

Psychoimmuno-neuroendocrinology: *an integrative approach to modern philosophy in medicine and psychology*

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Key words: **psychoimmuno-neuroendocrinology; integration; continuity; cross-fertilization; butterfly effect; prevention**

Neuroendocrinology Letters 1999; 20:205-213 pii: NEL203499X02 Copyright © Neuroendocrinology Letters 1999

Abstract

The immune system is now seen to be closely integrated with other physiological circuits, such as the central nervous system (CNS) and the neuroendocrine system. There is also an increasing amount of evidence that this integrated circuit is bidirectional and both systems exert a reciprocal effect on each other. We have always stressed the **interdisciplinary** nature of the science where disciplines and sciences such as medicine, biochemistry, genetics, psychology, human ethology, etc. meet and undergo a process of “**cross-fertilization.**” We also have stressed the indivisibility of the somatic and psychological processes in the indivisible continuum of human life from its very beginning and the **inseparability** of the development and functions of the central nervous system and the immunological and neuroendocrine processes.

This **transdisciplinary** and integrative aspect of sciences and their entree in the twenty-first century is the true vision for our common efforts. Integration means also amalgamation, assimilation, blending, combining, incorporation, unification and harmony. This last mentioned, harmony, should be stressed and underlined specifically: a **harmony** between different views and approaches, between different methods and methodologies, different theories and practices. In order to undertake such a challenge, a new scientific theory and a common language is required, a language that would be understood across disciplines and would be able to assist in getting beyond semantic problems.

The bridge between the immune system, neuroendocrinology and the rest of the central nervous system opens the **gateway** to more common understanding and acceptance across the disciplines. It is an umbrella for the endeavor that unites various scientific fields in their attempt to elucidate the processes of experience involved from the earliest stages of human life.

This integration does cross over the different disciplines and diagnostic systems. It attaches theoretical and applied fields, basic research and clinical experience throughout the whole continuity of human life from conception and onwards. **Integrated Psychoimmuno-Neuroendocrinology** represents a unique opportunity for the primary prevention of psychological, emotional and physical disorders.

The human life has to be considered as an indivisible continuum where each of the developmental stages is equally important, all stages interdependent and not separable from the whole individual life's continuum. In this continuum, the individual represents an indivisible entity of all functions on both physiological or physical psychological and social levels. The physical, biochemical, endocrinological and psychological processes represent a whole which cannot be divided.

The continuum of life begins in utero. It is not possible to separate any stages of human development from the rest of an individual life's continuum. The life continuum is one of the basic needs in human life in order to maintain homeostasis and equilibrium. The disturbance of individual life continuum on a momentous scale would lead to illness or in the extreme cases, where homeostasis cannot be regained, death is the result. Any discontinuity from outside or from inside the individual organism will violate these basic biological and psychological needs, both prenatally and postnatally [1].

In order to understand the integrative approach to human life and to life as such where there are no distinctions made between the so-called "somatic" and so-called "psychological" dimensions, a new language is required and a new scientific theory is needed. One of the most essential problems in understanding the integrative processes in the human being from the theoretical and practical points of view is that of semantics which is, at the same time, a prerequisite for a dialogue between researchers and practitioners from different scientific and clinical divisions [2].

Or, as it was expressed in the leading article of *Lancet* in 1985: "Psychiatrists and immunologists do not meet much, and when they do they tend to speak in different tongues." [3]

In a holistic and comprehensive view of human life we cannot make divisions between somatic and psychological phenomena. Psychologically, medically, anthropologically considered, all life events are experienced as indivisible phenomenological situations wherein body and mind (soma and psyche) represent an entity of mutual influence and interdependence within the individual's life continuum and a particular sociocultural environment [4].

All integrative processes on the biochemical, hormonal, immunological, psychological, etc. levels start already from the very beginning of the human life at conception. The intrauterine experience is also a learning process for the individual. This learning is a vital prerequisite for survival since it makes

it possible for the organism to adapt itself to new circumstances.

