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Depression as a Form of Non-Specific Defense-Anabiosis

Leonchuk S.L*

Department of Psychiatry, Sechenovskiy University, Moscow, Russia

Abstract

Currently, there is no uniform understanding of the internal nature of depression and its connection with the problems of general biology. The article proposes the author's concept study of depression as a state of non-specific defense non responsiveness, the equivalent of anabiosis, emphasizing its adaptive nature. The central cyclic and affective forms of response regulation, as well as an autonomous form of regulation, are discriminated. The article describes clinical characteristics of depressive conditions. The clinical outcome of depression is the primary disintegration and atrophy of the depressed tissue and secondary disintegration diseases. Senile tissue atrophy is explained by a chronic depression of the organism due to age-related sub compensation of the homeostatic systems functioning.

Keywords: Evolution • Reactivity • Adaptation • Anabiosis • Depression • Disintegration • Atrophy

Introduction

Currently, there is no uniform understanding of the internal nature of depression [1-3], which leads to errors in diagnosis and treatment of depressive conditions. Some authors associate depression with hypothymia [4], others with a complicated affective complex of symptoms validated by path psychological studies, and still others with phase defensive states [5]. Some consider depression to be a purely psychopathological phenomenon, others consider it as a complex neurobiological syndrome. A number of authors offer more than 18 criteria for depression (Hamilton, Beck and others' rating scales for depression), which is time-consuming and does not clarify understanding of the depression phenomenology. The neurotransmitter model of depression is simplified, reveals its neurochemical, mediator mechanisms, but does not reflect the evolutionary path physiological nature of depression. Meanwhile, any clinical and psychopathological phenomenon has a phylogenetically basis, is a clinical expression of evolutionary processes, and not an arbitrary consequence of failure and dysfunction of biological structures. This applies, for example, to the phenomena of comatose condition, stupor, agitation, convulsive syndrome, fear, pain, trance, and others. The aim of the article is to understand the internal nature of depression applying the methods of systemic evolutionary analysis and theoretical modeling, to substantiate its clinical picture, dynamics and outcome.

Literature Review

The organism, as an open biological system, expresses and preserves itself through the stability of the internal environment, homeostasis. Homeostasis regulation occurs at all its levels -cellular, tissue, systemic. Homeostasis is a moment of integrity and independence of the organism from the ecosystem, which defines its morph functional structure through natural selection. Homeostasis disruption is the essence of destruction and death. The organism, as the whole, is formed through internal need reflection and reciprocal launch of self-regulation processes aimed at satisfying this need, which leads to homeostasis and maintenance of the organism.

Reactivity is the main property of life. Reactivity is a bodily ability to respond internally to changes in the requirements of the ecosystem to the organism, the form of its interaction with the ecosystem, a special type of reflection associated with the homeostasis regulation. A cell is a structural unit of a macroorganism, a biological system of the lowest order. Cells are rigidly integrated into a macroorganism, as an integral system, and are subject to its requirements, although they have a certain independence, which ensures the plasticity and flexibility of its regulation. A reflected need is an integrative factor in the regulation of the vital activity of a macroorganism, as a biological system of a higher order, as for the system-forming reactive structure, it is the basal nuclei of the brain and emotions. In humans, reactivity has a differentiated character, which is associated with the development of the brain, higher forms of consciousness and intellect.

***Address to Correspondence:** Leonchuk SL, Department of Psychiatry, Sechenovskiy University, Moscow, Russia, E-mail: leon4yk@mail.ru*

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The development of emotions comes from the reflex ring and basal nuclei of homeostasis regulation, working on the feedback principle. Emotions, as a form of the psyche, reflect the actual needs of the organism in matter, energy and information necessary to maintain homeostasis, and bear an energy charge of self-regulation and goal setting. Evolutionarily and genetically, according to the 'stimulus-reaction' behavior, emotions are paired with effectors processes and form a single complex of the bodily reactivity with them. The bodily reactivity is associated with the energy modules of its vital activity. Emotions are the center of goal-setting, adaptive reactivity, homeostasis regulation, and organism integration. Being a system-forming reactive center of the organism, they regulate the movement of energy flows (metabolic, hormonal, and vegetative) in it. In phylogeny, under the influence of the need for information, in the organism, emotions generate the development of the brain, higher forms of consciousness, intellect, and the soma as a super-homeostat. Emotions are the center of the ego. The ego is a bundle of needs and drives associated with them.

