NEUROSCIENCE ON WELLNESS
by Inna Rozentsvit

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"A large part of virtue consists in good habits." (William Paley)

"The mind takes the shape of whatever it rests upon… for better or for worse." (Rick Hanson)

"He who knows others is wise; he who knows himself is enlightened." (Lao-Tzu)

What is wellness and what does neuroscience have to say about it? To answer this question, I conducted a little study (although not placebo-controlled and not double-blind, as clinical neuroscience would require). I asked 40 people of different generations, education, religions, and professional backgrounds: "What is wellness?" The most common answers included: 1) absence of/freedom from disease; 2) physical and emotional state of well-being (satisfaction); 3) healthy life style; 4) being spiritual; 5) being balanced; and 6) a positive approach to living. The definitions were not contradictory, but rather complementary, and reflective of the multitude of life experiences.

To summarize the results of my study: Wellness is perceived as the state of one's being; quality of one's life; or actions needed to be taken to "achieve" wellness. I would add that wellness is the state of one's mind. I think that in this century of brain-related discoveries it is important to include the mind in our consideration – at least for the simple reason that it is the state of mind that allows people with debilitating chronic conditions, but in the presence of a bright and well-integrated mind, to overcome the sorrow and dissatisfaction with the state of their physical being. Examples that come to mind are many, but I'll name just two: Stephen Hawking and Louis Pasteur. Hawking, a brilliant mathematician, theorist-cosmologist, and an engaging world-known writer, was diagnosed with ALS (Lou Gehrig's disease) when he was just 21. Now, at the age of 70, he is completely physically debilitated, but nevertheless as productive and creative—more so, even—as any able and bright 70-year-old would be. As for Pasteur, he had his first stroke at the age of 40 and, while hemiplegic, continued his quest to find cures for infectious diseases and invented vaccinations against anthrax, rabies, and diphtheria, which started the era of triumph of humanity over microbes.

In medicine, psychology, and psychoanalysis, there is a tendency to focus on the "negative," or on "pathology." This phenomenon has more than a few explanations, some of them being: 1) a person becomes the subject of our attention when he/she brings us some symptoms of discomfort or suffering; 2) scarce societal resources cannot be spared for looking into something that "works"; 3) scarce personal resources tend to be spent on getting more pleasure than on evaluating why one is "happy," "content," "satisfied," etc. Despite all of the above, some multi-disciplinary researchers are interested in finding that substrate or that ingredient of happiness (not jolliness, but "flourishing," as Dr. Jeffrey Rubin put it in his latest book *The Art of Flourishing*; or what Daniel Siegel calls "mindfulness").

I think that neuroscience can actually direct us to an understanding of those unifying ingredients which help one to flourish, help one be in touch with his/her surroundings, and his/her inner world. It seems that neuroplasticity (NP) and neural integration (NI) are those unifying ingredients of wellness. NI is employed by our mind on a 24/7 basis, with no days off and no vacations. NI is involved in our appreciation of the world around us, through sensory receptors, neural pathways, and sensory relays, to cortical and subcortical sensory analyzers. It is involved in making sense of the information coming from our own body, our muscles, and internal organs – to somatosensory analyzers, as well as in responding to sensory analyzers. NI is involved in communication between two cerebral hemispheres and the very unique processes going on in each hemisphere (where fast, linear, binomial, computer-like processing of the left brain gets balanced with the full-of-opportunities, ifs-and-buts, and creative abilities of the right brain). NI also includes the integration of emotions, prior memories, and experiences in thinking, problem solving, and developing strategies.

NI is only possible because of another unifying process, neuroplasticity (NP), which was originally introduced in the 1920s, but was not understood and subsequently forgotten. Later, it was reintroduced by Michael Merzenich and others, over forty years ago. NP allows our brain to reorganize its neural pathways according to new experiences, learning, or trauma, and it involves electro-chemical and morphological changes in the brain substrate. NP is triggered by two main conditions: 1) "normal" brain development and 2) adaptation to changes of the environment (or loss of function). While developmental NP involves "synaptic pruning" and apoptosis (on the principal "use it or lose it"), injury-driven NP involves re-wiring our neural pathways and obtaining new skills by the cells and circuits that were meant for different functions. In memory and learning, NP proceeds via changing the neuronal/synaptic structure and increasing the amount of synaptic connections. Of course, there are examples of "negative" NP, when too much re-wiring and an excess of neurotransmitters cause damage to nerve cells and/or other undesirable outcomes, such as abnormal electrical activity (and seizures) or muscle spasticity.

In the world of mental health, such examples of negative NP would include our ability to concentrate on negative thinking/fears/anxiety triggers and, with each repetition of those, to rewire/prime our automatic negative responses to such stressors. As Dr. Norman Doidge said in his book *The Brain That Changes Itself*, "Neuroplasticity contributes to both the constrained and unconstrained aspects of our nature," and "it renders our brains not only more resourceful, but also more vulnerable to outside influences." And vulnerability (although not very popular in our culture) was found to be the main pre-requisite of connectedness,

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of relating to ourselves, to others, and to the environment around us. As with NI and NP, vulnerability is the main ingredient of being in the present moment…. These are the ingredients of wellness, if we look at it through the eyes and mind of a neuroscientist. And, to put it in simple terms, wellness is a state of our being that allows us to always feel the light, even if there are only shadows around, as shadows "simply mean there's a light shining somewhere nearby" (Ruth Renkel).

Inna Rozentsvit, PhD, MD, is a neurologist and neurorehabilitation specialist, trained in psychoanalysis and psychotherapy. She is a founder of Neurorecovery Solutions. Dr. Rozentsvit is a scientific faculty member and an administrator of the Object Relations Institute for Psychotherapy and Psychoanalysis.