

Diseases of the development of the body in ontogenesis

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Abstract

The individual development of an organism is a negentropy process. The body fights against entropic degradation through growth, maturation, complication of its structural and functional organization, systemic integration of organs and tissues, and an increase in the power of hemostats. The source of development is the internal struggle of the organism with the ecosystem, which seeks to increase its entropy and dictates the morphological and functional structure through natural selection. The development of an organism in ontogenesis is not a straightforward, progressive and painless process, but always an internally contradictory, multidimensional, undulating process through internal crises and conflicts. The consequence of the internal struggle and the contradictory nature of the relationship between the organism and the ecosystem are diseases of the organism's development.

Keywords

Biological System • Ontogenesis • Developmental Diseases.

Introduction

Up to the present time, many problems of ontogenesis, individual development of the body have not been solved. There is no single view on the stages of its development, the processes of evolution, involution and aging, biological crises and sensitive periods, developmental diseases, their causes and morphological and functional content. Involution is often understood narrowly; only through the prism of sexual wilt the processes of involution and aging of the body are separated. Senile processes are explained by separate nosological units, and not by the inner essence of involution, entropic degradation of the organism [1]. Death is considered alien to life, and not its natural outcome. From the standpoint of synergetic, an organism is an open non-equilibrium self-organizing biological system that strives for balance, stability at the point of the main attractor through the dissipation of internal energy and an increase in the entropy of the system. Movement to the point of equilibrium can proceed in an evolutionary way through internal conflicts, crises, bifurcation passing points and intermediate attractors and through states of internal catastrophe, chaos, which lead the organism to entropic death at the point of the main attractor. The purpose of the article is to find ways to solve the problems of ontogenesis, individual development of the organism using the methods of synergetic, systemic evolutionary analysis, theoretical modeling.

Literature Review

The energy evolution of biological matter is a part of the energy evolution of the universe. Entropy is a measure of the irreversible dissipation of energy [2]. Negentropy is a measure of the morphological and functional organization of an organism, directed against an increase in its entropy. The main content of the energy evolution of biological matter is an increase in the volume of its information, the level of complexity and negentropy, the emergence of a new quality.

An organism is an open biological system that is able to maintain the constancy of the internal environment with the help of homeostasis mechanisms. Homeostasis is the moment of integrity and independence of an organism from the ecosystem, which dictates its morphological and functional structure through natural selection. The violation of homeostasis is the essence of destruction and death. The organism, as a system, is formed through the reflection of an internal need and the reciprocal launch of self-regulation processes aimed at satisfying this need, which leads to homeostasis and survival of the organism. The reflected need is an integrative system-forming factor of the body's vital activity, and the system-forming reactive structure is the basal nuclei of the brain, which are the center of adaptive reactivity, regulation of homeostasis and integration of the body. The activity of all the body's regulatory systems is aimed at satisfying the reflected need, maintaining homeostasis, which determines its total goal reflex.

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Received: 03 September, 2021; Accepted: 17 September, 2021; Published: 24 September, 2021

The second law of thermodynamics, or the law of increasing entropy, dominates in nature. Ontogenesis is a non-entropic process. Living organisms resist the general natural tendency to entropic degradation through the organization of complex biological systems with non-entropic properties. Countering the law of entropy degradation is the essence of development. The source of development is the struggle between the entropic forces of nature and the negentropy defense of the body. The main non-entropic mechanisms of the organism that restrain the entropic pressure of the ecosystem are its growth, maturation, an increase in the level of system complexity and organization, internal integration, and the power of homeostatic systems [3]. The development of biological systems is determined by the interaction of internal and external determinants, where the determining factor is the external determination of the ecosystem. Biological crises in the development of an organism are the result of an internal conflict of the determinants of development; they reflect its abruptness, stages, and the nodes of development. Sensitive periods in the development of the body are periods that are sensitive to deep internal transformations.

Maturation of an organism is represented by two interrelated negentropy processes of increasing its internal complexity and organization:

Increasing of the level of specialization and differentiation of organs and tissues;

Creating of a highly specialized, highly differentiated control center of the body based on the development of the brain, with an increase in its internal integration and the power of homeostatic mechanisms.

