
PSYCHOLOGY

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THE PSYCHO-IMMUNE UNITY OF THE LIFE-SUPPORT SYSTEM

SUMMARY. The conceptual grounding of the processes that provide the presence of psychosomatic connection and psycho-immune unity in particular is suggested. Perspectives for instrumental support of dynamic psycho-immunology are drawn.

KEY WORDS. Psychoimmunology, phylogenesis, similarisation, specific and nonspecific answers, defense strategies.

The main idea of the majority of modern research works which can be combined in the category “psychoimmunology” is to state links between the immune system and the psyche. At present there are many examples in the sphere of psychoimmunology, psychophysiology, psychiatry, neurophysiology, etc. where the majority of research was of a stating character and registered a link between the psyche and the immune system. For example, it has been established that **immune diseases** are caused, and are often determined by mental features, and they are involved in the single mechanism of self-control of the person as complete in their life manifestations. In turn, **in psychology** the problem of interpretation of body symptoms is of great importance, and this problem hasn’t received even a preliminary solution yet. There is an acute problem of interpretation of somatic feelings at immune failures. There are no descriptions of **the general mechanism** which causes/determines immune defects.

If such a mechanism were identified, it would allow:

- a) to understand cases of spontaneous recovery;
- b) to pass gradually from a symptomatic nosology to proper diagnostics—to remove ambiguity concerning the reasons of this or that disease;
- c) to include meaningfully the solution of psychotherapeutic (psychocorrectional) tasks in the scheme of treatment of immune diseases.

Therefore in the nearest future it is required to prove, first, the nature of the link between the immune system and the psyche, and, secondly, possible mechanisms,

providing their coordinated interaction that is presented in details in the form of more specific statements (theses).

The purpose is to outline the conceptual foundation of psychoimmunology, having proved the natural character and evolutionary need of the interaction between the immune system and the psyche, their adjoined functioning. Let us do so in the form of several theses.

Thesis 1. The basic (main) similarity between mental and immune systems is caused by their general phylogenetic origin. At a certain stage of evolution, primordialny hormone intracellular regulatory molecules were the basis of the creation of all the systems of future organisms which at first had no specialized organ and cellular structure. In particular, these molecules appeared to be the general “construction” material both for the immune, and for psyche systems. The first specialized completely in solving problems of the organism in a microcosm, the second in solving the same problems in a macrocosm (but with material realization of mental processes by biochemical means). Then, the process of morphologically structured complex systems (nervous, immune, endocrine) providing a physiological homeostasis took place. Consequently, we are dealing with phylogenetically common roots that combine the psyche and the immune system in a single unit.

Thesis 2. Differentiation of the mental and immune systems took place due to the specialization of the spheres of responsibility: a macrocosm/microcosm. The macrocosm and microcosm are two specific areas of objective reality, differing in the level of matter structure and organization. To survive in the constantly changing conditions of the world the body had to have precise system mechanisms at different levels of its organization. The macrocosm system is perceived by means of mental (cognitive) processes which provide effective adaptation to the environment and are the tool of the model (macro) world creation, made in the language of subjective experiences. The microcosm system is realized through mechanisms of the work of the immune system which have been secured evolutionally.

In psyche reflection incoming information undergoes specific processing and depends on subjective features. The basic process owing to which a reflection takes place is assimilation. **Assimilation** [1] is a modelling of object properties and phenomena by means of the counter activity of a living being.

The adequacy of a perception image (its conformity to reality) is achieved through the process of assimilation during its creation, perceiving the systems as properties of influence and, that is, a dynamic combination is created according to its characteristics is complementary comparable to the original.

Owing to the high specificity and sensitivity of the receptors passing signals to cells, the immune response is initiated, which has great value for a survival in interaction with both the external (in relation to the body), and the inner world.

Considering the complexity of these worlds and the abundance of threats (risks), it becomes obvious that the immune response should be in conditions of precise regulation, as much as any other physiological system.

Thesis 3. Initially (in phylogeny) the mental and immune systems have a common set of functions and problems solved by a living being. The recognition of danger; the forecast of the development of events; the accumulation and use of successful ways for the solution of vital problems and minimization of failures; blocking harmful agents or factors for the decrease of the damage done by them.

The recognition of danger for a living organism (a living being) is a process of categorization referring a certain object, living being or phenomenon to a category (a variety of elements combined by a common feature) in which all dangerous or harmful factors are included.

On the part of the psyche mentality categories are taken (are actualized) from an image (model) of the world.

In the immune system, the given mechanism works at a cellular level. Probably, the cells are the result of “generalization” and a biochemical “image of the world.”

The forecast of the development of events is a process of categorization—finding out the diagrams of the phenomena with which the given living being has already dealt. The forecast is based on the processes of memory—properties to fix, accumulate, store and actualize the traces of former interactions.

