

MODULE 4: THE SCIENCE OF BREATHING

LESSON 6: THE BRAIN

Breathing and the Brain

Thanks to cutting edge research in the field of mindfulness, neuroscience and psychoneuroimmunology, we are beginning to unravel the inner workings of the brain, how it functions, its ability to shape itself and how this all relates to health, behaviour and to consciousness itself. Yet it remains a mystery. And even though the breath is our most intimate experience of life, we are only scratching the surface of its potential. In this lesson, we will explore how the breath relates to the brain in the context of conscious connected breathing. We discuss the basic design of the brain and the possibilities for conscious breathing to be a tool that sculpts it to support our highest potential as conscious beings.

The brain contains billions of nerve cells arranged in patterns that coordinate thought, emotion, behaviour, movement and sensation. A complicated highway system of nerves connects the brain to the rest of the body, so communication can occur in split seconds. While all the parts of the brain work together, each part is responsible for a specific function - controlling everything from your heart rate to your mood.

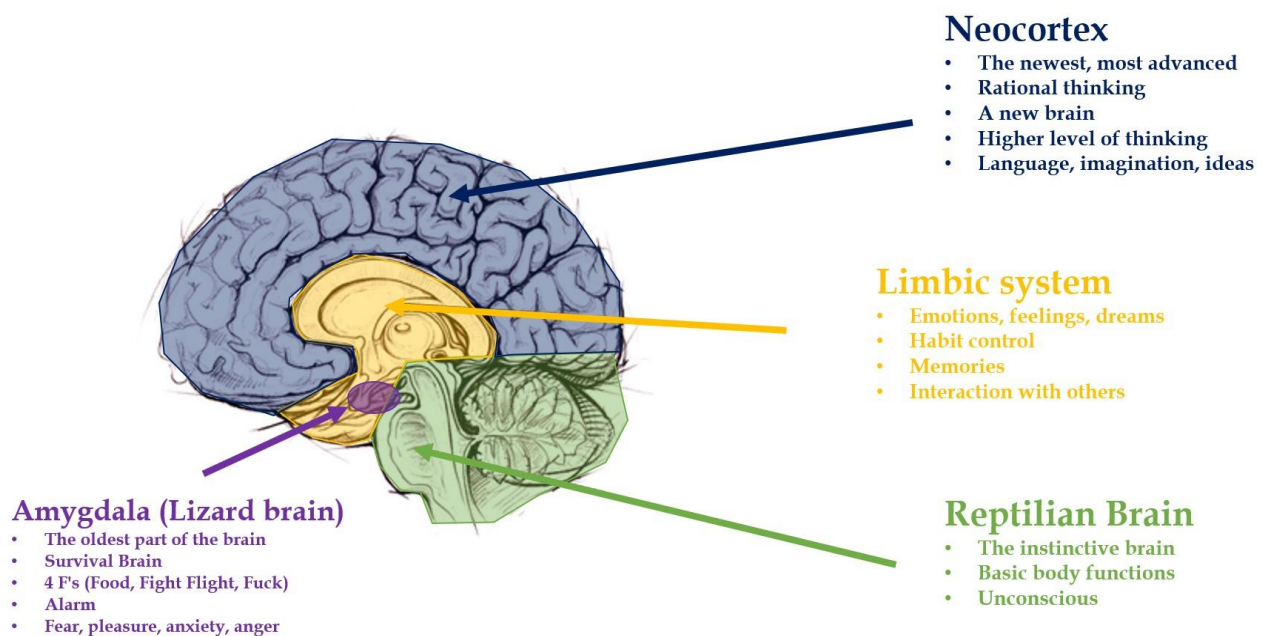
The three-part structure of the brain, or 'triune' as it's known, tells a long story of human evolution, each part reflecting our development through three distinct eras of our evolution. They are the Reptilian brain, Limbic brain and the most evolved part, the Neocortex.

The Reptilian Brain

About 500 million years ago, the brainstem, the most ancient part of the brain evolved. This is the junction where the spinal cord connects to the base of the brain. Old school scientists named this the reptilian brain because it looks like an entire brain of a reptile. Directly connected to this is the cerebellum at the base of the brain.

The brainstem, together with the cerebellum, makes up the reptilian brain. It is responsible for supporting basic life functions such as the control of heart rate, respiration, wakefulness and sleep. According to studies, the cerebellum is the brain's most active area, responsible for balance and coordination of movement. Learned movements and memorised habitual behaviours are also stored in the cerebellum.

Brain parts (Triune Brain model)



The Limbic brain (Emotional brain)

The next part of the brain to have evolved is the midbrain, which is made up of some interesting structures which influences our feelings, behaviour and basic survival instincts. Thus, it is also known as the 'emotional brain'. For the purposes of this discussion we will only look at some key structures.

