

# Role of Emotional Intelligence on Our Immune System during Pandemic Situations

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**Abstract-** COVID 19, a global pandemic, which first started in Wuhan city of China in December 2019, spread to different countries across the globe. The effect of the disease in terms of mortality and morbidity are manifold like death, depression, loss of income, anxiety, and migration. Vaccine has been formalized and life is getting normalized, but we are left with questions on what makes human beings susceptible and how can we build our immunity not only physically but also mentally. One such attempt is improving the Emotional Intelligence of people. This article is an attempt to understand the impact of Emotional Intelligence on the Immune System of the human body and how emotional intelligence, if understood and developed properly can help ward off many of the negative consequences of these type of pandemics. In this article, a review has been done on how the domain of Emotional Intelligence (EI) can help tackle this pandemic on an individual as well on the collective level. This is shown by discussing the relationship that EI has on the Immune System. Beginning the discussion from the interaction of Immune system with the environment, this article speaks about the influence of EI on Genes and Placebos which in turn impact the immune system.

**Keywords-** Pandemic, Immune System, Emotional intelligence, Placeboes & Noceboes.

## I. INTRODUCTION

Man, a complex multicellular organism, has evolved over ages as one of the intelligent species on this planet. The mechanism of evolution from unicellular to multicellular organism brought about unique structure and systems inside the human body controlled by the brain. The action and reaction responses are guided by this highly complex neural structure and give the body the ability to fight during threat- physical, environmental, or psychological. Survival depends on the ability of the body to maintain homeostasis and any physical changes in the body manifests as mental experiences called feelings (Damasio and Carvalho, 2013).

Millions of years of evolution of the human body has made our immune system strong enough to tackle many known viruses, bacteria and parasites. And as the product of evolution, we have developed and injected many antibodies as vaccines into our systems. However, nature is also evolving and responding to the threats posed by man and so from time to time, new diseases come into existence through unknown viruses and bacteria emerging from nowhere (or maybe by-product of our development). It was Bubonic Plague by bacterium *Yersinia pestis* in 1720, Cholera by bacterium *Vibrio cholera* in 1820, Influenza by H1N1 virus in 1920 and now it is the Corona Virus which is causing a disease called Covid-19. All these virus and bacteria effect the physical body and these

physiological responses of the body are expressed as feelings and emotions, and it is critical to understand these mental cues to respond appropriately. This ability to recognize, understand and regulate emotions is called Emotional Intelligence.

Research conducted by Antonio Damasio tells us that feelings help regulation of behavior (Damasio and Carvalho, 2013). Hence, another approach to prevent viruses from taking over our bodies could be to enhance the power of our immune system by equipping ourselves with the higher capacity to understand these feelings and help the immune system to maintain homeostasis. This internal approach aims at mitigating the negative ways of thinking and increase more life enhancing practices to strengthen the immune system by learning effective ways to manage our emotions and feelings and increase Emotional Intelligence.

What has Emotional Intelligence got to do with Immune System? This review is to give an understanding of how emotions and thoughts generated by the external environment, can lower immunity and cause diseases and how increasing emotional intelligence can help improve health individually and collectively. Enough research has now proved that cells in our body get highly impacted by emotions that we experience (D'Acquisto, 2017; Espinosa & Kadić-Maglajlić, 2018). The objective of this article is to look at the association between Human Immune System and Emotional Intelligence.

## II. METHODOLOGY

The conceptualization of this article started with the reading of the book "Biology of Belief" by Dr. Bruce Lipton. The discoveries of Dr. Lipton of how human beings create beliefs that can manifest as diseases, and how managing those beliefs (by improving emotional intelligence) can help humans overcome illness, inspired the researcher to write this review. This is done by reviewing our beliefs on Genes and the Placebo effect akin to what Dr. Lipton does in his book.

