Margit Koemeda-Lutz

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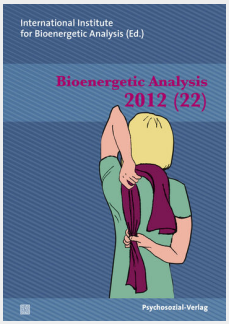

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Integrating Brain, Mind, and Body: Clinical and Therapeutic Implications of Neuroscience

An Introduction[1]

Margit Koemeda-Lutz

Abstracts

English

This paper presents a tentative assessment of what Bioenergetic Therapists may take out of the proliferating neuroscientific findings of the past two to three decades. A few examples are picked to demonstrate that different levels of observation – the sociobehavioral, the psychodynamic, the physiological and the cellular-biochemical – are equally relevant to an understanding of the complexity of human experiencing, information processing and functioning. Interventions on any of these levels can induce change on the same and/or any of the other levels: an increase of subjectively experienced stress, an activation of certain promotors and genes, synthesis and release of certain hormones, aggressive behaviour etc. All these processes are interconnected in highly complex systems. A short case vignette at the end recommends that clinicians acquire as much scientifically based explicit knowledge as possible, but that in moment-to-moment interactions with their patients they must also rely on their intuition and what has become "implicit" in their personality as psychosomatically oriented therapists.

Key words: bioenergetic analysis, body psychotherapy, neuroscience, psychosomatics, complex systems

1 Keynote presented at the 21st biennial IIBA International Conference, October 26–30, 2011, San Diego, California.

Zur Integration von Gehirn, Geist und Körper: Klinische und Therapeutische Implikationen Neurowissenschaftlicher Forschungsergebnisse – Eine Einführung (German)

Dieser Beitrag versucht eine Bestandsaufname bezüglich des Nutzens der in den letzten zwei bis drei Jahrzehnten exponentiell angewachsenen neurowissenschaftlichen Forschungsergebnisse für Bioenergetische AnalytikerInnen. Einige ausgewählte Beispiele sollen verdeutlichen, dass verschiedene Ebenen der Beobachtung – die soziobehaviorale, die psychodynamische, die physiologische, die zellulär-biochemische – gleichermaßen relevant für ein Verständnis der Komplexität menschlicher Erfahrung, Informationsverarbeitung und menschlichen Funktionierens sind. Interventionen auf jeder dieser Ebenen können Veränderungen auf derselben und/oder auf jeder anderen Ebene auslösen: ein erhöhtes subjektives Stresserleben, die Aktivierung bestimmter Promotoren und der entsprechenden Gene, die Synthese und Ausschüttung bestimmter Hormone, aggressives Verhalten usw. All diese Vorgänge sind in hoch komplexen Systemen miteinander verknüpft. Eine kurze Fallvignette am Ende empfiehlt, dass sich klinisch Arbeitende möglichst viel wissenschaftlich fundiertes explizites Wissen aneignen, sich aber in den von Moment-zu-Moment sich entfaltenden Interaktionen mit ihren PatientInnen auch auf ihre Intuition und das, was in ihrer Persönlichkeit als psychosomatisch Arbeitende "implizit" geworden ist, verlassen müssen.

Schlüsselwörter: Bioenergetische Analyse, Körperpsychotherapie, Neurowissenschaft, Psychosomatik, komplexe Systeme

Integrer cerveau, esprit et corps: Implications cliniques et thérapeutique des neuroscience – une introduction[2] (French)

Cet article présente une tentative d'évaluation de ce que les thérapeutes bioénergéticiens peuvent tirer de la prolifération des conclusions neuroscientifiques des deux ou trois décades passées. Quelques exemples sont choisis pour démontrer que différents niveaux d'évaluation – la socio

2 Présentation principale présentée à la 21ème Conférence Internationale biennale IIBA, 26–30 Octobre 2011, San Diego, Californie, USA.

behavioriste, la psycho-dynamique, la physiologique et biochimique cellulaire – sont également utiles pour une compréhension de la complexité de l'expérience humaine, le traitement et le fonctionnement de l'information. Les interventions à n'importe lequel de ces niveaux peuvent induire du changement au même et/ou à n'importe lequel des autres niveaux: une augmentation du stress expérimenté au niveau subjectif, une activation de certains organisateurs et gènes, synthèse et libération de certaines hormones, comportement agressif etc … Tous ces processus sont interconnectés dans des systèmes extrêmement complexes. A la fin une courte vignette d'un cas recommande aux cliniciens d'acquérir une connaissance scientifique aussi explicite que possible, mais que dans leurs interactions dans l'instant avec leurs patients ils puissent aussi faire confiance à leur intuition et avec ce qui est devenu "implicite" dans leur personnalité en tant que thérapeutes orientés vers la psychosomatique.