This search mechanism in psychology is called *the transderivational search*. The transderivational search [2] is a process, which:

a) provides the actualization of links which have ever been formed with the given category, including the links with these actualized too. Physiologically it is provided by the initiation of action potential (or mediator preparation for its start) through all synapses which have ever been involved in according to the given activity;

b) hierarchizes the actualized links in accordance with a degree of their relevance to problems of a living being. Physiologically different thresholds of sensitivity synapses correspond to it. (it is provided with the availability of appropriating quantity of mediator and readiness of acceptors).

In the immune system this reaction is called the immune response [3], as a result of which:

a) the processes become activated (almost all), and they are connected with many individual properties and definite genetic peculiarities; these processes are aimed at activation of extracellular and cellular responses, which influence a pathogenic object or intensifies a body reaction; this set of processes got the name of the immune response—a total mobilization of evolutionarily accumulated resources;

b) the processes of this or that defense line become hierarchized and they are necessary for a body relevance; the immune reactions are organized to secure accuracy and precision of its cellular components interaction and their symbiotic for the organization of protective immune reactions; altogether they realize a specific immune response.

Blocking harmful agents or factors to reduce the damage done by them means behavioural patterns (learned from experience) aimed at eliminating or weakening the harmful factor (threat), minimizing its influence (damage), etc. These sample

strategies are capable of protecting an organism from overloads, destruction and/or substitution of the quality of both the psychological and the antigenic plan.

The earliest or primary lines of protection allow to reduce the anxiety of different etiologies. These nonspecific (therefore sometimes unconstructive) types of protection reflect the influence of inborn, somatically caused and characteristic biological forces. The main mechanism of these protections is stereotypical behaviour, allowing another to accept full responsibility for significant forms of activity.

Comparing the two systems, we find that blocking the threat occurs similarly as there are a lot of generalized mechanisms of protection capable of preventing a danger:

- they begin working by the principle of an emergency response;
- they are characterized by a wide range of activity;
- weak differentiation.

The second line of protection is more specific and differs in greater complexity. There is a mitigation of initial primary strategies and the choice of an effective way of protection.

Solving difficult problems coping's the economic or resource approach, thus we keep our health, the capacity for adaptation and there is a precise distribution of resources.

On the basis of innate mechanisms of immunity, acquired immunity is built which develops only after the contact with an antigen and only in the case when innate immunity has failed to cope with its task.

The differentiated, specific means are built on over generalized, nonspecific [3] ones, using a time stock which provided these rough but important mechanisms for a living being.

Thesis 4. There are close links between the two systems due to a common origin, as well as common (often single) tasks (needs and script).

As a means of links for communication, a difficult complex of chemical reactions takes place. Hormones, neurotransmitters and cytokines play a role of mediators (intermediaries) or the "language" in intercellular interaction, and they should be considered as specialized representatives of the functionally single group of the intercellular communicatory molecules working in the conditions of a microcosm.

The psyche carries out the activity with the help of numerous physiological mechanisms, where differentiated neurochemical systems belonging to the nervous system are the language of interactions with the micro/macrocism. These systems represent a set of brain structures whose function is determined by the existence of the common mediator and the receptors interacting with it.

Thereby the dynamic system of the interdependent electrochemical biological processes composing a difficult network interaction is created.

At the emergence of a nonspecific reaction at all regulatory levels, behavioural, psychoemotional, vegetative, humoral, immune, complex changes take place which occur in a quite standard manner.

The first way of reaction is psychological, and immune protection becomes weaker, and the organism becomes defenceless.

The second means of response to a nonspecific reaction is the steady resistance of the organism, and it mobilizes its resources to return the system to stability. The manifestation of nonspecific reactions by an organism to nonspecific irritants is the most constant and quantitative both from the psyche and from the immune system. The nonspecific reactions define the possibility of restoration of the homeostasis of an organism after the influence of specific reactions are carried out with the indispensable participation of nonspecific components. Therefore no matter how many (sub) systems there are, all of them begin running at the same time.

Thus, the psycho-neuro immune endocrine interactions are connected with the performance of a single function in the elimination of the external (macro) and internal (micro) reasons, capable of preventing the threat to the all-organismal homeostatic process. To carry out this function they are united in one system called a “single regulating metasystem”, and such interaction is possible only with common functional properties and corresponding regulatory factors and receptors.

The psyche and immune system developed evolutionarily very similarly in the mechanism of functioning categorical systems and behavioural patterns which don't only provide multilevel protection, but also create new strategies, capable of protecting an organism against overloads and destruction from different exogenous and endogenous factors.

The essence of psycho immune links is largely determined by how various levels interact with each other. At the same time, all levels are relatively independent from each other. So, changes (in particular, violations) at the molecular level cannot affect practically a long time at the cellular level of the organization before the achievement of certain threshold values, and practically do not influence the functioning of specific organism cells.