Without adaptation there would be no survival and one cannot adapt without making and having had experiences upon which to base the adaptation and such a process requires memory—whether consciously retained or subconsciously imprinted. The informative processing which reaches the individual from the very beginning of his/her development will be received via the different biochemical pathways and then transformed and stored as memory traces. Already the embryo shows evidence of responding to and retaining the impact or imprint of sensory experiences in a biochemical language which remain as a potential learning source. These prebirth memory imprints may in turn be revoked as informational sources (whether negative, positive or ambivalent in character) during later life [2].

A great deal of such research is a direct consequence of the latest findings of two relatively new and innovative lines of medical and psychological research, namely psychoneuroendocrinology and psychoimmunology.

Psychoneuroendocrinologists and psychoneuroimmunologists have already elicited useful data from preliminary theoretical research in recording fetal response to and the tension of outside environmental stimuli (touch, sound and light stimuli for the most part). Various highly specific biochemical functions (hormones, neurotransmitters and other polypeptide structures) are needed in direct connection with input phenomena, for the transformation and storage of both sensorial and sensible types of information. Crucial to the formation of the primary central nervous system on the hypothalamic-pituitary-adrenal levels, some of these functions are detectable already in the very beginning of the development of the human being. Thus the embryo successively develops a high sensibility and competency for the potential ability for perception.

The implications of these preliminary findings are far-reaching. It will require nothing less than radically rethinking of the standard human-embryo development paradigm wherein structure is presumed to precede functions. Quite the contrary, recent research indicates the primacy of function over structure, the morphological organ. It is the morphological structure which develops as a result of the inborn primal functional urge. An organ would not develop if there were no functional urges compelling it to do so. In the same way, the mental capacity of the human is not posterior to the completed morphological structure of the brain, nor to

its subsequent introduction into and experiencing of a particular social cultural environment after birth. The unborn already has its psychological process functioning long before birth. In the philosophical sense, consciousness precedes being and not the other way around [1, 2].

“States of mind have long been suspected of having an effect on the immune system. For example in 1884 a leading article in the British Medical Journal suggested that at funerals, ‘the depression of spirits under which the chief mourners labour at these melancholy occasions peculiarly predisposes them to some of the worst effects of chill.’ In spite of such early perceptions, the possible association seems to have been largely ignored in modern times and in 1982 a 1750 page textbook of clinical immunology made no mention of the effect of psychological stress on the immune system” [5].

Within the research in psychoneuroendocrinology and psychoneuroimmunology there are some excellent models showing a multifactorial, interdependent character of the origin and of the course of different diseases and conditions in humans. Among others there are the investigations on HIV diseases and AIDS, cancer, infections, depression, stress, etc. Psychoneuroimmunology is evolving as a defined multidisciplinary field dealing with the complex bidirectional interactions of psychological factors such as emotions and behavior, the central nervous system (CNS) and the immune system. Already in 1964 Solomon and Noos posed the hypothesis that “stress can be immunosuppressive.” In 1988 Solomon with co-workers postulated hypotheses or corollaries based on the thesis that the immune and central nervous systems are intimately linked, and he presented supporting data of Solomon and Temoshok [6].

I would like to quote from his latest list on such hypotheses:

1. Enduring coping style and personality factors should influence the susceptibility of an individual’s immune system to alteration by exogenous events, including reactions to events.

2. Emotional upset and distress should alter the incidence, severity, and/or course of diseases that are immunologically resisted (infectious and neoplastic diseases) or are associated with aberrant immunologic function (allergies, auto-immune diseases).

3. Diseases of immunologic aberration should, at times, be accompanied by psychiatric and/or neuro-

logical symptoms.

4. Factors elaborated by the immune system should affect the central nervous system (CNS) and substances regulated by it.

5. Behavioral interventions such as psychotherapy, relaxation techniques, hypnosis and others should be able to enhance or optimize immune function.

6. Prenatal hormonal environment may effect both CNS development with behavioral consequences and immune development with long-lasting alterations in the components and function of the immune system [6].

Thus, psychoneuroimmunology describes a new multidisciplinary area of research that has as its focus the dynamic interactions among behavioral factors, the central nervous system (CNS) and the endocrine and immune systems. The long-range goal of this research is to provide a comprehensive understanding of the role that behavior might play in promoting health and provoking illness [7].

