

# Stress, Memory, and Meaning

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## ABOUT THE AUTHOR

Yakir Kaufman was born in Haifa and received his MD from the Hebrew University Hadassah Faculty of Medicine in 1994. In 1995 he became a resident doctor at the Department of Neurology of the Hadassah University Hospital in Jerusalem. Dr. Kaufman is a member of the Israel Neurological Association and the Israel Integrative Medicine Society. He spent two years in Toronto, Canada, as a Fellow in the Behavioural Neurology Program at the Baycrest Centre for Geriatric Care and the Rotman Institute. Since his return to Jerusalem in 2004, he has joined the medical staff of Herzog Memorial Hospital (now called the Herzog Integrative Medical Center), where he heads the department of Neuropsychogeriatrics and has founded the Brain Health Center, which combines conventional and complementary medicine, using also a spiritual approach, placing the patient at the center of the healing process. In addition to teaching medicine with an integrative approach at the Hebrew University Hadassah Medical School, Dr. Kaufman founded and heads the spiritual support program for patients and caregivers at Herzog Hospital. He is a member of the steering committee of the Israeli Network of the Jewish Spiritual Support Organizations. His research on behavioral neurology focuses on psychoneuroimmunology (PNI — the science linking body and mind) and the link between spirituality and health.



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## ABSTRACT

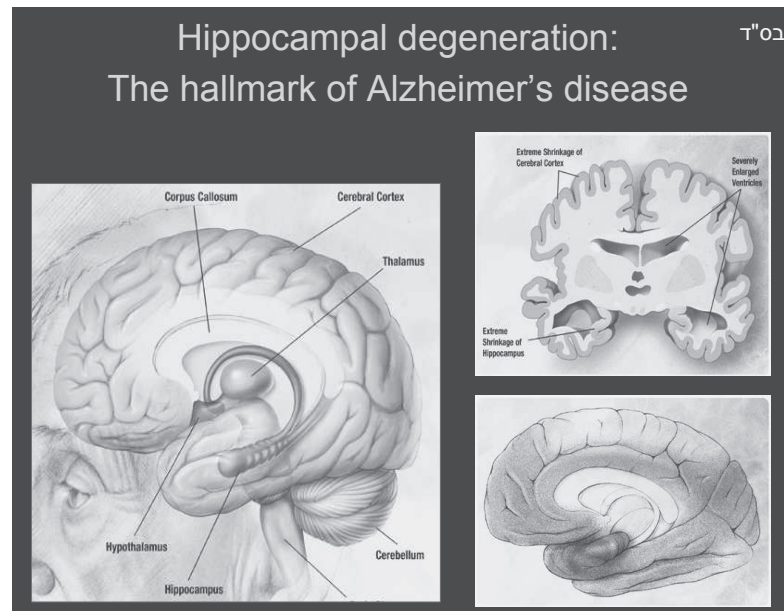
*Stress is a risk factor for almost every disease. Research also shows that loss of meaning in life is a major risk factor. These factors are associated with brain impairment and Alzheimer's disease. Health is defined as the enhancement of well-being, including physical, social, psychological, and spiritual well-being. Thousands of studies have shown that spiritual well-being is associated with better health or longevity. Therefore lowering stress levels, by enhancing spiritual well-being and meaning in life, may prevent and help alleviate Alzheimer's disease. It has been found that Alzheimer's disease has a prominent vascular component. The Torah teaches us this in various ways, including in the account of the arch-villain Amalek. The name Amalek means "to behead," to disconnect the (warm) blood supply from the heart to the brain. The commandment to both remember and obliterate Amalek can be interpreted in hasidic terms as the need for us to dispel the coldness and doubt of the archetypal Amalek within ourselves, thus allowing an adequate warm flow of the blood supply from the heart to the brain and protecting us from possible brain impairment.*

Loss of traumatic memories — particularly of Holocaust experiences — can be a blessing. I learned this when as a fellow in behavioral neurology I received an eighty-year-old woman, a Holocaust survivor, in my clinic. Her daughter said that her mother had always been depressed and anxious until she developed Alzheimer's. As her mother became more demented and her traumatic Holocaust memories were erased by disease, she started smiling and laughing, even singing like a little girl. She was now reliving pleasant memories of her happy childhood.

