Perceptions, Emotions and the Biochemistry of How Your Feelings Dictate Your Physical Health

by

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"It is easy to praise providence for everything that happens in the world provided you have both the ability to see individual events in the context of the whole and a sense of gratitude. Without these, either you will not see the usefulness of what happens or, even supposing that you do see it, you will not be grateful for it." - Epictetus

A leading stoic principle is to live life in accordance with nature. This does not mean in a physical sense by eliminating the use of all man made and technological developments from your life, but by a psychological means. When these concepts are understood and applied to your life the result is a state of gratitude for all events that you endure, both challenging and supportive, and that, not only provides a state of the upmost mental wellbeing and happiness, but also supports optimal physical health too.

As our human ancestors evolved into more neurologically complex beings we became able to differentiate ourselves from other members of the animal kingdom by that enhanced cognitive development. That is, the development of our brain size and structure and our ability to reason. Humans still contain the same brain structures that allow us to react on animal instinct, the area of the brain known as the amygdala, which is often referred to the emotional centre of the brain, but we also have an extremely well developed prefrontal cortex, often referred to as the brains executive centre.

Whilst the executive centre is responsible for our high intelligence and ability to think, without the mastery of perceptions, it can be a curse when it comes to how our thoughts and perceptions initiate our stress response.

Perceptions induce in us emotions and emotions are the result of the hormonal state within the body at any given moment. However, the function of the amygdala and the hormonal responses that can be produced by the endocrine system have altered little since humans evolved from our ape ancestors. The same internal chemical responses which are activated by our autonomic nervous system are concurrent through other animal species too. This is important to consider when it comes to our health as our higher emotional intelligence only induces far more reasons for the activation of primitive evolutionary responses. Note how a cat will initiate a very similar flight or fight response when confronted with danger to that which we see in humans. However, once the cat is free from danger, it does not continue to think about the confrontation throughout the day, the week, or even years later. Also, a cat does not have to experience such

dangers from things such as being late for work, dropping its phone, missing an appointment, receiving a bill and the many more constructs of our human societies. Not only do we initiate the flight or flight response when we are late for work, but we may be annoyed at having done so for a long period after the event has occurred. When you also consider that the fear of events potentially occurring, or the resentment towards the memories of more serious events also triggers the same response, we are often facing predators for a very large portion of the day!

As with any biological or physiological adaption, our feelings and emotions evolved into being as they served a survival advantage. Let us say that you are an early human and are asleep at night in simple wooden dwelling. You are awakened by a rustling sound from outside, this sensory information is relayed from the amygdala to the hypothalamus, which in turn causes norepinephrine and adrenaline to be released from the adrenal glands, propagate throughout the nervous system and the bloodstream stimulating changes throughout the tissues of the body.

The changes include dilation of the pupils, an increase in heart rate and the release of renin from the kidneys ensuring more sodium is retained in the blood stream, an important component of muscle tissue action. Glucagon is released by the pancreas, this stimulates the liver to release glucose into the bloodstream to fuel the perceived ensuing increase in energy demands of muscle tissue cells. The increase in blood glucose levels will stimulate an increase in insulin release in order to drive that glucose into the cells that need them. These change happen in an instant.

But, let us say the rustle is followed by a friendly voice, this will stimulate the release of acetylcholine as the parasympathetic nervous system kicks into gear, reversing these changes and signalling the body to calm down, lowering the heart rate, relaxing the breathing etc. The way the body is able to calm down relatively quickly after this initial shock would be akin to what happens after the small momentary fright from a friend hiding round a corner and shouting “boo!”

However, what if the threat continues and even increases? Let’s say that following the rustle you hear a roar! Before we respond to this enhanced threat, lets learn a little about receptors and ligands…

Receptors are tiny molecules that can be found on the surface of the cells in our body. They are so tiny that a typical nerve cell will have millions of receptors on its surface, there may be 100,000 of one type of receptor, 10,000 of another type and so on. Each type of receptor has a task of

allowing another chemical structure, a specific ligand, to bind to it. The analogy is often used of the receptors being like a keyhole and only a specific key, ligand, will be able to bind to that receptor. For example, opiates bind to opiate receptors, insulin to insulin receptors and the aforementioned acetylcholine to acetylcholine receptors. Once a ligand has bound to its specific receptor, information is passed from the receptor molecule into the cell and processed by the cells nucleus.

There are three chemical types of ligands. The first being the neurotransmitters, which are generally produced in the brain and transmit information across the nerve cells. These include acetylcholine and norepinephrine. The second category of ligands are the steroids and these substances are created in the body from cholesterol, they include the sex hormones - testosterone, estrogen and progesterone as well as the stress hormone - cortisol. The third type are peptides, the most abundant of the ligands, are responsible for carrying signals throughout the entire body and effectively commanding its mental and physical responses at any given moment.

Back to the roar! The fright is now heightened and the plethora of chemical responses throughout the body, the neurotransmitters and peptides binding to receptors, increases. The hypothalamus now releases corticotropin-releasing hormone, a messenger to the pituitary gland to release adrenocorticotropic hormone, which in turn signifies the release of cortisol from the adrenal glands. This state maintains the stress reposes and hyper-alert status, more glucose enters the bloody stream stimulating more insulin in response.

It is the overuse of this system that is catastrophic to health in modern societies. Consider the overuse of receptors alone. We know that the opiate receptors become less responsive to their messengers overtime and that is why an opiate addict will need greater and greater doses over time to exude the same effect. Then we can apply the same to insulin. Insulin resistance is a common result of not only heavy and frequent carbohydrate consumption but also the triggering of insulin release from the stress response. The degradation of the insulin receptor cells leads to many health issues and notably the onset of type 2 diabetes, the effects of which are reversible by proper diet management and not ignoring the manipulation of the stress response. By saying manipulation, I refer to using that executive centre of our brain to manage our perceptions and to minimise the use of the stress response.

It is not solely chronic stress that is the issue, that is the larger events that may happen to us in life such as losing a job, a car accident or a serious break-up, but that we are always engaged in these hormonal responses throughout the day by means of our perceptions. So whilst we may not be activating the extremities of the fight or flight response we may still be harbouring low levels stres or negative perceptions that cause the same cascade of responses, albeit to a much lower level, to be implemented extremely frequently. Overtime this will lead to physical health issues as a result of the mental state. Consider too how epigenetics has shown us that the signals sent to the nucleus of the cells affect how our DNA is transcribed when new cells are generated. This is how stress has become, in my option, a more serious killer in model societies that cigarettes, alcohol or recreational drug use.

Remember this going forward. You will encounter challenges every day! But it's in seeing how those challenges serve you that you will embrace them rather than shrink from them. If someone says something derogatory about you, it says more on their emotional state than it does your own. For someone who is completely happy in their life has no need to attempt to bring another down, they only do so to level the playing field by means of the fact that they have perceived the other person as above them in some regard. Yet, should you take it to heart rather than seeing how their response is in fact a compliment, then you will harbour resentment and be allowing your body to be subject to the aforementioned processes. If you harbour guilt or resentment to a past even, the same will be true also. But, look how that event has served you and what great things about your character or life would not be so had that event not occurred. Then you can change your perceptions regarding it and rather than seeing that event as negative you can balance it by introducing the positives. Apply this to all negative memories you harbour and you can completely change that data set to show that all events are just that - events, neither positive or negative and it is only our perception of an event that define it as good or bad. That is what lies at the heart of stoicism and an ability to master your mental and physical health!