The brain has various adaptive energy modes of operation, which increases its functional plasticity. The energy mode is an ability of the nervous tissue to temporarily change the energy range of its functioning. Its change is observed with a change in motivation, biorhythms, affect fluctuations. A low adaptive mode of bodily functioning with a decrease in the threshold of its response is postulated as depression.

In case of depression, the response of the organism is repressed, and with severe depression, the states of total no responsiveness are observed. The equivalents of depression, like the equivalents of other psychopathological phenomena, are projected into the animal world, for nothing comes from nothing, and each phenomenon has its own evolutionary history. It is known that primates and other higher mammals suffer from typical clinical variants of depression. The states of anabiosis are observed in lower animals. If we draw physiological parallels, then depression is the equivalent of anabiosis. Adaptive acquisitions in phylogeny do not disappear, but are suppressed and appropriated by new, higher achievements of evolution, acquiring a different internal content.

Discussion

The central adaptive mechanisms of bodily response regulation operate at all its levels - cellular, tissue and systemic, partial and total, but autonomous response regulation is also possible. The cell, being a biological system of a lower order, in case of weakening the central regulation of the organism, can show the possibility of autonomous parafunctional regulation.

There are three forms of life according to K. Bernard:

- **Hidden life (reactions):** Life appears only under certain conditions and depends entirely on the state of the ecosystem. It is observed in spores, grains, single-cellular animals and others;
- **Oscillating life (reactions):** Cyclical alternation of life and the state of anabiosis. It is observed in invertebrates, fish, amphibians, reptiles, birds and some mammals (rodents, badgers, bears, and others);
- **Free life:** Sustainable life (reactions). It is observed in higher mammals and humans.

Adaptation can be specific and non-specific [6]. Non-specific adaptation is associated with ancient, generalized, undifferentiated defense mechanisms: hyperthermia, phagocytosis, general adaptation syndrome, anabiosis, stupor, psychomotor agitation, convulsive syndrome, comatose condition, autism, trance, pain, and others. The evolution of the living world follows the path of creating differentiated defense associated with the development of higher forms of neuropsychic activity. However, the ancient mechanisms of organism vital activity regulation do not disappear in the process of evolution but are suppressed and appropriated by new mechanisms. When young functions are damaged phylogenetically, ancient forms of adaptation begin to appear. In the dynamics of the organism reactions to damaging factors, one should see not arbitrary dysfunctions and failures of structures, but a natural retreat to the passed stages of development and exposure of ancient mechanisms. The organism plasticity lies in the fact that when manifestation of new specific functions becomes difficult, non-specific relationships enter the scene again. This happens when the possibilities of specific regulation systems under the pressure of ecosystem extreme factors are impeded. When homeostatic systems and changes in internal constants are weakened, the cells of the organism begin to occur in harsh conditions of survival, young, highly organized brain structures responsible for specific adaptation especially suffer. As a result, the mechanisms of ancient non-specific adaptation come to the fore. The ancient mechanisms of bodily regulation continue to operate as well at the highest stages of evolution of the living world in the form of their equivalents. Depression is a state of no responsiveness, an adaptive suppression of the bodily vital processes in order to prevent its disorganization and decay. Depression is a form of non-specific adaptation, the equivalent of anabiosis, it gives time for restoration of impaired functions and reflects regulation plasticity. Anabiosis is a state of no responsiveness of the organism, in which life processes slow down dramatically, which contributes to its survival in conditions unfavorable for life [7]. It is common in cellular organisms, fish, amphibians and reptiles; this is a general biological phenomenon that does not exhaust itself even at the highest stages of the living world development. In mammals (bears, badgers and others), anabiosis is seasonal in the form of periods of hibernation. As an equivalent, it can manifest itself in a human being as a seasonal affective disorder.

It is known that in the presence of central depression, mental and neurological diseases are benign (CCT, encephalitis, ACVA, schizophrenia, Alzheimer's, Parkinson's, Pick's, etc.), in contrast to lucid intervals. Depression acts as a factor of biological adaptation [8]. Probably, somatic diseases in the presence of autonomous peripheral depression also develop benignly. Depressed tissue is a tissue in which no responsiveness, defensive and protective inhibition of vital processes, is observed, aimed at preserving its structural and functional organization under the influence of extreme factors.