Then, the researcher went on to search for more articles and recent research studies using search engines Google Search and Google Scholar. The keywords used were, Emotional Intelligence, Immunity, Immune System, mind and body, emotional well-being, Covid and lockdown, psychology, assessment, Placebo, gene, environment, stress, physical health, pandemic, etc., These searches linked to other search engines and websites like PubMed, Research Gate, Academia, Positive Psychology, Science Direct, Plos One and even some online news sites. The articles were selected based on whether the information mention fits the idea of the researcher and if the study is valid. Some articles were review articles; some were based on original studies done. Journal from reputed sites like PubMed, Research Gate, Science Direct, Positive Psychology were considered for our review.

## III. EMOTIONAL INTELLIGENCE

This multicellular-organ mechanism what we call 'The Body' is controlled by its dominant authority, The Brain. There is a unique mechanism that the evolved Limbic system uses to convert the chemical communication signals which the cells in the body experience as sensations. And the conscious mind experiences these signals as what we have named as 'Emotions' (The Biology of Belief 10th Anniversary Edition, n.d.).

Emotional intelligence is ability to Perceive or Recognize, Understand and regulates our emotions and that of others. To precisely put, Emotional intelligence has been defined, by Peter Salovey and John Mayer, as "the ability to monitor one's own and other people's emotions, to discriminate between different emotions and label them appropriately, and to use emotional information to guide thinking and behaviour".

Salovey, Rothman, Detweiler, and Steward (2000) stressed upon the influence of emotional states on physical health which suggests that a person's quality of physical health is the outcome of the way he perceives his physical and emotional symptoms (Tsaousis & Nikolaou, 2005). Hence it is imperative on considering a direct relationship between Emotional Intelligence of a person and that person's Immune system (Physical health).

Also, in this war with the Corona virus whose powers are unknown and there is uncertainty (even though vaccine has been discovered) in the way to proceed, the negativity aroused due to fear of this unknown and the inability to take control (due to the belief about uncertainty), increases stress (Peters et al., 2017) and puts our immune system at risk. A situation like pandemics caused by unknown virus where cure is uncertain makes the environment volatile and insecure, increasing the risk of depression, cognitive impairment and strokes (Peters et al., 2017).

This is where the 'Emotional Intelligence (EI)' of the individuals and that of the collective community comes in handy. Herd immunity in terms of controlling the spread of epidemic is well established in epidemiology and the same when applied to enhancing emotional immunity in the community may help reduce the burden of the disease on the population emotionally, if not, pose resistance to the disease. Impact of environment, especially, the surroundings in which we live both physical as well as psychological has influence on the health of an individual. Psychological well-being contributes to Physical well-being and mental or emotional well-being can help cure a disease faster and better the outcomes of treatment (Abdurachman & Herawati, 2018).

Research in cell and molecular biology has discovered the deep connection between the body and mind. In her experiments, Candace Pert discovered that the same "neural receptors were present on most, if not all, of the body's cells". This ascertained that the 'mind' was not focused in the brain alone but was dispersed all over the body through signal molecules. She proved that through self-consciousness, the mind can use the brain to generate "molecules of emotions" and override the system (Pert & USA, 1997).

"While proper use of consciousness can bring health to an ailing body, inappropriate unconscious control of emotions can easily make a healthy body diseased" (Pert & USA, 1997; The Biology of Belief 10th Anniversary Edition, n.d.). And consciously, humans have the ability to evaluate environmental stimuli and respond appropriately rather than react according to past programming.

If all cells have mind and the brain controls the mind, brain is affected by the belief system regarding the environment it is surrounded by (Peters et al., 2017). Author Dr. Bruce Lipton in his book establishes that "Belief controls Biology" (The Biology of Belief 10th Anniversary Edition, n.d.). Recent studies have established that Genes don't control our health (Immune System Shaped by Environment More Than Genes, 2015; Tammen et al., 2013) and it's the way we think and feel that impacts health (D'Acquisto, 2017; Lamers et al., 2012). Based on this discovery, it is imperative for us to safely assume that immunity of a human being will depend

on the degree to which man is emotionally intelligent and use his mind to his advantage by understanding and managing his feelings and emotions to align to the needs of the body.