Mots Clés: Analyse Bioenergétique, psychothérapie corporelle, neuroscience, psychosomatique, systèmes complexes

Integrando el cerebro, la mente y el cuerpo: Implicaciones clínicas y terapéuticas de la neurociencia – Una introducción (Spanish)

Este artículo presenta un intento de evaluación de lo que los analistas bioenergéticos pueden obtener de los crecientes hallazgos neurocientíficos de las dos o tres últimas décadas. Se muestran algunos ejemplos para demostrar que distintos niveles de observación – el socioconductista, el psicodinámico, el fisiológico y el bioquímico-celular – son igualmente relevantes para una comprensión de la complejidad de la experiencia humana y el procesamiento y funcionamiento de la información. Intervenciones en cualquiera de estos niveles pueden inducir cambios en el mismo y/o en cualquiera de los otros niveles: un aumento de stress experimentado subjetivamente, una activación de ciertos promotores y genes, síntesis y liberación de ciertas hormonas, comportamiento agresivo, etc. Todos estos procesos están interconectados en sistemas altamente complejos. La viñeta de un caso al final recomienda que los clínicos adquieran tanto conocimiento científico explícito como sea posible, pero que en las interacciones momento-a-momento con sus pacientes también deben confiar en su

intuición y en lo que se ha convertido en "implícito" en su personalidad como terapeutas con orientación psicosomática.

Conceptos clave: neurociencia, celular-bioquímico, hormonas, explícito, implícito

Integrare il cervello, la mente e il corpo: conseguenze cliniche e terapeutiche delle neuroscienze – un'introduzione (Italian)[3]

Questo scritto presenta il tentativo di valutare cosa un terapeuta bioenergetico può trarre dalle ricerche neuroscientifiche degli ultimi venti o trent'anni. Vengono portati alcuni esempi per dimostrare che diversi livelli di osservazione – quella sociocomportamentale, la psicodinamica, quella fisiologica e biochimica-cellulare – sono ugualmente rilevanti per la comprensione della complessità dell'esperienza umana, del funzionamento e del modo di processare le informazioni. Interventi su ognuno di questi livelli possono indurre cambiamenti sullo stesso e/o su qualcuno degli altri livelli: l'incremento dello stress soggettivamente sperimentato, l'attivazione di alcuni geni e promotori, la sintesi ed il rilascio di alcuni ormoni, il comportamento aggressivo ecc. Tutti questi processi sono interconnessi in sistemi altamente complessi. Una breve vignetta clinica raccomanda che i clinici acquisiscano quanta più possibile conoscenza esplicita scientificamente basata, ma che nelle loro interazioni con i pazienti debbono anche far assegnamento sul loro intuito e su ciò che è diventato implicito in quanto terapeuti psico-corporei.

Parole chiave: neuroscienze, biochimico-cellulare, ormoni dello stress, esplicito, implicito

3 Relazione presentata al 21° Congresso biennale dell'IIBA, 26–30 Ottobre 2011, San Diego, California.

Integrando Cérebro, Mente e Corpo: Implicações clinicas e terapeuticas da Neurociência – una Introdução (Portuguese)[4]

Este artigo apresenta uma contribuição experimental do que terapeutas bioenergéticos podem extrair da multiplicidade de descobertas neurocientíficas das duas ou três últimas décadas.

Alguns exemplos foram selecionados para demonstrar que diferentes níveis de observação – sócio-comportamental, psicodinâmico, fisiológico e bioquímico-celular – são igualmente relevantes para a compreensão da complexidade da experiência humana e do processamento e funcionamento da informação.

Intervenções em qualquer desses níveis podem induzir mudanças nos mesmos e/ou em outros níveis como: aumento do stress subjetivamente experienciado, ativação de certos promotores e genes, síntese e liberação de certos hormônios, comportamento agressivo, etc. Todos esses processos estão interligados em sistemas altamente complexos.

Um pequeno estudo de caso no fim do artigo recomenda que os clínicos aprofundem ao máximo seu conhecimento do explícito baseado cientificamente, mas que em interações momento-a-momento com seus clientes, confiem em sua intuição e no que se tornou "implícito" em sua personalidade como terapeutas psicossomaticamente orientados.

Palavras-chave: Neurociência, celular-bioquímico, estresse, explicito, implícito

The past two to three decades have been witnessing a worldwide boom in the neurosciences. National and other funds have generously invested in this development. Psychiatric and psychotherapeutic clinicians have eagerly received new findings in this field, and neurobiologically informed models of human functioning and change have become "standard".

The 21st biennial International IIBA Conference, recently held at San Diego, was therefore dedicated to an exploration of the clinical and therapeutic implications of recent neuroscientific findings for Bioenergetic Therapists, who work with embodied human beings.

4 Palestra apresentada no 21º Congresso Internacional bienal do IIBA – Outubro, 26–30, 2011, San Diego.

Originally, Joachim Bauer, professor for psychoneuroimmunology at the University of Freiburg in Germany, had agreed to present two keynotes, one on "Genes as Biological Communicators – the Impact of Relational Experience on the Activity of our Genes", based on his book of 2002, the other one on "Mirror Neurons as a Neurobiological Basis for Intuition", based on a book of 2005. Bauer's professional training and expertise cover Internal Medicine, Psychiatry, Neurobiology and Psychosomatic Medicine. He initiated and carried out significant research in the fields of gene regulation and immunology, on Alzheimer's disease and Depression. In his books he accomplishes the difficult task of relating the details of microbiological knowledge to the more general questions of clinical psychiatry and psychotherapy.