#### THE SCIENCE OF MEMORY IMPAIRMENT

##### *Stress and Memory*

For behavioral neurologists, memory usually means memory impairment and dementia and its most prevalent form — Alzheimer's disease. Alzheimer's disease causes an atrophy of the brain, particularly of the temporal lobe containing the hippocampus, which is in charge of memory. (See Figure 1.) Thousands of scientific studies have shown that stress is a strong risk factor for almost any disease — heart disease, infectious disease, cancer, hypertension, diabetes, immune-mediated disease, allergies, gastrointestinal disease, respiratory tract disease, as well as dementia and Alzheimer's.



**Figure 1.**

*The Interconnection between Stress, the Body Systems, and Memory*

To understand the link between stress, memory, and Alzheimer's disease, we must first briefly review how stress damages our body and brain as studied by psychoneuroimmunology (PNI). Psychoneuroimmunology studies the interconnection of all bodily systems. As shown in Figure 2, the immune system and the hormonal system are orchestrated by the nervous system, which is controlled by the brain. This is the common concept taught for years, but this picture is not complete without the mind, including our emotions, beliefs, thoughts, and drives. This whole system is interactive, meaning that any change in one part automatically affects the other parts. A change in the immune system immediately affects the nervous system, the endocrine system, or the brain, and vice versa. The brain, of course, can affect all other systems. The mind in turn affects brain function. Generally speaking, the mind has two basic modes: a positive mode ("positive state of mind") and a negative mode ("negative state of mind"). The positive state of mind includes happiness, optimism, tranquility, while the negative state of mind includes depression, anger, anxiety, pessimism. A change from a positive to a negative state of mind immediately affects all bodily systems. A positive

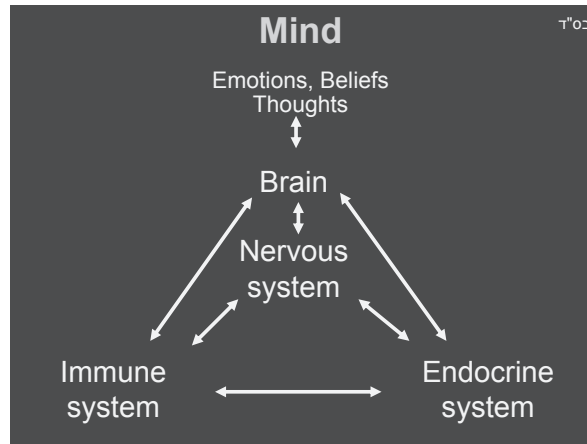


Figure 2.

state of mind enhances the function of the immune, endocrine, and other systems. A negative state of mind, however, causes stress that impairs and causes disequilibrium to the nervous and endocrine systems, creating a risk factor for disease.

An interesting illustration of the universal effect of stress on the immune system is a study conducted on medical students during the course of the year. Once the students are into the academic year and especially during exam time, their immune systems go down; when they're on vacation, their immune systems improve. The immune function of students who were given stress-reduction therapies stayed high. This shows that on the one hand, stress can impair health, but on the other hand, when we reduce stress, we can enhance health (GLASER et al. 1985).

The wear and tear that emotional stress causes the body is seen also on the molecular and cellular level. Professor Bruce McEwen, an expert in the field of psychoneuroimmunology at the Columbia School of Medicine, researched how cortisol (the main stress hormone) enters the individual cell, connects to the receptor, and changes the expression of the cell DNA. When this happens, the cell — and this could be a nerve cell in the brain — instead of taking care of its maintenance and growth, invests a significant amount of energy on the mode of stress. Thus, stress impairs the normal function of the cell and shortens its life. The longer the stress, the more the cells are impaired, including cells of the nervous system (MCEWEN 1998).