#### IV. GENETICS TO EPIGENETICS

Even though we cannot willingly change the codes of our genetic blueprints, the blueprints can be tweaked to express our genetic potential by changing our minds (through self-awareness and self-regulation, aspects of EI). These changes can be enabled by possible mental states like biofeedback, concentration and meditation to control the transgene expressions in living cells with support from scientific discipline like Optogenetics (Folcher et al., 2014). Of late, the dawn of a new field of research, called Behavioral Epigenetics is giving us enough proof as to how “nurture shapes nature”(Brooke & Larsen, 2014; Powledge, 2011; Tammen et al., 2013).

While Nature refers to characteristics controlled by the Genes, Nurture refers to the influence of a wide range of life experiences happening via the environment. This is where high level of EI leads to a more favorable mental attitude which leads to better body health.

Environment influences are more prominent in evolution of immune systems than Genes (Immune System Shaped by Environment More Than Genes, 2015). There are vast varieties of external and environmental factors that influence our immune system (MacGillivray & Kollmann, 2014). In fact these environmental exposures can even drive epigenetic modifications that reprogram innate immune cells (MacGillivray & Kollmann, 2014). But thanks to the Emotional or Affective system that a lot of threats get filtered before it reaches the immune system.

This speaks of a high synergy between the two systems giving rise to a new scientific research area called Affective Immunology (D’Acquisto, 2017). And many studies have proved that Psychological Well-Being (PWB) influences our immunity and in turn affects the morbidity or mortality due to infectious diseases (Abdurachman & Herawati, 2018) and PWB depends on how emotionally intelligent someone is (Tsaousis & Nikolaou, 2005).

Emotional Intelligence (EI) which is the ability to perceive, understand, use and manage our emotional response to the environmental stimuli, acts directly, impacting the well-being of the body’s 50 trillion cells. This happens when these emotional responses, in reaction to our mind’s perceptions (beliefs) are translated (by the brain cell) into unique and complimentary chemical profiles, that when discharged into the blood, controls the functioning of these cells. And in the words of Steve Cole, an Epigeneticist, “A cell is a machine turning experience into biology”(The Biology of Belief 10th Anniversary Edition, n.d.).

So, when the perception of the environment around us changes, which is the ability to manage and modify our beliefs (which generates emotions), blood’s neurochemical composition changes, initiating a complementary change in the body’s cells.

The conclusion is simple: “Positive perceptions of the mind enhance health by powering the immune functions, while negative perceptions inhibit immune activities and causes dis-ease”(The Biology of Belief 10th Anniversary Edition, n.d.). This is how immunity to the Corona Virus gets adversely impacted with the messages that the media imparts to the general public, when the media over-hypes negative information.

Umpteen numbers of researches has established that stress is majorly responsible for our modern-day issues and physical ailments. One research has even established that “stress accounts for up to 90% of all doctor visits” (The Biology of Belief 10th Anniversary Edition, n.d.).

Also, early life exposure to stress (ELS) is a global and an evolutionary problem that has significantly damaging impact on the immune system (HOWELL & SANCHEZ, 2011; MacGillivray & Kollmann, 2014). In fact ELS may result into chain of mental (HOWELL & SANCHEZ, 2011), cardiovascular (Nuyt & Alexander, 2009; Schooling et al., 2011), metabolic disorders (Tarry-Adkins & Ozanne, 2011) and many other forms of diseases (Qian, 2012). And high EI leads to lower stress (EMOTIONAL INTELLIGENCE BUFFERS STRESS, n.d.).

High EI also enables higher social interaction (Cole et al., 2007; Lopes et al., 2004) versus people with lower EI suffer loneliness (An Investigation of Loneliness, Self-Esteem and Emotional Intelligence Skills In University Students, n.d.; Rokach, 2013). And lonely people are more prone to attract disease. A research showed that 209 of 19000 human genes (approximately) showed sharply different gene expression responses in lonely and not-lonely people. And many of these 209 genes play very important roles in inflammatory immune responses (Cole et al., 2007).