Unfortunately, four weeks before the conference, Joachim Bauer had to cancel his flight for sudden serious health problems, as he told us.

In the seventies of the last century there were fierce debates about the relative importance of nature versus nurture. In a Time Life Books issue on "The Genetic Code" from 1994, the preface still contends that the genetic blueprint determines the somatic appearance of individuals as well as their intelligence and temperament.

From current neurobiological findings, especially the field of epigenetics, we learn that heredity explains only a very small proportion of interindividual variation. Human beings share the same genetic blueprints to the incredible amount of 99.9%! The obvious variation between individuals therefore must be due to the **interaction** between environmental, including cellular and proprioceptive signals and genes.

According to current knowledge, only 1–2% of all human diseases are caused by gene mutations. The overwhelming "remainder" is due to dysfunctional communication processes on biological, social and/or psychological systemic levels. Also, it is certain substances or environmental factors, as e. g. nutrition, perceived relational situations, ultraviolet radiation, and transcription factors etc., that absorb or activate promoters, i. e. regulatory sequences on specific genes.

The Human Genome Project was accomplished in 2000. It had decoded the totality of all human genes – comprising over 3 billion nucleotides. Genetic "texts", i. e. DNS sequences, are fixed for each organism and subject to hereditary processes. The "expression" and activity of most genes though is subject to regulation in interaction with "contextual" and environmental stimuli and is a continuing, life long process. Individual experiences provoke and form reaction patterns that influence this regulation.

One level of observation, where epigenetics is relevant, is neuronal information processing. Our brain "translates" sensory into biological input. Nerve cells get stimulated and genes in these cells become activated. They elicit the production and release of neurotransmitters, growth factors or hormones and cause nerve cells to grow or decline. Active synapses enhance their structure, while inactive synapses dissolve ("Use it or loose it"). Frequent and intense experiences strengthen the interconnection of cell assemblies. Simultaneous, synchronic, rhythmical bioelectric activities (ca. 40 Hz) in cells create networks ("Cells that fire together, wire together").

Neuroscientific findings taught us that perceptions and notions are based on synaptic connections between nerve cells and that mental operations are facilitated by the interconnections of nerve cell assemblies. In addition, we learned that the neuronal architecture of our brains is subject to change throughout our lives. The good news to us psychotherapists is that it is therefore never too late for psychotherapeutic work! Here may be a connection to the rapidly growing field of gerontopsychotherapy.

In his book, Bauer reviews and reflects on an immense body of microbiological, psychiatric and psychosomatic research literature to demonstrate how life experiences, especially early in life, interact with the genetically designed human potential, in order to shape individual personalities on different levels – mental, emotional, behavioural, physiological and morphological levels.

He further demonstrates that – more than anything – interpersonal relationships influence somatic processes. This influence reaches as "deep" as to the regulation of gene activity. It is effective in adult human beings, and even more so during infancy and prenatal development.

As psychotherapists we KNOW that early experiences shape our feeling, thinking and behavioural patterns. But neurobiological research has demonstrated that early experiences also shape our somatic functioning, such as physiological patterns and the neuronal architecture in our brains. Attuned positive bonding in early childhood protects stress genes from over-reactivity in later life. Positive human relationships constitute the best "medication without side effects" (Bauer 2002, p. 13) for coping with psychic and somatic stress.

Early in life neuronal networks develop that later determine how a person appraises his or her environment and how he or she copes with challenging events. The architecture of neuronal networks and their functional patterns depend on early (relational) experiences. If they are positive, they foster

resilience, if they are detrimental (like e.g. neglect, abuse, violence), they may lead to dissociative patterns and contribute as etiological factors to the evolution of psychiatric disorders.

Integrating brain, mind and body means to perceive our clients and interact with them on several different levels, most of them beyond our consciousness. There are biochemical, cellular, behavioural and psychological changes in each of the participating organisms involved. None of these levels is more essential than any of the others. Processes on each of these levels influence each other, bottom-up and top-down and evolve parallel in time.

The question whether psychiatry and psychotherapy should be a natural or a philosophical science has been debated since Sigmund Freud's time and one may doubt if it will ever be settled. While in the sixties and seventies of the past century the social sciences boomed and prospered, the nineties of the last and the first decade of the 21st century shifted to more emphasis on the natural sciences. Most likely, we need both perspectives. And psychosomatic orientations in psychotherapy – Bioenergetic Analysis is one of its prominent exponents – are especially predisposed to integrate both aspects.

The following paragraphs will, on the basis of four short examples, delineate what we may have learned from the neurosciences lately.

Neurobiological Aspects of Stress Reactions

In a series of animal studies, Canadian stress researchers working with Michael Meaney found that maternal attention and love, operationalized as the amount of time spent with licking, cuddling, touching etc., significantly influenced their offspring's biological stress system. In intensely mothered animal babies, stress-gene (CRH) activation was lower later in life under standardized stress conditions than in animals that had been poorly mothered as newborns; and growth (BNDF-producing) gene activation, which is a prerequisite for successful learning, was higher.

