Stress and the Brain

What is stress from the view-point of the brain?

Stress is a biological response controlled by the brain as a reaction to a challenging stimulation of a physical or emotional nature.

From the brain’s view point, everything can be perceived as stress. From walking down the street to handing a difficult report in on time, it is all a question of the degree of stimulation and the level of threat perceived during that stimulation.

We all know that our brain is responsible for the control of our physiology, our movements, our thoughts and emotions.

In response to what is perceived as a stressful stimulation, the brain triggers the biological reactions necessary to put the individual experiencing stress on alert, engaging the fight or flight response of the sympathetic nervous system (SNS). The biochemical cascade of reactions (driven by the HPA axis or Hypothalamus-Pituitary-Adrenal axis) leads to the activation of the adrenal gland, the release of circulating cortisol and the well known consequences of increased heart beat, increased blood pressure, etc.

A further consequence to consider with the well documented signs of stress response is the generation of a hyper active brainwave.
An initial level of stress stimulation sends all resources in the body towards the fight and flight response and shuts down reproduction, growth, the immune system, the blood flow to the skin and stimulates stronger memory, sharper senses while making us less sensitive to pain.

It is however important to realize that as the SNS is fast reacting in creating the fight and flight response, it is slow to shut down. At normal levels, the cortisol release has an inhibitory feedback effect on the hypothalamus and the pituitary gland of the HPA axis and helps shut the fight or flight response.

The problem comes in our current life styles with the constant stimulation of the fight or flight response which keeps our systems constantly on high alert with detrimental effects on our health and mind sets as a consequence of over active brain waves. Continuous levels of stress hormones in our blood stream engage us in the downwards spiral of chronic stress.

When chronic stress develops, there is an overload of the short term response chemicals and the increased base line of cortisol levels is toxic for the hippocampus which tends to decrease in size, hindering the quality of memory formation, decreasing the brain’s neurogenesis ability and decreasing our learning ability. The perifrontal cortex is affected; the brain’s neuroplastic ability is decreased, resulting in loss of higher executive functions.

Other areas of the brain responsible for our emotional reactions such as the amygdala tend to increase in size in situations of chronic stress and keep us in fear based learning.

Eventually the symptoms of chronic stress will manifest in our body and create dis-ease, poor stomach health, tension headaches, etc..

Knowing that the brain is responsible for triggering the fight or flight
response to stressors is key to finding solutions to chronic stress. It is fair to consider that the brain itself can be used to counteract the effects of stress.

A great step to a healthy attitude to stress is to realize our ownership over our brain and learn to engage our brain intentionally to manage the consequences of the fight and flight response.

It is actually very simple for us to learn to intentionally engage the parasympathetic nervous system, which controls the rest and digest response in our body.

The rest and digest response returns the body resources towards the digestive system but also the brain balance needed to enjoy a healthy brain wave. We have the power to educate our own brain to do so intentionally. Once the over stimulated fight or flight response returns under control, the true potential of our brain becomes accessible, our learning ability is enhanced and our executive reasoning functions become strong again.

To create a healthy brain that can lead us in a positive and healthy lifestyle where stress is well managed, our brain needs us to provide it with

- **Physical exercise:**

Any type of physical activity that helps you keep reasonable fitness levels and that you enjoy will support you in keeping a healthily balanced brain. However, it is important to realize that stretching our spine and releasing any tension from our spinal structure helps us keep an energized and performing nervous system. It is a very good practice to start every day with a few back stretches which will only demand a few seconds of your time.
- **Mindfulness and Relaxation:**

The only autonomic nervous system function that can be directly affected by our conscious mind is the breath. Conscious breathing is a great way to experience deep levels of relaxation and to activate the parasympathetic nervous system.

Prepare your body for comfortable breathing:
‘Stand your feet parallel and about shoulder width apart, bend your knees slightly to not exert too much pressure on your lower spine. Join the fingers of your hands together your thumb knuckles facing your body. Bouncing on your knees with a comfortable rhythm, tap the knuckles of your thumbs repetitively on the centre of your sternum exhaling deeply. With each out breath, try to empty your chest of all tension while you keep bouncing on your knees.’ Continue for 3-5 min, emptying your mind of all worries and thoughts with every out breath. Keep your eyes closed while you focus your attention on the physical sensations around the centre of your chest and imagine any discomfort or pain released with every out breath. Finish by taking a deep breath in and sweeping down the centre of your upper body as you exhale.

Then sit comfortably keeping your spine straight and supported. Practice relaxing your focus on the feeling of your breath and breathing deeply into your abdomen. As your breathing practice progresses, you will notice the exhaling phase of your breath lengthening and the levels of relaxations deepening.
At night, if you have had too much stimulation during the day, use a mindful relaxation exercise to bring your brain wave down and allow yourself a sound and deep sleep. As you lay on your back in your bed ready for sleep, leave some space between your legs and rest your hands on your abdomen. Focusing on your breathing, gently turn your feet in and out, in and out in rhythm engaging the whole length of your legs so that even the hips are in movement. As the rhythm develops it will feel like you are simply shaking your legs. This exercise if done for 2-3 min at night will release the tension accumulated in the brain and lower the brain wave before sleep. When you finish the exercise relax your whole body completely focusing on a comfortable abdominal breath and let yourself drift off to sleep.

- **Empowerment**

The neuroscience of today has debunked many myths about what was believed about the brain. As an example, it is not true that we use only 10% or less of our brains. The ability of the brain to recreate itself as a flexible network of neuronal connection is more and more documented and termed ‘neuroplasticity’. Our minds seem to be powerful enough to shape and re-shape our brains depending on what we focus on. It has for example been documented by researchers of University College London that London black cab drivers who ‘learn’ the streets of London and do not rely on a navigation system have a significantly larger hippocampus as compared to the rest of the
population. The hippocampus is the part of the brain that manages spacial orientation. Since it is put on constant demand by its users (the cab drivers) it has grown much like a muscle grows in bulk when trained and used regularly.

In other words, it is fair to assume that if we continue to let our mind respond to stimulation with stressful reactive patterns our brain will re-enforce the circuits and the biochemical cascades that leads to chronic stress.

We can empower ourselves to shift into strong ownership of our brain and learn to change its state to not be powerless in front of the stress response. Brain Brilliance Consulting programmes are trainings designed to gain higher level of ownership over our brains and to use them as responsible owners who manage their brain activity much more intentionally. Managing our brain state in response to stress forms only a first step into the journey of brain ownership.

For more information on Brain Brilliance Consulting and blogs, please visit brainbrilliance.org or contact Claire on claire@brainbrilliance.org