Rapid changes in Gene activity can be induced by changing beliefs. When individuals elevate their optimism levels and expand their social connections, it raises their happiness level which in turn gives them high immunity. And it is people with high levels of EI who can accomplish this. The evidence that belief exercises a formidable influence over physiology, gene expression and behavior, has led Epigeneticist Cole to conclude, “To an extent that immunologists and psychologists rarely appreciate, we are architects of our experience. Your subjective experience carries more power than your objective situation” (The Biology of Belief 10th Anniversary Edition, n.d.). Subjective experience represents perception or belief that a high EI person has

more control on. Objective situation is reality. In simple language, it means, “Your belief carries more power than your reality” (The Biology of Belief 10th Anniversary Edition, n.d.).

## V. PLACEBOS AND NOCEBOES

Beliefs are thought patterns that generate emotions in us. When the mind influences and improves physiology using positive affirmations it is referred as placebo effect. And when it has a negative effect, it becomes a nocebo.

Merriam-Webster says the word ‘Placebo’ comes from Latin which literally means ‘I shall please’ in the sense of flattering. Medicine borrowed this word in the 18th century to mean “an inert medicament or preparation given for its psychological effect specially to satisfy the patient or to act as a control in an experimental series”. If sincerely, it is a neutral medicine just to please the psychology of the patient. In fact any positive statement/information told by the doctor can have a healing effect on the patient (Bystad et al., 2015).

Hence a doctor who is emotionally intelligent would perceive and understand patients better and help them actively heal faster. A patient who is emotionally intelligent can use positive affirmations to heal themselves and a patient with low EI would cry and curse the condition they are in which worsens their health and immunity. These affirmations and thoughts then becomes what we call ‘Belief’ which when positive, helps in healing, and when negative, they deteriorate health. And numerous studies have demonstrated the magical power of the placebo effect.(Fabrizio Benedetti & Amanzio, 2013; Bernstein & Brown, 2017; Bystad et al., 2015; de la Fuente-Fernández et al., 2001; Pain, Emotions and the Placebo Effect, n.d.; The Biology of Belief 10th Anniversary Edition, n.d.) An innovative study done at the University of Luxembourg using fMRI technology has shown that placebos work strongly on people who have the ability to perceive and interpret negative situations around them and control their feelings(Part of EI construct).(Pain, Emotions and the Placebo Effect, n.d.)

Beliefs are contagious. And when mind responds to change in a belief which affects our thought patterns, it affects our biology (The Biology of Belief 10th Anniversary Edition, n.d.). And Placebos work better on people who have the ability to identify negative interpretations and can regulate and control those emotions (Pain, Emotions and the Placebo Effect, n.d.) which is an EI construct. Also, if the doctors and the medical faculties who are attending to the patients are emotionally intelligent and sensitized, they can make Placebos work wonderfully to cure the patient.

Studies have proved placebo effect to be very effective in treating many diseases including Parkinson’s (de la

Fuente-Fernández et al., 2001). In a study conducted by Dr. Bruce Moseley which was an attempt to check if placebos work on surgery, he encountered shocking results to his disbelief that the Placebo Effect works wonders even with respect to surgery (The Biology of Belief 10th Anniversary Edition, n.d.).

Placebos also works wonderfully well in the treatment of mental disorders, especially depression and neurological conditions, which is now becoming rampant (Bernstein & Brown, 2017; The Placebo Effect on JSTOR, n.d.). In a study that he conducted, Professor Irving Kirsch found that “Placebo Effect accounted for 80% of the effect of antidepressants as measured in clinical trials” (The Emperor’s New Drugs, n.d.). This clearly is a demonstration of how high EI can help boost healing by improving immunity.

Conversely, placebo’s counterpart called the nocebo which also comes from Latin which means ‘I will harm’ (Merriam-Webster) can worsen the patient’s health condition or immunity who’s EI is low versus patients with high EI. Negative suggestions cause a negative emotion which leads to lower immunity (Bhattacharya, n.d.). This added with prolonged rumination are more often found in people with low EI who are highly susceptible to stress and anxiety.(Constantin et al., 2019; Lanciano et al., 2010, 2012)

Also, doctors low with EI are more prone to anxiety and stress in the hostile medical environment which leads to they being cynical and that can lead to them making more negative suggestions towards the patients.(Daniali & Flaten, 2019) Nocebo cases shows that people can be made to believe they are powerless when physicians, parents and teachers take away hope from them(The Biology of Belief 10th Anniversary Edition, n.d.) By giving them a pessimistic view of the condition.