Such findings are relevant to us bioenergetic therapists if we assume that we may make inferences from animal studies to human beings and that similar mechanisms are at work in us. Secondly, we must claim that psychotherapy provides for similar resources as does parental bonding

and love and therefore may influence our patients' epigenetic functioning in a way that they become less vulnerable to stress and increase their resilience in coping with life. We KNEW that intuitively before, didn't we? But neuroscientific findings have provided empirical proof that when we experience stress, in our brain (more precisely: in the hypothalamus) genes get activated that produce corticotropine-releasing hormones (CRH). This activation then triggers a whole cascade of further reactions. A second kind of genes (POMC) in our pituary gland is then activated, producing proopiomelanocortine, which in turn produces adrenocorticotropic hormones (ACTH). These are then released into our blood circulation. They then spread throughout our body and initiate the production and release of cortisol in our adrenal glands. Current cortisol levels in turn modulate CRH production in the hypothalamus. All this (and more) happens within a few minutes after having been exposed to stressful stimulation. Actually, it is even more complicated than this – my description only refers to the left part of figure 1.

Psychoneuroimmunological Aspects of Stress-Induced Inflammatory Reactions

In addition to endocrine reactions, stress also impacts the immune system. The immune system consists of two subtypes – an innate one (comprising granulocytes, macrophages, dendritic cells and natural killer cells) and an acquired one (comprising B-(bone marrow) and T-Lymphocytes), the latter being characterized by adaptive learning and shaping by stochastic genetic recombination in the thyroid gland in order to effectively meet and bind intruding antigenic material.

Psychological stress activates the sympathetic division of the autonomic nervous system and at the same time triggers (among many other things) inflammatory activities in the immune system. As pointed out earlier, it also activates the HPA-stress-axis, which triggers an antagonistic reaction in the immune system in order to confine the inflammatory reaction (TH1/TH2 shift), protecting the organism from an overreaction. These interacting processes can derail at several points. Either the endocrine part (HPA-axis) is not sensitive enough to immunological activation or immune cells are not sensitive to the inhibitory effects of glucocorticoids, e. g. cortisol. The inflammatory reaction can not be limited with detrimental

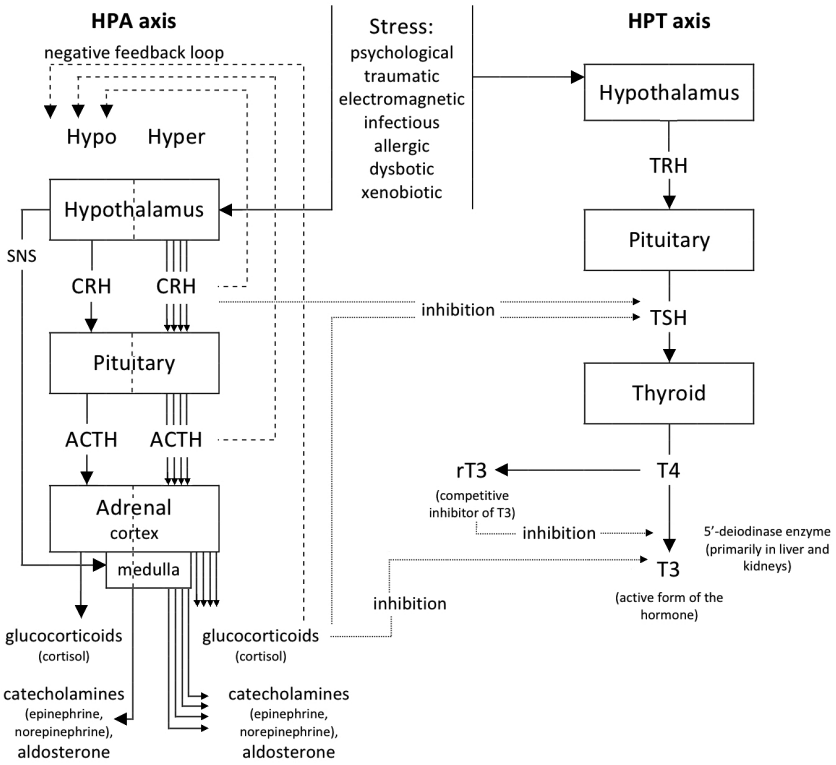

Figure 1: HPA and HPT Axes
HPA Axis = Hypothalamic Pituitary Adrenal Axis
HPT Axis = Hypothalamic Pituitary Thyroid Axis
CRH = Corticotrophic Releasing Hormone
ACTH = Adrenocorticotrophic Hormone
TRH = Thyroid Releasing Hormone
TSH = Thyroid Stimulating Hormone
rT3 = Reverse T3

long term effects on the organism (Besedovsky and del Rey 2007, cit. after Schubert 2011, p. 76). Schubert speculates that premature exhaustion of the stress system and a consecutive development of inflammatory diseases (like polyarthritis, multiple sclerosis etc.) may be due to imprints early in life, even prenatally. In San Diego there is a long-term study on Adverse