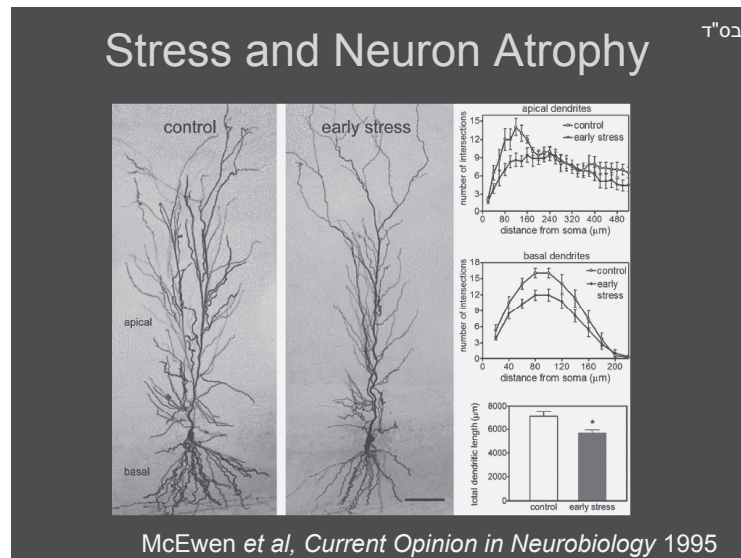


Figure 3.

The picture on the left of Figure 3 shows a healthy neuron from the hippocampus area (the memory area) with all its dendrite branches; while the picture on the right shows the neuron already diseased after a short period of stress.

The limbic system is the part of the brain most closely associated with the role of the mind. The limbic system is the center of emotions, memory, beliefs, and willpower. An integrative part of the limbic system is the hypothalamus, the “mother organ” of all the endocrine systems, controlling all the hormones in the body and creating homeostasis (the balance of bodily systems). Any positive or negative change in our state of mind involves the limbic system, thus automatically affecting the hypothalamus, and in turn changing the total homeostasis of our body.

As has been stated above, when we are under stress, one of the main hormones secreted is cortisol. Cortisol is secreted into our bloodstream and has receptors in almost every organ in our body, including the brain. The cells of the hippocampus contain one of the highest concentrations of cortisol receptors in the brain. When we are chronically stressed, gradually the high concentration of cortisol entering the hippocampus can cause atrophy and dysfunction, leading to Alzheimer’s disease. This also occurs in post-traumatic stress disorder, specifically in many traumatized Holocaust survivors. The connection between

the stress that Holocaust survivors suffer and memory impairment is therefore apparent.

Hongxin Dong elegantly proved the connection between stress and Alzheimer's disease pathology in mice. Mice who were more stressed developed more Alzheimer's disease pathology and memory impairment (DONG 2008).

#### THE EFFECT OF MEANING AND PURPOSE IN LIFE

Stress can be induced by a sense of uncontrollability, which in turn is increased by a sense of meaninglessness. When we lose our sense of meaning our stress level increases, resulting in higher risk of disease. Many people derive their sense of purpose and identity from their work and career. Upon reaching retirement age, suddenly they have a feeling of meaninglessness. Or, for example, if a person's meaning in life derives from his or her spouse, when the spouse dies, meaninglessness sets in. When a person's sense of meaning is low, even trivial issues can cause high levels of stress. Stress increases, well-being decreases, and then patients come to our clinics with strokes, heart attacks, Parkinson's, Alzheimer's, or other diseases.