Central regulation of the bodily response

Organism response regulation is associated with the regulation of the energy modes of its vital activity. The following forms of regulation can be distinguished:

- A cyclic form- Ancient, associated with the basal structures of the brain, non-specific, generalized adaptation, reflecting natural cycles and rhythms. The low energy mode of the bodily vital activity is postulated as endogenous depression. In case of depression, disorders in rhythm of functioning of the pituitary-

hypothalamic, limbic systems and epiphysis are observed, which manifests itself in the rhythm of releasing hormones and melatonin. This form of regulation is associated with light photons, which affects the total rhythm of the organism, including the rhythms of wake and sleep, sexual activity and food intake.

- An affective form is phylogenetically younger, emotional regulation, dictated by an environment impact and an urgent need. The progressive evolution of the bodily response involves developing basic emotion differentiation. Emotions, reflecting needs and being a reactive system-forming center of the organism, regulate the energy modes of its vital functions. Low energy mode of life is postulated as endogenous depression.

Autonomous regulation of the bodily response.

If weakening the central regulation, peripheral body cells and tissues may show a possibility of autonomous, parafunctional regulation. Autonomous regulation is characterized by clinical atypia, polymorphism, drug resistance, and chronification of the illness (Table 1).

	Cyclic	Affective
Phasicity	+++	+
Onset	Indigenousness	Endogenous response
Seasonality	+++	+
Circadian rhythms	+++	+
Depth	+	+++
Onset age	Young	Middle
Duration of a depressive episode	+	+++
Hypothymia, low mood	+	+++
Hypersomnia	+++	+
Anesthesia	+++	+
Apathy, psychomotor retardation	+++	+
Anorexia	+	+++
Decrease in libido	+	+++
Premenstrual syndrome	+++	+
Postpartum depression	+++	+
Evening cravings	+++	+
For carbohydrates		
Winter depression	+++	+
Positive symptoms	+	+++
Response to sleep deprivation	+++	+
Light reflex	+++	+
Resistance to lithium, antidepressants	+	+++
Affectivity	Negative	Positive
Suicidal thoughts or actions	+	+++
Mixed episodes, transition to mania	+++	
Acceleration of involution	+	+++
Spontaneous episode end	+++	+
Chronic course	+	+++
Comorbidity	PAS abuse, bulimia, hypertensive disease, migraine	Anxiety, obsessions, panic attack, anorexia
Premorbidity	Cycloidia	Asthenia
Level of depression	Somatic and vegetative	Neuro-psychic, psychosocial

Outcome of depression	Intermission	Remission
Nosology	BAD	RAD

Table 1. Comparison of the clinical characteristics of depression in the central forms of response regulation.

Disease is an interaction of external and internal, pathological and defensive factors. Weakening a pathological process, we reduce a need for reciprocal defensive reactions. Thus, central depression, as a defensive factor, often accompanies central asthenia. When curing asthenia while treating astheno-depressive syndrome, we also relieve depression as a reciprocal defense. When treating depression with antidepressants, we expose the pathological process, provoke the aggravation and chronicity of the disease, and create a morphological defect. Antidepressants should be prescribed strictly according to indications. In the process of recovery, the organism itself will remove depressive defense.

It is necessary to differentiate between central depression and hypothymia. Depression is a defensive fertile ground on which a pathological process develops; it is deep, indispensable and associated with the systemic regulation of the bodily response. Hypothymia is superficial, random, and transient and is not an obligatory attribute of depression. Depression is more often treated with biological methods, hypothymia with psychotherapy. Antidepressants are not effective for hypothymia and should not be prescribed. Otherwise, we run the risk of rocking the activity of the nerve centers responsible for regulating bodily response, and through the withdrawal syndrome, provoking the onset of central depression.

Clinical forms of depression

Central depression

- **Central total depression:** Clouding of consciousness, stupor, mutism, paresis of the sense organs, response decrement of reflexes, analgesia, hypothermia, decrease in basal metabolism, inhibition of the internal organs function, endocrine glands, bradycardia, bradypnea, amenorrhea, total disintegration and depersonalization, etc. After emergence from depression, amnesia of its period is observed. Systemic compensatory processes aimed at the reintegration of the organism do not occur due to the depressive blockade of systemic vital activity;
- **Central partial depression:** The clinical picture is formed from the loss (depression) of the central (CNS, brain) depressive focus, focal neurological and mental phenomena, secondary disintegrative somatic disorder, primary mental and secondary somatic depersonalization, secondary compensatory processes from the general vital bodily activity. At the same time, the localization of the secondary disintegrative somatic link is an obligate component of a complicated psychosomatic complex. There are objective dysfunction indicators of the secondary disintegrative somatic link. Accompanying excitation of functions in partial depression reflects secondary compensatory processes in the organism.