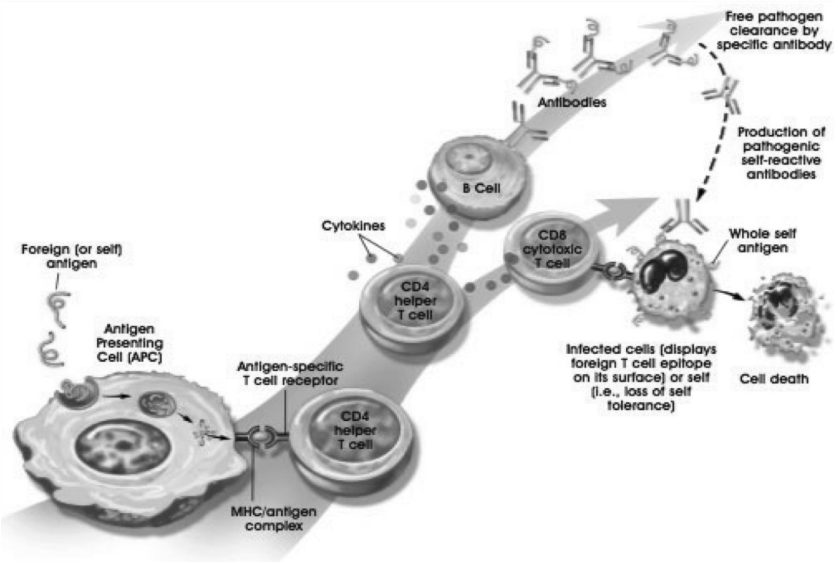

Figure 2

Childhood Experience (ACE) carried out by the Southern California Permanent Medical Group (Felitti et al. 1998, cit. after Schubert 2011) who try to follow up the effects of adverse childhood experiences to health and illness in adult life.

This was a second example of how a subjectively experienced process is connected to physiological processes. Next, a third example of the interrelatedness of processes at different levels of observation is provided.

Hypocapnia States

Bioenergetic Therapists work with exercises designed to induce stress and arousal in the autonomic nervous system. In a pilot study (Müller & Koemeda-Lutz 2004) at the State Hospital Münsterlingen we could demonstrate that, for instance, the "Backwards Bow" (figure 3), as well as induced hyperventilation, elicited a state of hypocapnia. As an indicator we took Carbon Dioxide concentrations in the blood, as measured transcutaneously.

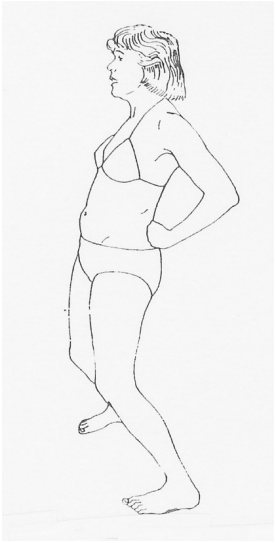

Figure 3: Backwards Bow

Hypocapnia is defined as an increase in breathing volume (voluntary ventilation, deepened breathing), which causes an enlargement of the area of contact between the air and the pulmonary surface (number of capillaries) and through this increases the rate of exhalation of carbon-dioxide (CO_2). An increase in breath volume and rate increases the rate of gas exchange. The more air saturated with CO_2 is exhaled, the faster the external air can absorb additional CO_2. In this way the CO_2-concentration in the blood decreases.

During the "Backwards Bow" the mean CO_2-concentration dropped significantly (from 5.7 to 5.1 kPa (Kilo-Pascal)), and even more so with hyperventilation (down to 3.7 kPa). With muscle activity or expressive vocalizations, the CO_2-concentration rose back to normal. During the "elephant"(also known as "forward bend"; figure 4) exercise the breathing deepened and vibrations in the leg muscles became visible, but a hypocapnia state did not emerge.

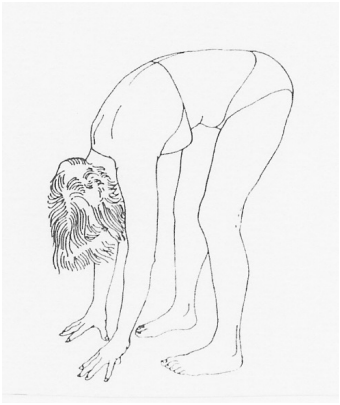

Figure 4: Elephant/Forward Bend

From a neurological point of view, hypocapnia causes states of ANS-excitability and reduces modulating and inhibiting influences from the cortex. Limbically dominated modes of processing prevail, which can, for instance, lead to emotional arousal.

Clinical Bioenergetic-Analytic experience has repeatedly demonstrated that the previously mentioned exercises lead to a loosening of affective defenses and make way for chronically suppressed emotions to be expressed. By interacting with the therapist, corrective experiences can be made – for instance, the client might say, "The therapist does not get angry when I express my rage, she does not abandon me", or the like. Such experiences create new entries in the emo-

tional experiential memory and are paralleled by physiological changes that can be traced.