The study of pain has been helpful to understand both the neuroanatomical and the neurochemical bases of the nocebo effect (F. Benedetti et al., 2007). Recent experiments have indicated that cholecystokinin (CCK) (which facilitates pain transmission) is activated by verbally-induced anxiety when a negative verbal suggestion about pain is said (F. Benedetti et al., 2007). As mentioned before, low EI can amplify this.

The results showed that the perceived pain was strongly influenced by the anticipation of whether the pain from the stimuli will be either low or high. “It was found that the oral administration of an inert substance, along with verbal suggestions of hyperalgesia (Nocebo), induced hyperalgesia and hyperactivity of the hypothalamic–pituitary–adrenal (HPA) axis which activates Pituitary gland and leads the body into a protection mode which then increases anxiety. Nocebo suggestions induce anxiety which, in turn, activates two different and independent

biochemical pathways: a CCKergic facilitation of pain and the activation of the HPA axis, as assessed by means of plasma ACTH and cortisol increase" (F. Benedetti et al., 2007). Higher EI predicted less pain and reduces the level of negative effect engendered by the health condition. (Ruiz et al., 2011) Placebo effect has been associated with health recovery process which impacts our Affective and Emotional systems but yet not accepted commercially as an effective way to healthy cures and preventions (Why Does Mainstream Medicine Ignore The Placebo Effect?, n.d.).

According to neuropsychologist at the University of Luxembourg who has been researching on pain and placebos, Dr Marian van der Meulen, "Clinicians or psychiatrists may be able to improve the outcome of a medical intervention by optimising the contribution of the placebo effect." And this teamed with high EI skills can take us to have high immunity and healing with minimal medicines. (Pain, Emotions and the Placebo Effect, n.d.)

In the present environment, people's perception depends on the Beliefs they have which are like filters on a camera, dictating the way they view the world and the situation (The Biology of Belief 10th Anniversary Edition, n.d.). And the infodemic that the media is propagating through negative (mostly rumors) news about Corona virus is instilling fear which leads to Nocebo effect in the collective community. And our biology adapts to those beliefs. Also, there is lot of suppression happening in the society which if not manifested appropriately and well-regulated can lead to more health damage (Tsaousis & Nikolaou, 2005) to the individual and impact the collective health of the community.

Even though the actual effects of these noceboes are yet to be seen on the society, the panic that's created has induced negative behaviors (like people not following social-distancing, disrespecting the rules made for the common good, etc.) from certain sections of the society and is also accumulating as pain in the bodies of individuals. This can be reduced by enhancing Emotional Intelligence through Self-Awareness, Motivation, Learning Empathy and Social Interaction (using Social Media). So, enhancing the level of EI which is a measure of improved mental health leading to better immunity is very much possible at any age.

And some ways to do it during this time of a lockdown is;

- By interacting more authentically with family
- By interacting with good old friends on phone,
- Reducing exposure to TV and news,
- Watching mood enhancing movies or comedy shows,
- Taking good care of parents,
- Voicing out irritations and disappointments with close confidantes,
- Taking good care of self by eating positive foods and exercising,

- Adding positive words in speaking with others
- Imagining something good happening out of negative situations too.

Overall, eventually we have a vaccine now to exit this crisis we are going through. And we also have the fear of a second wave which has already begun in some part of Europe and US. The degree to which we can manage this fear emotion will ensure good immunity.

## VI. CONCLUSION

As seen above, Emotional Intelligence is correlated positively to Immunity of an individual. Man has the power to improve immunity and keep himself healthy by managing his emotions and feeling, if his EI is high. So, efforts have to be made by individuals to improve their Emotional Intelligence consciously and the Governments have to take steps to set up Mental Health Organizations to impart Emotional Literacy Programs so that collectively we are ready to face any more pandemics of this scale in the future. Newer challenges require newer approaches and adaptation is mandatory for future existence.