What was said before about the holistic and comprehensive view on all human functions will be true also in considering the issue of health and disease. The psychophysical organism is trying to maintain its health. It strives toward recovery, away from destruction; it strives toward homeostasis, away from disorganization and chaos. Health has clearly a very strong dynamic and creative dimension and in 1974 I described health as “the dynamic movement along the creative path toward self-realization” [8]. Self-realization has to be understood to contain the biological, psychological and social dimensions. Self-realization with regard to:

- a. the constructive integration of dialectically changing, individually dependent conditions with simultaneous maintenance of the homeostasis of the “*milieu interieur*”; and

- b. the balance in the striving toward satisfaction of the central intimate vision of the individual during the continuous confrontation and adaption of the psychoendocrine system with and to the “*milieu exterieur*” of ordinary day-to-day life situations. By adaption is meant not just the adaption of the individual to the environment, but also the possibility to transform the environment to suit oneself.

As Ader [9] pointed out, the assumption on an autonomous immune system is no longer tenable. The immune system, like all other physiological systems, functions in the interests of homeostasis and is integrated with other psychophysiological processes and, as such, is subject to regulation or modulation by the central nervous systems (CNS).

Fundamental processes of life, such as reproduction, metabolism, information processing and immune responsiveness, are controlled by the neuroendocrine-immune system. The brain is a central nervous controller and neurotransmitters, systemic hormones and hormone-like mediators of immune cells are chemical messengers in this complex system [10].

All this has again to be seen and understood in the undivided continuum during the individual's life. There is a strong impact of hormonal, psychological and immunological influences already on the whole embryonal and fetal development.

Gupta has pointed out that humors and hormones in pregnancy can act as determinants for personality development in the child and the concept of "endocrine personality" developed. Exposure of the fetus to higher and lower secretion of various hormones in the mother can affect the fetal and neonatal brain development and may cause significant changes at least in certain agreed areas in adulthood [11, 12].

O'Leary et al. [13] have described the relationship between temperament and immune function in children with AIDS. Analyses of psychoimmunologic relationships in the children revealed significant association between temperament and quantitative immune function.

Prenatal stress, maternal depression, maternal separation, hormonal deviations, immunology disorders, infections of various characters, and environmental influences have impact on the fetal brain and its differentiation or changes in neurotransmitter level and/or neuroendocrine development, disturbances and predispositions. Thus, the prenatal stages of life represent a unique opportunity for the primary prevention of psychological, emotional and physical disorders in later life. At this stage we can also develop preventive procedures to decrease premature birth and perinatal morbidity and mortality. We also can influence the destiny of the psychoneuroendocrinological and psychoneuroimmunological health during the individual's entire life [14].

Conditions which still have not been sufficiently explored such as sudden infant death syndrome (SIDS) and others have a highly probable connection to the early prenatal neuro-hormonal-immunological disturbances or failures. According to the "butterfly effect," events are interdependent to the degree that very subtle and seemingly insignificant movements of a butterfly's wings are able to set off, somewhere far away, a large typhoon. This but-

terfly effect can be likened to the prenatal stage of human development. With respect to that lies the unique opportunity for primary prevention.

In the beginning of this paper I have stressed the need for continuity in an individual's life as one of the basic needs. What was said about the "butterfly effect" and primary prevention is certainly true during the entire individual's life. David L. Felten [15] emphasized how some stressors and some distressing events and affective states such as depression and bereavement may be associated with adverse health outcomes and diminished measures of immune response under some circumstances. At the same time he expressed regrets on how little attention has been given to the scientific examination of the counterpart, namely, that positive emotions may contribute to beneficial health outcomes and enhanced immune responsiveness. He asked whether laughter, strong personal and social support, determination and the will to overcome adversity could help a patient to recover from an immune-mediated disease or prevent it from recurring. Observing his own patients the answer was "possible" or even "likely."

This is our task as clinicians and scientists. If we can develop our skills, our theories and scientific practice in more truthful and beautiful ways like the butterfly's wings, we can effect the very future of humanity.

In closing I indeed agree with what André Gide said—"Everything has been said already, but as no-one listens, we must begin again."

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