Emotions – Psychosomatic Phenomena

Working with emotions is essential to bioenergetic therapy. Most psychopathological disorders imply emotional dysfunction. According to Thoits (1985, cit. in Berking 2008) 85% of all disorders listed in DSM-IV (Saß et al. 2000) have at least one emotion-related criterion as one of their constituents. Emotions are truly psychosomatic phenomena. Subjective feelings on one side parallel somatic processes on the other side, i.e. the Autonomic Nervous System (figure 5), the somatic nervous and muscular system (figure 6), the Endocrine System (figure 7), and the Immune Organs (figure 8).

The chances are good that if we help a patient to heal her emotional life, this will be paralleled by positive changes on all the other levels of her embodied being. To summarize, most perceptions are processed unconsciously and our nervous system initiates or triggers many psychic and somatic reactions without our awareness.

Stress in so-called civilized societies is mainly caused by interpersonal conflicts and lack of social support, as when needs and desires are not communicated, or by offenses, hurt and humiliation. As clinicians we may be familiar with the Hypothalamus-pituitary and adrenal gland-stress axis and its regulatory functions in cortisol synthesis and release. But that this stress system is individually coined in every single organism may not have been so widely known. In addition to raised cortisol levels, stress also causes the release of other transmitters noxious to nerve cells, e.g. adrenaline, noradrenalin and glutamate. Increased cortisol and glutamate concentrations in the brain can cause cell decline, especially in the hippocampus, which is responsible for memory functions.

Cortisol has lasting effects on the immune system, blocks interleukins and tumor necrosis factor. Under prolonged stress, these immunological transmitters are no longer produced in sufficient quantities because cortisol blocks important genes responsible for their production.

Stress increases the susceptibility for virus infections. Cortisol represses fever and other important defence reactions necessary for healing. Stress can have negative effects on the course of several diseases like multiple

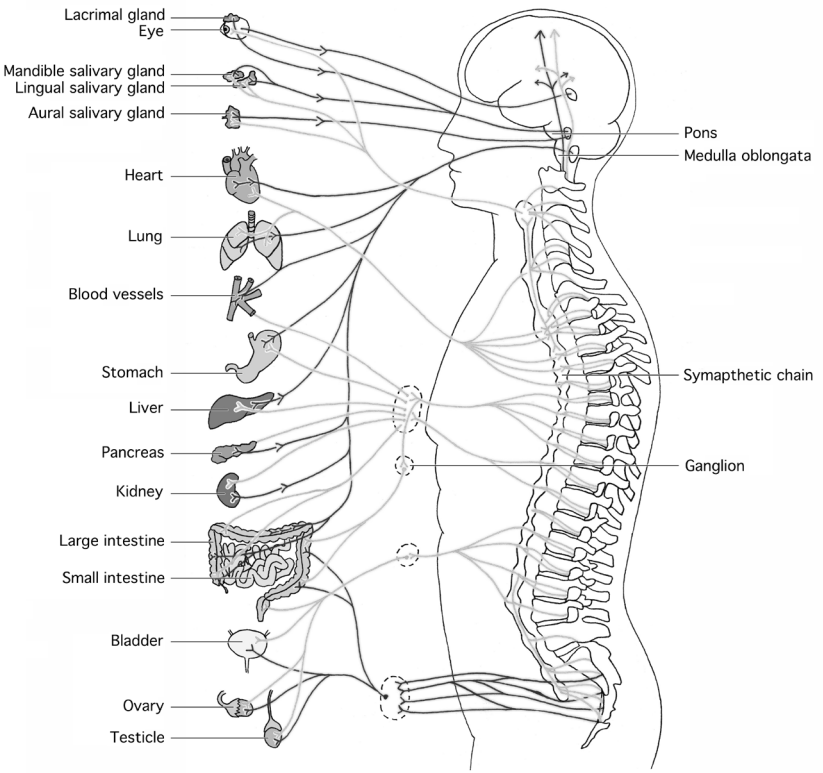

Figure 5: The Autonomic – Sympathetic and Parasympathetic – Nervous System

sclerosis, rheumatoid arthritis, skin diseases (like psoriasis), diabetes, and coronary and heart conditions.

Bauer and others have collected empirical evidence to demonstrate that positive relationships are biologically rooted health factors. When interpersonal relationships decrease quantitatively and qualitatively, health disorders increase.

