltose syrups. Banats J Biotechnol. 2016;7(14):120-5.
36. Ojogu NA, Annune PA, Okayi GR. Toxicological effects of aqueous extract of piptadeniastrium africanum bark on Clarias gariepinus juveniles. Banats J Biotechnol. 2017;8(15):123-35.
37. Ghasemi E, Kohnehrouz BB. Cloning the cotton rrn23–rrn5 region for developing a universal interfamily plastidial vector. Banats J Biotechnol. 2016;7(14):81-8.
38. Ruchin AB. The effects of illumination on the early development of tailed and tailless amphibians. Banats J Biotechnol. 2017;8(15):113-8.
39. Idris A. Comparative analysis of 16SrRNA genes of Klebsiella isolated from groundnut and some american type culture collections. Banats J Biotechnol. 2016;7(13):34-40.
40. Ould Yerou K, Meddah B, Touil AT, Sarsar F. Laurus nobilis from Algeria and immune response. Banats J Biotechnol. 2017;8(15):119-22.

41. Rezaei A, Akhshabi S, Sadeghi F. Evaluation of exon 17 of insulin receptor (INSR) gene and its relationship with diabetes type 2 in an Iranian population. Banats J Biotechnol. 2016;7(13):61-9.

42. Bhattacharya , Sadhukhan AK, Ganguly A, Chatterjee PK. Investigations on microbial fermentation of hemicellulose hydrolysate for xylitol production. Banats J Biotechnol. 2016;7(14):13-23.

43. Zarkani AA. Antimicrobial activity of Hibiscus sabdariffa and Sesbania grandiflora extracts against some G-ve and G+ve strains. Banats J Biotechnol. 2016;7(13):17-23.

44. Basuny AMM, Al Oatibi HH. Effect of a novel technology (air and vacuum frying) on sensory evaluation and acrylamide generation in fried potato chips. Banats J Biotechnol. 2016;7(14):101-12.

45. Salajegheh Ansary MM, Ahmadimoghadam A, Mirtadzadini SM. Distribution of cyanobacteria in two sirch hot springs with regards to the physicochemical traits of water. Banats J Biotechnol. 2017;8(15):83-9.