Brain development is a biosocial process. Biological development proceeds simultaneously with the formation of its social functions through quantitative changes and qualitative leaps-metamorphoses that reflect the stages of ontogenesis. Biological and social are two sides of the same development process. Biological development of the brain is an increase in its volume, differentiation of functions, integration, and the power of homeostatic mechanisms. The social development of the brain is the development of its social functions -consciousness, speech, higher emotions, thinking, intelligence, will. Biological development realizes its innate social potential. The biological and social determinants of development are interrelated [4]. The biological determinant is intense during biological crises; the social determinant is intense during sensitive periods of development. Sensitive periods are periods in the development of the social psyche that are sensitive to deep internal changes with the emergence of a new quality. Biological crises and sensitive periods are the moments when the next negentropic mechanism is activated in the development of the organism. The processes of mental development go from simple mental acts to higher social forms. The moral-ethical and aesthetic are the highest forms of the social movement of matter and appear only at the end of the biosocial development of the brain. The volume of potentials for the development of the social psyche is individual and limited by the innate energy potential of the brain development.

Laws of individual development of the organism

Uneven and heterochronous development. The processes of development of the body are undulating and not at the same time. The intensity of development is determined by the age of the body.

The younger the body, the more intense its development (compression of development) is.

Stage-by-stage and cyclical development.

Each stage of the development of the body has its own content, pace and growth.

Plasticity of development.

The development of an organism is the interaction of flexible and rigid determinants of development.

Cumulative development - the accumulation of quantitative changes in development leads to a new quality - leaps and metamorphoses of development.

Combination of the processes of evolution and involution.

Each stage of development is an interaction of different development potencies: old and new, progress and regression, evolution and involution, compensation and decompensation, life and death.

Divergence - An increase in the fields, properties and potencies, the diversity of neuropsychiatric activity. It is characteristic of evolution, progressive development. Convergence - Reduction of fields, properties and potencies, diversity of neuropsychiatric activity. It is characteristic of involution, reverse development.

Evolution - A stage of progressive development of the organism. It is characterized by its growth, maturation, unfolding of structures and functions, an increase in system integration, and the power of homeostatic systems. The reason for the evolution of the organism is negentropic processes directed against entropic degradation, as a general natural tendency in the development of living systems. The physiological mechanism of evolution is an adaptive decrease in the threshold of reactivity of the hypothalamus to peripheral hormones and metabolites.

This is the period of life from the moment of conception to full maturity, the peak of individual development-20-25 years. Acme - The peak of development - full maturity, the peak of individual development, when entropic and non-entropic processes balance each other.

Plateau - The time when an organism is at the peak of individual development, the state of its homeostasis, dynamic equilibrium at the point of energy, integration and information maximum. The maximum adaptation of the organism in the ecosystem is observed. Involution -the stage of reverse development of the organism [5]. There is a decrease in the previously achieved level of internal integration, complexity, organization, energy capacity, an increase in the threshold of adaptive reactivity and entropy of the organism in order to increase its stability in the ecosystem. At the same time, "diseases of involution" are formed. This is the period of life over 30 years. Involution is the withering, entropic degradation of an organism associated with the action of the second law of thermodynamics and the principle of increasing entropy in living systems. The physiological cause of involution is the continuation of the mechanisms of development of the body after the passage of acme, based on the pleiotropic of genes, which lead to an increase in the threshold of adaptive reactivity, a violation of homeostasis and "diseases of involution" of the body .

Death - A natural outcome of ontogenesis, a consequence of entropic degradation of the body. The physiological cause of death is aging, as an extreme expression of involution, a total atrophic process, and "diseases of involution" leading to systemic disintegration, homeostasis disorders, multiple organ failure, and cachexia.

"Diseases of evolution" of the organism

Internal contradictions in the development of an organism at the stage of evolution are expressed through "diseases of evolution". In its extreme expression, "diseases of evolution" can reach the state of pathology. "Diseases of evolution" are diseases of growth, formation, maturation and adaptation, typical of childhood and adolescence. This includes neuropathy, childhood infections, disorders of eating, motor skills, general and special development, behavior and emotions, drives, asthenic, neurosis-like and somatoform disorders, transient hormonal dysfunctions, obesity, vegetative - vascular dystonia, and others. The "diseases of evolution" are characterized by a typical nature, the relationship with the age period, the mildness of clinical manifestations, transience, and sub adaptation of the organism in the ecosystem. The "diseases of evolution" of the organism lead it to the acme, the peak of individual development.