About two decades ago, when I first started talking about the connection between meaning in life and disease, there were not enough studies on the subject being conducted. In the past few years this area of research has grown. Among the research available now is a good study by a distinguished group of researchers from the Rush Memory and

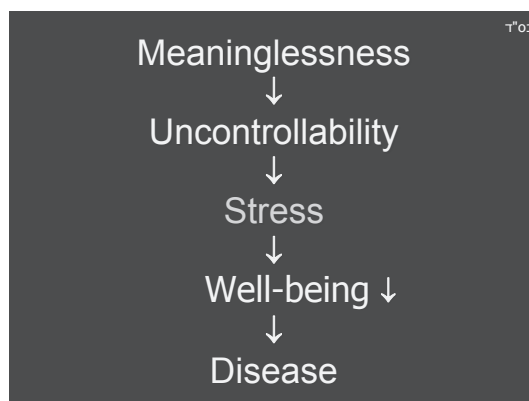


Figure 4.

Aging Project in Chicago. The study shows that people who have a higher purpose and meaning in life have a 2.4 times lower chance of developing Alzheimer's disease. This is a robust finding (BOYLE et al. 2010).

There are two types of meaning in life: conditional and unconditional. Meaning derived from something that can change, like status or a job or even family, is conditional and can be lost. There is unconditional meaning, however, that transcends change even in the face of loss. Unconditional meaning can be derived from well-being in general and spiritual well-being in particular.

#### STRESS REDUCTION, WELL-BEING, AND HEALTH

Indeed, the World Health Organization states that health is a state of complete physical, social, and mental (meaning psychological and spiritual) well-being — and not merely the absence of disease or infirmity. According to this definition, we can achieve a higher level of health if we enhance our sense of well-being, whether it is physical, social, occupational, psychological, or spiritual well-being.

In the year 2000, the *Medical Students' Journal of the American Medical Association* published a report showing that there are more than 1,500 studies pointing to the relationship of

Does our health system actually enhance health as defined by the World Health Organization? I think we have a long way to go to prevent disease and not just treat disease after it appears. Preventive medicine is the best, most efficient, and economically feasible medicine.

#### *Lessons in Medical History*

In ancient China, a doctor would be paid more when all his patients were healthy. If one of his patients was sick, or died, G-d forbid, the doctor would be paid less. The prime interest of the ancient Chinese physician was to enhance the well-being of his patients in every way, thus preventing disease and death (a "health-orientated medical system"). In our society, the more people are sick, the more surgery and medical procedures we do, the more drugs we prescribe, the more hospital beds are full, the more health professionals and medical institutions get paid. This creates an anomaly in which — from the point of view of the medical establishment — it is economically profitable for people to be sick and be treated for disease (a "disease-orientated medical system"). This could be changed. One way to change this is by encouraging the growth of integrative medicine centers. The medicine of the future — of the messianic age — will be preventative treatment that sees the whole person and not only the disease.

spiritual well-being to good health outcomes (KOENIG 2000). Today we have more than 3,000 such studies. The National Institutes of Health in the USA is investing more money now into researching the association between health outcomes and spirituality and religiosity (McLAUGHLIN and IDLER 2003).

For example, a study was conducted in California in 1997 among over 5,000 adults. It showed that women with high levels of religious/spiritual well-being have a reduction of almost 50 percent in mortality. This factor was even more robust than exercising regularly or not smoking (STRAWBRIDGE et al. 1997). A 1999 study of over 20,000 Americans found that people with a high level of spiritual-religious well-being have a longer life expectancy (over seven years) than others (HUMMER 1999).

#### THE SPIRITUALITY-BRAIN CONNECTION

The effect of spiritual well-being on the brain now can be demonstrated due to the advancement of technology. Now that we can use PET scans, MRIs, and so on to image the brain, we can actually look into the brain and see how it changes when engaged in higher spiritual activity, as in meditative prayer (NEWBERG et al. 2003).

