In order to write this post today I spent a little time skimming through online articles containing research supporting placebo and nocebo effects. As research widely suggests it seems that fake or sugar pills can bring about positive health outcomes when our expectations are positive, even when we are aware of being administered a placebo medication. In one study people with Irritable Bowel issues were informed that they would be taking a placebo pill. A placebo effect was still observed because the participants in the study had been told that placebo interventions can still bring about positive results. In another study it was found that a fake surgery for knee arthritis was just as effective as real surgery, and in another study participants were told that a mild electrical current would be passed through their heads, which could potentially cause a headache. Even though no current was actually passed, two thirds developed a headache. In one research setting people suffering from asthma were administered a bronchoconstrictor, which causes asthma symptoms to worsen, but were told that it was a bronchodilator, which usually improves symptoms. The placebo suggestion reduced their discomfort .The second group was given a bronchodilator and told that it was a bronchoconstrictor. The nocebo effect increased their discomfort.

In her book, *Own Your Self,* Dr Kelly Brogan cites examples in the medical literature of the power of mind to influence the body. She cites a Harvard study that took 84 hotel attendants with cleaning responsibilities and told half of them that their daily work satisfied the surgeon general's recommendation for exercise as part of an active lifestyle. The other half were told nothing. The group that believed that their activities satisfied the surgeon general's recommendations showed a decrease in weight, blood pressure, body fat, waist-to-hip ratio, and body mass index. The researchers concluded that "These results support the hypothesis that exercise affects health in part or in whole via the placebo effect." She also writes about patients at UC Davis undergoing spinal surgery that had 45 percent less blood loss when they practised a brief pre-surgical visualization technique.

Nocebo is the opposite of placebo, which means that harm is caused by negative expectations. The nocebo effect can result from our beliefs and expectations, but also, other people's words or expectations of outcomes. A wrong diagnosis or pessimistic prognosis can negatively impact the evolution of a health condition. Where words, beliefs, thoughts and suggestions reduce pain in placebos, negative words, thoughts of harm, and suggestions of injury or hopelessness can trigger and exacerbate a problem or increase pain. Study findings suggest that the influence of nocebo is as strong as the influence of placebo. In one article, it was suggested that health personnel should become aware of their use of language and evaluate what patients are exposed to. Being aware of the placebo and nocebo effects could provide the basis for better recognition of both positive and detrimental influences in a clinical environment, which could allow changes towards more positive interactions to take place. It was suggested that patients should not be left with a focus on a negative past or future, but shifted to positive experiences prior to their illness and positive expectations in the future, In other words pairing the negative current experience with a positive past and future could shift the patients focus, expectation and emotional state and increase resilience.

In another source it was suggested that placebo and nocebo effects are both embedded in the very fabric of therapeutic relationships, are a manifestation and outcome of the rituals that characterize clinical practice and remind us of the multiple personal and environmental factors, including the attitudes, beliefs and expectations of both the health practitioner and the patient that ultimately shape health outcomes. In this article they described how recent biological and neuropsychiatric data have clarified the operation of placebo and nocebo effects in clinical practice - demonstrating the ability of a therapeutic context to modulate endogenous biological processes in a targeted manner.

Dr Kelly Brogan refers to a study reported in the *New England Journal of Medicine,* which reveals that there is increased risk of death from heart-related causes during the week following a cancer diagnosis, regardless of whether the diagnosis was accurate. She writes: “It’s possible that a doctor’s negative attitude and beliefs surrounding a diagnosis can contribute to this outcome by infecting the patient with helplessness and hopelessness, two psycho-spiritual states at the very root of disease.” She also provides a more ancient example of how our beliefs and emotions can translate to physiology. She refers to a practice known as “bone-pointing”, which involves pointing a bone at a person whose death was believed to be imminent and from supernatural causes, resulting in the person actually dying from emotionally induced trauma. She writes: “the translation of emotions to physiology is becoming…. more and more scientifically validated. A landmark study of women with breast cancer provides even more evidence by demonstrating the mechanism for the power of emotions to affect outcomes. Researchers measured markers of inflammation called cytokines and correlated them with levels of emotional acceptance. Previous studies have found that cytokines are elevated in cancer patients and can contribute to symptoms of fatigue, chronic pain, and nausea that not only diminish a person’s quality of life, but also sap physical resources needed to heal. Unfortunately, the very experience of being diagnosed with cancer creates a surge of pro-inflammatory cytokines, a form of medical hexing. Emotional acceptance was defined as the process by which a person allows emotions, both positive and negative, to emerge and dissipate without attempts to control, change, or reject these emotions. Measuring the women’s cytokines against their levels of self-acceptance, this breast cancer study found that this emotional state yielded lower levels of inflammatory cytokines.”

Our expectations and beliefs have neurobiological consequences, what is in our minds and has a strong emotional valence will influence our physiology. To expect otherwise

would suggest that the mind is separate from the body, but this would be a fallback into an outdated Cartesian way of thinking. Dr Gabor Mate writes: “The separation of mind and body is an erroneous view, incompatible with science. Personality traits—that is, psychological patterns—conduce to disease because the brain circuits and systems that process emotions not only exert a profound influence on our autonomic nerves, as well as our cardiovascular, hormonal, and immune systems: In reality, they are all conjoined. The recent, but no longer new, discipline of psychoneuroimmunology has delineated the many neurological and biochemical mechanisms that unite all these seemingly disparate systems into one super-system.”

Alongside expectations, conditioning and old programming around our bodily functioning also come into play when understanding the neurobiology of the placebo or nocebo responses. Our expectation of an anticipated positive consequence will trigger the brains’ reward system, Brogan quotes a *New England Journal of Medicine* report: “Placebo effects rely on complex neurobiological mechanisms involving neurotransmitters (e.g., endorphins, cannabinoids, and dopamine) and activation of specific, quantifiable, and relevant areas of the brain (e.g. prefrontal cortex, anterior insula, rostral anterior cingulate cortex, and amygdala in placebo analgesia).” On the other hand, negative expectations will get us revved up and trigger fear responses. Neurobiological changes, such as immune responses mediated through the reward system or the stress/anxiety network, are preparatory responses that help us avoid harm, as in the case of nocebo, or maximize benefit, as in the case of the placebo response.

Our mind is a powerful tool in shaping our physiology and when we become aware of how our unconscious beliefs and old conditioning around our body and our health trigger emotions,

which in turn reinforce beliefs and fears, and how this whole process impacts our physiology, we can perhaps encounter our symptoms with more acceptance and curiosity, which allows for more empowered, holistic and informed choices and prevents us from outsourcing our embodied power. The level of health and vitality we have reflect multiple interacting factors. Sometimes our symptoms reflect a deep need for change, boundary setting or self care. Dr Gabor Mate writes: “We human beings are biopsychosocial creatures whose health or illness reflects our relationship with the world we inhabit—including all the variables of family, class, gender, race, political status, and the physical ecology of which we are a part. A recent article from the National Institutes of Health called for a new foundational theory for medicine, based on a “biopsychosocial-ecological paradigm.”