Violations at the cellular level of the organization before the achievement of a certain qualitative limit can be almost imperceptible at all-organismal (integrity) level. All-organismal changes, in turn, can be ignored for a long period of time by the psyche, and the events in the psyche are also capable of being ignored vaguely long by the consciousness (not to be conscious).

Methodical support of dynamic psychoimmunology.

Basic principles:

1. Orientation towards the dynamics: from stating to monitoring. It means the aspiration to reveal the functional dependencies, allowing to record the interfaced interdependent changes in the immune system and in the psyche. It is necessary to pass from fixing the existence of dependencies to the identification of the mechanisms providing these dependencies. It is important to understand how changes in one system are duplicated in another, providing a margin of safety of the life support system where the possibilities of one system act as an additional resource for another, and to answer the following questions:

- How do the interfaced changes of the psyche and immune system take place?

- How are the changes in one system duplicated by another?
- How are psychological events and circumstances modulated by the immune response?

- What links of the immune response must be investigated in the distinction of psychophysiological strategies?

2. To distinguish the psyche and consciousness. Their undifferentiated state leads to the fact that in experiments on the person, the effects on the psycho immune processes by consciousness are taken as a psycho immune dependence. Contradictory results are difficult to interpret reasonably.

During anthropogenesis there was a need for people's ability to suppress a transfer of the mobilization impulse from the psyche to the immune system because it allowed to spare an organism from stressful overloads, in the abundance of cultural (civilization) events, such as wars, love, celebrations, executions, sacrifices, etc. In other cases, it was required to make the immune answer active, for example, in ritual practice. Mechanisms of transfer of an impulse's influence are still waiting for description. In view of this, at first it is required to work out the model of psychoimmune links on subjects which don't have consciousnesses, i.e. on animals.

3. Analysis units—strategies. The central phenomenon we are going to pay attention to is **the similarity in strategies**, which both systems use at different levels. At present as a result of model reconstruction 6 basic strategies have been noted:

Variables	Passive form	Active form
Distancing with an aggressor	1. Escape, leave	2. Destruction, exile
Control of nature of influence	3. Blocking, barrier creation	4. Impact on a harmful factor, management of it
Blocking of information	5. Masking, mimicry	6. Ignoring the threat

Analysis shows that these strategies are universal, governing all types of activity of both systems.

Substantially the work must be organized gradually:

The first stage (where we are now)—**the creation of a laboratory model on subjects which don't have consciousnesses.** It is required to create a model, which:

a) would bring together the conceptual languages used for the description of the mental phenomena and immune processes;

b) would allow to state hypotheses about the processes owing to which there is a mutual activation of two systems;

c) would allow to use the idea of functional isomorphism of two systems, therefore, to plan applied research;

d) would give the opportunity to predict the development of processes in one system on the activation of processes in another.

It will give an opportunity to track the work of immune and mental systems and to define their involved interaction without the intervention of a conscious component.

Strategies	Psychological parameters (Behavioural displays)	Immune parameters
Passive form		
Flight Leaving	The desire to distance himself from the aggressor space or harmful factor	Paralysis of the immune system
Blocking Creation of a barrier	The use of body parts or an element of the environment as shields, barriers in the way of danger	Acellular and cellular elements preventing the antigen in the body
Masking Mimicry	Use of properties of an organism or possibilities of behaviour, allowing to become imperceptible for an aggressor	Production of specific antibodies
Active form		
Destruction Exile	The aspiration to separate with an aggressor by means of its exile, in extreme cases its destruction	Capture and destruction of microbes and other alien bodies
Influence on the nocuous factor, management of it	The aspiration to affect parameters of the nocuous process—to soften, transform, subordinate to oneself, to change the behaviour of an aggressor	Inactivation of antigen Antigen presentation
Ignoring the threat	Expense of forces on changing the way of perception of a situation or its assessment: an imputation of threat, perceptive protection (functional blindness ...)	Autoimmune failures: FIC in an instant virus invasion

The second stage. The creation of a basic model for subjects having consciousness.

The basic model will be complicated due to the introduction of the level of consciousness in it. There are:

- culturally set standards of health, relevant values;
- civilized requirements to a way of life and social behaviour, comprehended as factors of life-support;
- behavioural strategies directed on the reception of socially meaningful results, influencing health;
- verbal formulae automatically repeated by people which lead up to the redistribution of the priorities of physiological activity (“my eyes would not see...”, “I’ve got you under my skin...”, “a headache...”, “to lose heart...”);
- convictions and beliefs of people influencing the course of physiological processes.

The placebo effect should be not ignored, but studied and involved as the means of modelling medical therapeutic procedures.

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