Dr. Andrew Newberg, the pioneer in recording images of spiritual activities of the brain, published his results in the proceedings

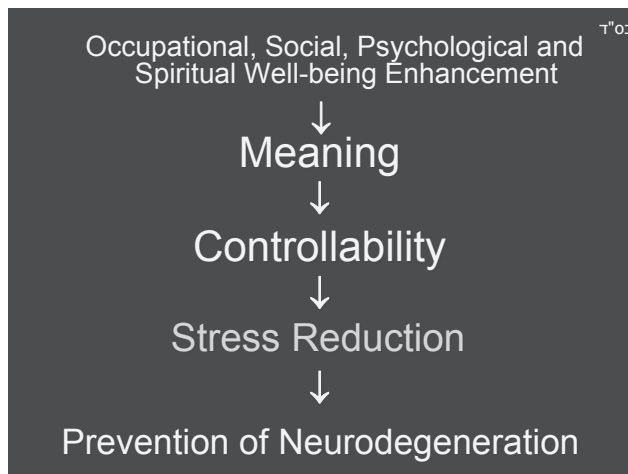


Figure 5.



of the NIH conference on spirituality and health in 2003 and later in the *American Journal of Psychiatry*. (Some of the scans were reprinted by permission in *B'Or Ha'Torah* volume 16.) Newberg's images record how the metabolism of the superior parietal lobe and the inferior parietal lobe changes while the brain is engaged in prayer. These are first technological insights into seeing how the mind connects to the brain. Interestingly, Rabbi Menahem Mendel Schneerson, the Lubavitcher Rebbe, predicted that with the further advance of science, we shall bring science closer to the Torah.

The connection between the mind and the brain is so strong that the cognitive decline of Alzheimer's disease can be slowed down by higher levels of spirituality and private religious practices. This conclusion was reached by a study that three colleagues and I conducted on seventy patients with probable Alzheimer's disease. This means that higher levels of spiritual well-being correlate with better health outcomes and memory (KAUFMAN 2007). After it was published in *Neuropsychologia*, more researchers duplicated this finding with different populations.

The medical establishment of today is beginning to understand the complex connections between mind, meaning, spiritual well-being, and health. In order to prevent and to treat a disease, its source must be identified. The source of a disease is embedded in the root, and the cure to a disease is embedded in upstream mind factors such as meaning, well-being, and spirituality. Although medicine today still focuses more on downstream factors such as neurotransmitters and drugs, it is beginning to understand Victor Frankl's affirmation that "the spiritual dimension cannot be ignored, for this is what makes us human."

An excellent example of how the well-being of the elderly, including Holocaust survivors, can be enhanced is the Tiferes Zekanim groups led by Rabbi Sholom Lipskar of The Shul of Bal Harbour in Miami. These groups of elderly people meet twice to three times a week to learn Torah and Hasidism together. They receive a small allowance, pray, and have lunch together. Thus, the social, occupational, and spiritual well-being, cognitive stimuli, and overall sense of meaning of the participants are enhanced. This project, which was initiated by the Lubavitcher Rebbe, has the potential to prevent and modify the course of disease in general and of neurodegenerative and Alzheimer's disease in particular.

One application of this conclusion by health providers would be

At a conference on Alzheimer's disease at Tel Aviv University in 2011, I sat at a round table with many other neuroscientists discussing what do we really know about Alzheimer's disease and ways of treating it. It was a humbling experience because we concluded that there is a big gap between what we know about Alzheimer's and our clinical practice. The current treatment options of conventional medicine are modest and at most partial. We are looking for the key to Alzheimer's through the profit of drug companies rather than looking at the big picture of enhancing the upstream mind factors such as well-being and meaning in life of our patients. According to the latest research findings, it is the absence of these upstream factors which is the source of the disease.

to simply help enhance spiritual well-being in the medical setting. For instance, in Herzog Hospital, where I work, we initiated a spiritual support program that has been adopted throughout Israel. The Israeli Network of the Jewish Spiritual Support Organizations of twenty-one organizations is actually enhancing the well-being of people in crisis and illness. Like Rabbi Lipskar's Tiferes Zekanim program in Miami, we have a significant percentage of Holocaust survivors participating, although we cross the boundaries of the extremely diverse sectors of Israeli society, taking into account social, cultural, and religious factors. Currently, a study is being conducted by the Network to monitor the influence of spiritual support on the rate of rehabilitation of the participating patients.