Autonomous (peripheral, somatic) depression

It is never total. The clinical picture is the loss (depression) of the peripheral (somatic) depressive focus, focal somatic phenomena, primary somatic depersonalization and secondary compensatory processes from the systemic life of the organism. Autonomous depression rarely comes to the attention of a psychiatrist; patients are observed by internists.

Depressive disintegration of the organism

In case of depression, primary and secondary disintegrative processes occur in the organism. The following variants of depressive disintegration can be distinguished:

Central total depressive disintegration

It is observed in total depression. Systemic compensatory processes aimed at the reintegration of the organism do not occur due to the depressive blockade of its systemic vital activity.

Central partial depressive disintegration It includes:

- Primary central partial depressive disintegration;
- Secondary peripheral partial disintegration. It goes from top to bottom. It occurs as a complication of the primary disintegration of the central depressive focus. The somatic area associated with the central depressive focus does not receive central integrative signals and is switched off from the systemic life.

Autonomous depressive disintegration

It goes from bottom to top. The depressive focus is located on the periphery and does not respond to central integrative signals. As a result, it is switched off from the systemic bodily vital activity.

The phenomena of disintegration in case of depression are associated with the phenomena of primary and secondary depersonalization, since the part of disintegration falls out of the systemic life of the organism.

Partial disintegration of the organism can lead to secondary cascade pathological processes with the release of the organism into total depression and total disintegration.

Outcomes of depression:

Functional paresis and primary disintegration of the depressive focus from the systemic bodily vital activity, its atrophy. Functional paresis of depressive tissue becomes atrophic. Tissue atrophy is the outcome of depression during its long, unfavorable course. Senile atrophy of the organism is associated with its chronic depressive state due to age-related sub compensation in the work of homeostatic systems. The aging process leads to systemic disintegration, total atrophy, multiple organ failure and cachexia. In case of disharmonious aging, atrophic processes in the organism proceed unevenly.

Secondary peripheral (somatic) disorder of disintegration: Autonomous parafunctional processes appear in the secondary peripheral focus of disintegration. These include:

- Atherosclerosis;

- Oncological diseases;
- **Metabolic disorders:** Type 2 diabetes mellitus, hypothyroidism, cachexia, obesity
- **Skin diseases:** Psoriasis, neurodermatitis;
- States of immunodeficiency;
- Autonomic depression

Conclusion

- Ancient non-specific adaptive forms of bodily response regulation in the process of phylogenesis do not disappear, but are suppressed and appropriated by new, higher regulations, acquiring a different internal content. Depression is an adaptive decrease in bodily response, the equivalent of anabiosis, a universal defensive biological phenomenon.
- Depressive tissue is a tissue in which no responsiveness, defensive and protective inhibition of vital processes is observed, aimed at preserving its structural and functional organization under the influence of extreme factors.
- There are central cyclic and affective, and autonomous adaptive mechanisms for regulating the energy regimes of bodily vital activity. A low adaptive energy mode of bodily vital activity is postulated as endogenous depression.
- The outcome of long-term unfavorable effects of depression is:
- Primary disintegration of the depressive part from general bodily vital activity, its atrophy;
- Secondary peripheral disorders of bodily disintegration in case of central partial depression: atherosclerosis, oncological diseases, endocrine disorders, immunodeficiency states, skin diseases, and others.
- The essence of bodily aging is its chronic depressive state with outcome to total disintegration, atrophy, multiple organ failure and cachexia.
- The phenomena of disintegration of the organism during depression are associated with the phenomena of primary and secondary depersonalization, since the disintegrative area falls out of the systemic life.
- Accompanying excitation of functions in central partial depression reflects secondary compensatory processes in the organism.
- Antidepressants should be prescribed carefully and strictly according to indications due to adaptability of depression.
- An approach to a human being as the pinnacle of evolution, who has absorbed all the historical experience of survival in the process of rigorous natural selection, can improve the quality of treatment and prevention programs.

Conflict of Interest

There is no conflict of interest.

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