Evolution course options:

Harmonious, proportional development of tissues, organs and systems of the body.

Disharmonious, asynchronous development of tissues, organs and systems of the body.

Acceleration - rapid development of tissues, organs and systems of the body.

Retardation - delayed development of tissues, organs and body systems.

Evolution course types:

Uncomplicated, benign, compensated development of the body.

Complicated development - with frequent crises, shifts and sub compensations in the work of organs and body systems.

Evolution is not a straightforward, progressive and painless process, but it is always an internally contradictory, multidimensional, wave-like process through biological crises, conflicts, states of sub compensation, sensitive periods of development associated with the entry into the arena of ontogenesis of another negentropy mechanism. The reasons for the difference in the nature of evolution lie in the invariance of the genotypes of individuals and ecosystems in their internal conflict. Hereditary anomalies, early organic brain damage, hormonal dysfunctions, exogeny, somatogeny, psychogeny, deprivation at the stage of development distort and complement the picture of childhood pathology, change the nature of the course of evolution and lead to dysontogenesis. Treatment of "diseases of evolution" is carrying out regime-protective measures, correction of complications of the work of organs and systems.

"Diseases of involution" of the organism

The involution is expressed through an increase in the threshold of adaptive reactivity, a decrease in the total energy capacity, system

integration and power of homeostatic systems. As a result, "diseases of involution" are formed. They are menopause, general atherosclerosis, hypertension, diabetes mellitus, cancrophilia, hyperadaptosis, endogenous depression, immunodeficiency states, senile atrophic processes with access to Alzheimer's type dementia, multiple organ failure and cachexia. Old age is an extreme expression of involution, the reverse development of the organism. While the "diseases of evolution" lead the organism to the acme, the peak of individual development, the "diseases of involution" lead it to death.

Involution course options:

Harmonious, uniform, proportional course of involution.

Asynchrony is an uneven, disproportionate course of involution. Acceleration is an accelerated course of involution.

Retardation - a delayed course of involution.

The reasons for the difference in the variants and types of involution lie in the invariance of the genotypes of individuals and ecosystems in their internal interaction and struggle. Hereditary anomalies, exogeny and somatogeny and psychogeny distort and complement the picture of involution. Treatment of "diseases of involution" is prevention of chronic pathology exacerbation and decompensation in the work of organs and systems.

Old age is an extreme expression of involution, the reverse development of the organism. Its morphological basis is a total atrophic process. The cause of aging is the entropic degradation of the body, which is expressed through an increase in the threshold of adaptive reactivity, a decrease in the total energy capacity, the power of homeostatic systems, and systemic disintegration. Senile atrophy of the organs and tissues of the body is a typical outcome of its involution with the release of multiple organ failure, cachexia and Alzheimer's type dementia. Partial variants of senile atrophy of the body reflect the variants of unevenness and asynchrony of its aging. Compensatory processes aimed at the reintegration of the body, the preservation of homeostasis, and the state of chronic depression complement the overall clinical picture of aging. Chronic depression in the aging of the body is a form of adaptive protective and protective inhibition of its vital activity in the conditions of sub compensation and decompensating of the work of organs and systems.

Conclusion

The development of the organism in ontogenesis is not a straightforward, progressive and painless process, but always an internally contradictory, multidimensional, often reversible process through deep biological shifts, recessions, crises, conflicts, states of sub compensation and decompensation. The development of the organism is based on its internal conflict with the ecosystem, which dictates its morphological and functional structure through natural selection. The consequence of the internal struggle and the contradictory nature of the relationship between the organism and the ecosystem are diseases of the organism development in ontogenesis. "Diseases of evolution" lead the organism to acme, full maturity, the peak of individual development. Diseases of involution lead the organism to death. Death is a natural outcome of the

individual development of the organism, a consequence of its entropic degradation in ontogenesis. The physiological cause of death of the body is its aging, as a total atrophic process, and "diseases of involution", leading to a violation of homeostatic regulation, disintegration, decompensation in the work of organs and systems, multiple organ failure and cachexia.

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How to cite this article: Leonchuk Sergey. "Diseases of the development of the body in ontogenesis." *Clin Schizophr Relat Psychoses* 15 (2021) :