#### TORAH INSIGHTS

G-d looked into the Torah and created the world. (*Zohar*, vol. 2, 134b)

Since the Torah is the blueprint by which G-d designed the universe, the finished product — the universe — cannot contradict that blueprint.

Our sages said that every part of our physical body has a spiritual correlate. The 248 limbs of the human body correspond to the 248 positive commandments of the Torah; and the 365 sinews of the human body correspond to the 365 negative commandments (Targum Yonatan on GENESIS 1:27). This is a wonderful illustration of the Jewish view of how the body and mind are connected. Indeed, Job declared, "From my flesh I see G-d" (JOB 19:26), meaning that the vitality, strength, and health of every part of the body or organ is derived from a specific

spiritual correlate (commandment). The fulfillment of a spiritual characteristic vitalizes a specific organ, allowing its full capacity and functioning. Therefore, spiritual well-being and fulfillment protect and bring us closer to a more complete state of health. This is also relevant for cognitive brain function and health.

The *Zohar* calls the human body an *olam katan* (small world), meaning that man is a microcosmic world, and the world is a macrocosmic man (*Zohar*, vol. 1 on GENESIS, 24b). Our sages said, “Just as the soul fills the body, puts up with it, and sees but is not seen, so G-d fills up the world, puts up with it, and sees but is not seen” (TALMUD *Brakhot* 10a).

There are two Torah verses that encapsulate all that has been said above in this paper. The first of these verses is:

כי נפש הבשר בדם

For the life force of the flesh is in the blood. (LEVITICUS 17:11)

Recent research shows the connection between stress and vascular impairment and between vascular impairment and Alzheimer’s disease (GORELICK et al. 2011). Lapse of memory, as in Alzheimer’s, is caused by impairment of blood flow from the heart through the neck blood vessels to the brain. This means that the life force in the blood (*nefesh*) is vital for the function of memory and other cognitive functions of the brain. The life force, the *nefesh*, is in the blood.

The second verse is somewhat surprising:

זכור את אשר עשה לך עמלק...אשר קרך בדרך

Remember what Amalek did to you on your way out of Egypt. When they encountered you on the way, and you were tired and exhausted, they cut off those lagging in the rear, and they did not fear G-d. Therefore, when G-d gives you peace from all the enemies around you in the land that G-d your L-rd is giving you to occupy as a heritage, you must obliterate the memory of Amalek from under the heavens. You must not forget. (DEUTERONOMY 25:17–18)

The name of the arch enemy Amalek, who attacked the weak stragglers of the Jewish People in the desert, shares the same root as the verb *molek*, meaning to behead, to disconnect the blood supply between the heart and the brain by severing the intermediate neck with its blood

vessels supplying the brain. Life cannot go on when the head/brain/mind is separated from the body and the heart.

The verb the Torah uses to describe how Amalek attacked is קרק (karkha), meaning to make cold. Blood is warm. Cooling (karkha) means opposing the warm flow of blood (specifically to the brain, in our case), thus decreasing blood flow to the brain, in turn impairing memory and bringing about dementia and Alzheimer's.

Memory is the antidote to becoming “beheaded” by cerebrovascular impairment. Traumatic memories, however, sometimes become frozen or freeze us. When we are “warm” about something that brings positive emotions and well-being, we don't forget it. Memory is formed and persists. Even after dementia sets in, there remains a small vessel of pure oil when all other vessels have been spoiled. The Hanukkah miracle can take place inside us. Just as the small amount of holy pure oil found in the Temple lit the entire menorah, the little bit of pure oil that remains in a diseased person can spread warmth and light to his or her entire being. Healthy people can take preventative measures against the archetypal Amalek that lurks within. The detachment, indifference, and coldness that lead to spiritual and physical disease can be dispelled by lighting the pure oil within to warm and activate our entire being.

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