In (body) psychotherapy we have different levels of intervention: On a biomedical level we can prescribe medication aiming, for instance, at an increase of intercellular serotonin. In this way – and it works on the biochemical and cellular level – we hope to enhance the patient's subjective feeling of well-being. On a psychological level we can help a patient to better become aware of and express his anger and by this means hope

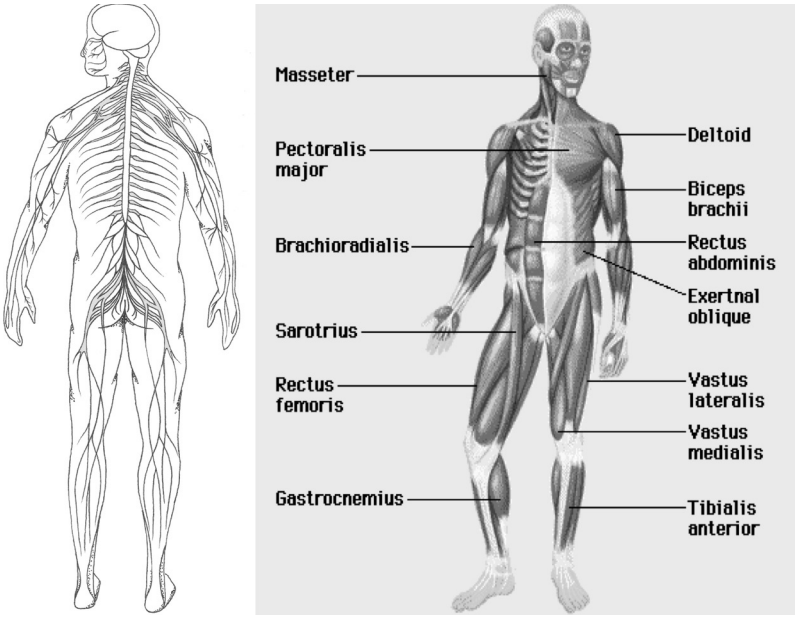

Figure 6: Somatic Nervous and Muscular System

to increase his interpersonal competence and at the same time possibly lower his blood pressure. On a behavioural level we can encourage a patient to quit her job which may result in burnout prevention, and at the same time enhance immune function. While interventions can be aimed at one systemic level, effects might be observed on the same and/or at other levels.

How does this apply to the most prevalent illnesses in Western societies: depression, coronary and heart disease, cancer, pain syndromes, post traumatic stress disorder and burnout states? Here is a brief outline, following Bauer's propositions:

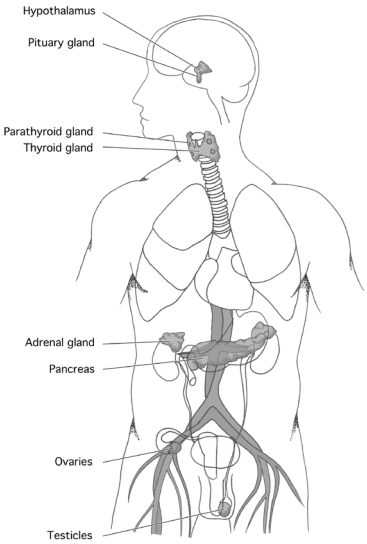

Figure 7: Immune System

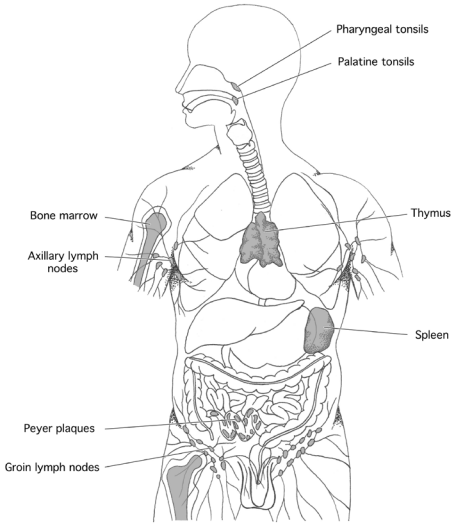

Figure 8: Endocrine System

Depression: Life events not only influence the well-being of a person, but substantially dysregulate gene activity and other somatic processes, resulting e. g. in sleep disorders, lack of motivation and agitation. With repeated depressive episodes there need not be any triggering events for a new episode any more. Depression is biologically conditioned. Depression is an over activation of the stress system. It has been demonstrated that depressive patients have significantly more problems and losses in their early relationships as compared to non-depressive controls.

Coronary and Heart Diseases: Several studies have shown the relationship between stress and depression and their influence on coronary and heart diseases. A combination of heart condition and depression bears a triple risk of mortality. Depression decreases heart rate variability and thereby increases the risk of heart disease.

Cancer: Stress and depression also influence the immunological defence and risk of tumor growth. Increased cortisol levels block immunological and inflammatory responses (reduction of natural killer cells). There exist studies which demonstrate that psychotherapeutic support reduces the risk of mortality.

Pain syndromes: Pain experiences leave imprints in our neuronal system like any other experiences. Pain leaves imprints specifically in the sensory area of the cortex and in the gyrus cinguli and facilitates future sensations of pain. Psychological and somatic pains "use" the same brain structures. Therefore psychological support and relaxation decrease the probability of pain sensations.

Post traumatic stress disorder (PTSD): In traumatic situations dissociation serves as a protective mechanism as genes for the production of endorphins are activated. The alarm reaction is stored in the amygdala and the

person develops a chronic amygdaloid over-activity and exhibits an increased sensitization towards stress. This is often the starting point for dissociative disorders, borderline personality or eating disorders to evolve.

According to Bauer, several studies have demonstrated that psychotherapy is a method of healing which influences psyche and body at the same time. These results were from studies of verbal therapies under examination!