Advancements in science and technology have contributed immensely to medicine improving the wellbeing of people. But there are situations wherein rather than medical approach, psychosocial approach may foster better outcomes of treatment. External approaches to disease management may serve short-term whereas internal approaches like behavioral, psychological and emotional may serve long-term benefits in prevention as well as better outcomes of disease.

This article looked only on effect of beliefs, feelings and emotions on genetic and pain aspects of immune system. More studies are happening regarding the role of different feelings, role of language on feelings and health, role of culture on health. It is only now that emotions are getting its due place as a major contributor to good health and finding a place in the field of scientific research.

Hence newer studies need to be happening in combining the fields of Cellular/ Molecular Biology, Quantum Physics (to understand how thoughts and emotions work), Psychology, Neuroscience, combining behavior, affective, emotions and their direct effect on the cells overtime. There is a big debate happening between science and spirituality too and a new term called Spiritual Intelligence is also gaining momentum. And so, integration of all the above areas is critical for us to make the best of the emotions we have, to enhance our immunity as a species.

## REFERENCES

- [1] A investigation of loneliness, self-esteem and emotional intelligence skills in university students.

- ResearchGate. Retrieved June 29, 2020, from [https://www.researchgate.net/publication/271025482\\_An\\_investigation\\_of\\_loneliness\\_selfesteem\\_and\\_emotional\\_intelligence\\_skills\\_in\\_university\\_students](https://www.researchgate.net/publication/271025482_An_investigation_of_loneliness_selfesteem_and_emotional_intelligence_skills_in_university_students).
- [2] Emotional intelligence buffers stress: a study on emotional intelligence and coping styles. ResearchGate. Retrieved June 29, 2020, from <https://www.researchgate.net/publication/281630073>.
- [3] The Emperor's New Drugs: An Analysis of Antidepressant Medication Data Submitted to the U.S. Food and Drug Administration. ResearchGate. Retrieved July 1, 2020, from <https://www.researchgate.net/publication/228550299>.
- [4] Abdurachman, & Herawati, N. (2018). The role of psychological well-being in boosting immune response: an optimal effort for tackling infection. *African Journal of Infectious Diseases*, 12(1 Suppl), 54–61. <https://doi.org/10.2101/Ajid.12v1S.7>.
- [5] Benedetti, F., Lanotte, M., Lopiano, L., & Colloca, L. (2007). When words are painful: Unraveling the mechanisms of the placebo effect. *Neuroscience*, 147(2), 260–271. <https://doi.org/10.1016/j.neuroscience.2007.02.020>.
- [6] Benedetti, Fabrizio, & Amanzio, M. (2013). Mechanisms of the placebo response. *Pulmonary Pharmacology & Therapeutics*, 26(5), 520–523. <https://doi.org/10.1016/j.pupt.2013.01.006>.
- [7] Bernstein, M. H., & Brown, W. A. (2017). The placebo effect in psychiatric practice. *Current Psychiatry*, 16(11), 29–34. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6003660/>.
- [8] Bhattacharya, S. (n.d.). Brain study links negative emotions and lowered immunity. *New Scientist*. Retrieved June 29, 2020, from <https://www.newscientist.com/article/dn4116>.
- [9] Brooke, J. L., & Larsen, C. S. (2014). The Nurture of Nature: Genetics, Epigenetics, and Environment in Human Biohistory the Nurture of Nature. *The American Historical Review*, 119(5), 1500–1513. <https://doi.org/10.1093/ahr/119.5.1500>.