An important question for further inquiry will be: What benefit do we as clinicians have from increasing knowledge about the subconsciously functioning physiological and biochemical processes in human organisms? Are they the ultimate goal of our search for knowledge whereas concepts and theories on "higher" levels (as e.g. in psychology) are deficient and preliminary? Analyses on different levels have turned out to be worthwhile and these results may help us to shape and revise our concepts.

I would like to close with a case vignette.

Case vignette

A couple of weeks ago Laura came in for her 18th session, very frustrated, quite depressed and said: "I know I will fail, nothing works any more, my brain is on strike." She is a student at Zürich University, has accomplished writing and handing in her master's thesis, has passed a 3-day and another 4-hour written exam as well as an oral exam of 3 hours.

Her present task was to e-mail two additional theses with a short summary for their defence within the next two days to her professor, who was to see her for another oral exam the following week. Meanwhile I heard that she has passed all exams with excellent grades!

In that session I felt she had some anger underneath her depressed surface. How did I know? My mirror neurons must have told me: her overall muscle tone, some tiny movements around her mouth, the look of her eyes … When I addressed this, she shrugged her shoulders, shook her head and said: "I don't want to go through all this a second time. If I fail this next exam, I will have to start all over again."

Up to this point our therapy had predominantly been some sort of coaching during the preparation for her exams. We had been discussing her theses. I asked questions which helped her clarify her own thoughts and arguments. While talking about topics of her field of expertise she usually regained self confidence and got reassured that she had acquired solid knowledge, which

she was able to present and defend. On the basis of my empathic response connected to her frustrated and aggressive feelings, I suggested she express some of this. In this session I refrained from trying to help her formulate those two theses she needed and instead clenched my fists, raised them above my head, turned to the sofa next to my chair, hit on the pillow and said: "I feel pissed off. Ah!" then I added, "I really want to get out of this. I am fed up with this lonely studying business!"

She watched kind of disbelievingly. Then she nodded.

My post-hoc explanation: I had done this, hoping to trigger some neurons in her premotor cortex, serving as a model, so she could reconnect to her own self determination and her will to pass the last two exams.

Did I know at that point that she did NOT have a history of being subject to violent or abusive behaviour of others? I only guessed – because, if she had, my behaviour could have immediately thrown her back into a frozen state of immobilization and would have aggravated her present problems, even re-traumatized her.

My intuition then told me that she would have to do something with her head. She had mentioned that she really wanted to "switch" or even "tear off" her head. Expressive behaviour with her voice and her arms had not really connected her to her vital energy.

So I held up a cushion against the wall and suggested she kneel down in front of it and push with her head in order to "get through the wall". Triggered by this suggestion we found out that Laura was a caesarean baby. The rest of that session was spent simulating her birth process, whereby my hands served as the maternal cervix, gradually dilating while her vertex pushed against it. Later my whole body served as the maternal birth canal, which she was forcefully working herself through (I owe this kind of work to the pioneering work of William Emerson (e.g. 2011) and Karlton Terry (e.g. 2011)).

Totally to my surprise, at the end of this session, Laura pulled out of her purse seven typewritten pages, from which she read one paragraph to me. To my ears this was a perfect thesis for her next exam as her voice was firm, self confident and clear.

Was it helpful to me, the therapist, to know about mirror neurons, premotor and motor cortices, limbic systems, and the thalamus as a connecting center for incoming sensory data? All this neurobiological knowledge which I have acquired over the past 10–15 years, and which Bauer presents in his books with great expertise, is fascinating. It may have contributed to my

decisions for the interventions in the described session above. But, during the process the leading part was probably not my cerebral cortex drawing from the storages of my explicit knowledge. I was certainly not directed by any theoretical knowledge of neurobiological functioning, but rather subconsciously driven by intuition and implicit knowledge, i.e. my own embodied experience as a human being and a bioenergetic clinician.

Conclusion

A fundamental principle of our universe is self similarity. We find analogies on all different levels of structure and functioning. Therefore, for effective psychotherapeutic work it is worthwhile studying different levels of organization in human beings. Symptoms and effects may be observed on any of these:

- If we help a patient to increase her assertiveness, we may also strengthen her immune system.
- If we are deeply empathic with another person who has to grieve a severe loss and teach her to limit grieving when needed, this is likely to change the dynamics of her cerebral blood flow.
- Relaxation training has been shown to correlate with increased cellular immunity (McGrady et al. 1992, cit. in Hall & Olnes 2011).
- But the connections are far more intricate and complex than simple causal relationships, as for example, I teach a person to express her anger and her lymphocyte titre goes up. However, the change in lymphocyte titre can be caused by an infection instead.

Since recent results from the neurosciences also inform us that most of our behaviour is not due to conscious decisions or our "free will" (e.g. Roth 1994, 2001, 2004; see also the startling Libet experiment, Kornhuber & Deecke 1965), we – bioenergetic clinicians – might as well continue to accumulate neuroscientific knowledge and clinical expertise, but then trust the subconsciously stored body of implicit knowledge to interact with our patients in the best way possible in each moment.

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