- [10] Bystad, M., Bystad, C., & Wynn, R. (2015). How can placebo effects best be applied in clinical practice? A narrative review. *Psychology Research and Behavior Management*, 8, 41–45. <https://doi.org/10.2147/PRBM.S75670>.
- [11] Cole, S. W., Hawkey, L. C., Arevalo, J. M., Sung, C. Y., Rose, R. M., & Cacioppo, J. T. (2007). Social regulation of gene expression in human leukocytes. *Genome Biology*, 8(9), R189. <https://doi.org/10.1186/gb-2007-8-9-r189>.
- [12] Constantin, K., Penney, A. M., Pope, C. J., Miedema, V. C., Tett, R. P., & Mazmanian, D. (2019). Negative repetitive thoughts clarify the link between trait emotional intelligence and emotional distress. *Current Psychology*. <https://doi.org/10.1007/s12144-019-00497-2>.
- [13] D'Acquisto, F. (2017). Affective immunology: Where emotions and the immune response converge. *Dialogues in Clinical Neuroscience*, 19(1), 9–19. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5442367/>.
- [14] Damasio, A., & Carvalho, G. B. (2013). The nature of feelings: Evolutionary and neurobiological origins. In *Nature Reviews Neuroscience* (Vol. 14, Issue 2, pp. 143–152). <https://doi.org/10.1038/nrn3403>.
- [15] Daniali, H., & Flaten, M. A. (2019). A Qualitative Systematic Review of Effects of Provider Characteristics and Nonverbal Behavior on Pain, and Placebo and Nocebo Effects. *Frontiers in Psychiatry*, 10. <https://doi.org/10.3389/fpsy.2019.00242>.
- [16] De la Fuente-Fernández, R., Ruth, T. J., Sossi, V., Schulzer, M., Calne, D. B., & Stoessl, A. J. (2001). Expectation and dopamine release: Mechanism of the placebo effect in Parkinson's disease. *Science (New York, N.Y.)*, 293(5532), 1164–1166. <https://doi.org/10.1126/science.1060937>.
- [17] Espinosa, A., & Kadić-Maglajlić, S. (2018). The Mediating Role of Health Consciousness in the Relation between Emotional Intelligence and Health Behaviors. *Frontiers in Psychology*, 9. <https://doi.org/10.3389/fpsyg.2018.02161>.
- [18] Folcher, M., Oesterle, S., Zwicky, K., Thekkottil, T., Heymoz, J., Hohmann, M., Christen, M., Daoud El-Baba, M., Buchmann, P., & Fussenegger, M. (2014). Mind-controlled transgene expression by a wireless-powered optogenetic designer cell implant. *Nature Communications*, 5(1), 5392. <https://doi.org/10.1038/ncomms6392>.
- [19] HOWELL, B. R., & SANCHEZ, M. M. (2011). Understanding behavioral effects of early life stress using the reactive scope and allostatic load models. *Development and Psychopathology*, 23(4), 1001–1016. <https://doi.org/10.1017/S0954579411000460>
- [20] Immune System Shaped by Environment More Than Genes. (2015, November 9). National Institutes of Health (NIH). <https://www.nih.gov/news-events/nih-research-matters/immune-system-shaped-environment-more-genes>.
- [21] Lamers, S. M. A., Bolier, L., Westerhof, G. J., Smit, F., & Bohlmeijer, E. T. (2012). The impact of emotional well-being on long-term recovery and survival in physical illness: A meta-analysis. *Journal of Behavioral Medicine*, 35(5), 538–547. <https://doi.org/10.1007/s10865-011-9379-8>.
- [22] Lanciano, T., Curci, A., Kafetsios, K., Elia, L., & Zammuner, V.L. (2012). Attachment and dysfunctional rumination: The mediating role of Emotional Intelligence abilities. *Personality and Individual Differences*, 53(6), 753–758. <https://doi.org/10.1016/j.paid.2012.05.027>.
- [23] Lanciano, T., Curci, A., & Zatton, E. (2010). Why do some people ruminate more or less than others? The role of Emotional Intelligence ability. *Europe's Journal of Psychology*, 6(2), 65–84. <https://doi.org/10.5964/ejop.v6i2.185>.
- [24] Lopes, P. N., Brackett, M. A., Nezlek, J. B., Schütz, A., Sellin, I., & Salovey, P. (2004). Emotional

- Intelligence and Social Interaction. *Personality and Social Psychology Bulletin*, 30(8), 1018–1034. <https://doi.org/10.1177/0146167204264762>.
- [25] MacGillivray, D. M., & Kollmann, T. R. (2014). The Role of Environmental Factors in Modulating Immune Responses in Early Life. *Frontiers in Immunology*, 5. <https://doi.org/10.3389/fimmu.2014.00434>.
- [26] Nuyt, A. M., & Alexander, B. T. (2009). Developmental programming and hypertension. *Current Opinion in Nephrology and Hypertension*, 18(2), 144–152. <https://doi.org/10.1097/MNH.0b013e328326092c>.
- [27] Pain, emotions and the placebo effect. (n.d.). ScienceDaily. Retrieved June 29, 2020, from <https://www.sciencedaily.com/releases/2017/08/170829131224.htm>.
- [28] Pert, C. B., & USA, C. P. (Biochemikerin. (1997). *Molecules of Emotion: Why You Feel the Way You Feel*. Simon and Schuster.
- [29] Peters, A., McEwen, B. S., & Friston, K. (2017). Uncertainty and stress: Why it causes diseases and how it is mastered by the brain. *Progress in Neurobiology*, 156, 164–188. <https://doi.org/10.1016/j.pneurobio.2017.05.004>.
- [30] Powlledge, T. M. (2011). Behavioral Epigenetics: How Nurture Shapes Nature. *BioScience*, 61(8), 588–592. <https://doi.org/10.1525/bio.2011.61.8.4>
- [31] Publishing, H. H. (n.d.). The mental side of recovery. Harvard Health. Retrieved July 3, 2020, from <https://www.health.harvard.edu/mind-and-mood/the-mental-side-of-recovery>.
- [32] Qian, X. (2012). *Glucocorticoids: New Recognition of Our Familiar Friend*. BoD – Books on Demand.
- [33] Rokach, A. (2013). *Loneliness updated: Recent research on loneliness and how it affects our lives*. Routledge.
- [34] Ruiz, D., José M., S., & Fernández-Berrocal, P. (2011). Emotional Intelligence and Acute Pain: The Mediating Effect of Negative Affect. *The Journal of Pain : Official Journal of the American Pain Society*, 12, 1190–1196. <https://doi.org/10.1016/j.jpain.2011.06.008>.
- [35] Schooling, C. M., Jiang, C., Lam, T. H., Zhang, W., Cheng, K. K., & Leung, G. M. (2011). Parental Death during Childhood and Adult Cardiovascular Risk in a Developing Country: The Guangzhou Biobank Cohort Study. *PLOS ONE*, 6(5), e19675. <https://doi.org/10.1371/journal.pone.0019675>.
- [36] Tammen, S. A., Friso, S., & Choi, S.-W. (2013). Epigenetics: The link between nature and nurture. *Molecular Aspects of Medicine*, 34(4), 753–764. <https://doi.org/10.1016/j.mam.2012.07.018>.
- [37] Tarry-Adkins, J. L., & Ozanne, S. E. (2011). Mechanisms of early life programming: Current knowledge and future directions. *The American Journal of Clinical Nutrition*, 94(suppl\_6), 1765S–1771S. <https://doi.org/10.3945/ajcn.110.000620>.
- [38] *The Biology of Belief 10th Anniversary Edition*. (n.d.). Retrieved June 29, 2020, from <https://www.Hayhouse.com/biology-of-belief-10-anniversary-edition-paperback>.
- [39] *The Placebo Effect on JSTOR*. (n.d.). Retrieved July 1, 2020, from <https://www.jstor.org/preview-page/10.2307/26057628?seq=1>.
- [40] Tsaousis, I., & Nikolaou, I. (2005). Exploring the relationship of emotional intelligence with physical and psychological health functioning. *Stress and Health*, 21(2), 77–86. <https://doi.org/10.1002/smi.1042>.
- [41] *Why Does Mainstream Medicine Ignore The Placebo Effect?* (n.d.). Retrieved June 29, 2020, from <http://www.healyourlife.com/why-does-mainstream-medicine-ignore-the-placebo-effect>.