- **The Thalamus** acts as the relay station, integrating all the incoming information from the senses and external world.
- Connected to the thalamus is the **Hippocampus**, the database of the brain, the store house of memories of all our experiences from the beginning of our lives, both

conscious and unconscious. It is responsible for encoding long-term memories and processing information through learning.

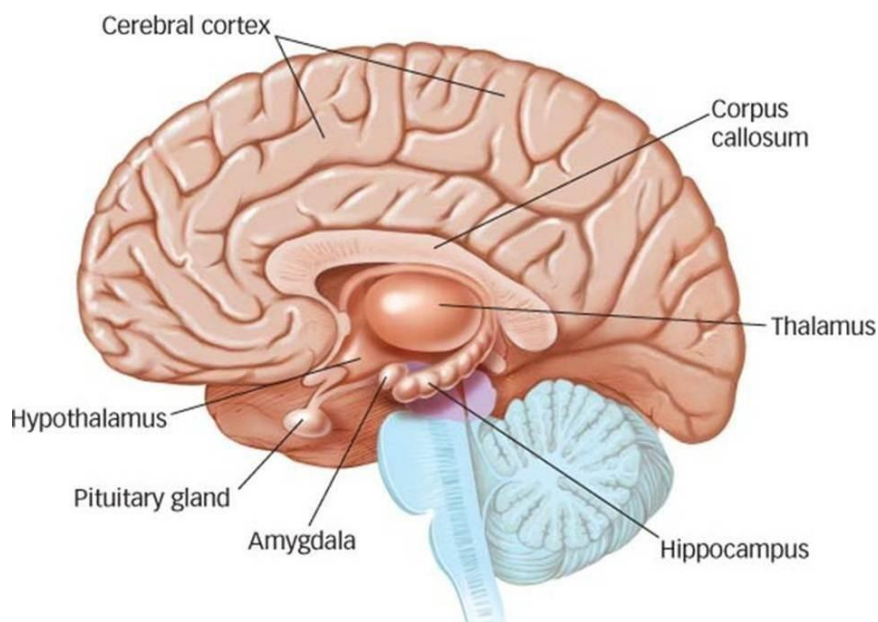
- **The Amygdala** is a small almond shaped structure that works with the hippocampus to generate primary emotions from the interpretation of events based on the memories stored there. Essentially, it is the brains panic button which mobilises the bodies resources to deal with a threat. It sends signals down to the adrenal glands to secrete adrenaline and cortisol, kicking the body into high gear.

A primary emotion (anger, fear, sadness or joy) response is activated when an incoming stimulus from the external environment (or an internal thought) links to a memory in the hippocampus. For example, a child might have had a nursery school teacher who was strict and who always wore rose scented perfume. This association gets imprinted in the hippocampus. The child then grows up and his boss wears rose scented perfume. He can't understand why he always feels anxious when he is around her. The scent of rose unconsciously triggers the stress response. Think about the implications of this understanding.

New research has revealed that the amygdala has two parts. The central core seems to store primal or instinctive fear while the more plastic outer part is formed from learned fears based on traumatic fearful experiences. It has been found that people who have PTSD have a larger amygdala and thus the stress response is more easily activated.

The Neocortex

This is the new or most evolved part of the brain that is highly plastic and able to sprout new neural connections based on our thoughts, behaviour and actions. There are 4 lobes of the neocortex each responsible for various functions and yet interconnected. It is the home of the conscious mind. Of interest to us is the left prefrontal cortex responsible for decision making, concentration and focus and lights up during meditation. It sends fibres into the limbic brain inhibiting the acting out of primal instincts. The neocortex is also the last part of the brain to develop and remains very malleable until the mid-twenties. This gives the brain an opportunity to grow, learn, evolve and entrench the initial neural pathways until early adulthood.



As we mentioned earlier on in our discussion, the limbic brain responds to both internal and external signals, either interpreting them as safe or fearful. Our breathing pattern i.e. rate, volume and place from where we breathe is a language, constantly sending signals back to the limbic brain about our state of being.

A long deep inhalation, a fast rhythm and breathing high up in the chest is interpreted by the body as a high demand state. The stress/energy/sympathetic response will be triggered, and the limbic system will be activated.

A conscious connected breathing session opens up the opportunity to 'see' and relate to the stressful state by learning to consciously relax through what is surfacing. Breathing from the belly, relaxing on the exhale and slowing the breath down helps the body to trust the intensity and change our relationship to the intensity of the physical sensations and emotional experiences. It helps us to refine our ability to respond with relaxation rather than react to what is coming to the surface. Thus, the breath opens us up to the visceral experience of the subconscious, and through skilled facilitation gives us the opportunity to work through, release and integrate it.

Exercise:

Practice the ABC formula:

A - Awareness: Become mindful of when you have been triggered and how it feels in your body.

- What sensations do you feel in your body when something has shifted you from a state of balance?

B - Breathing into it: Use your breath to slow down to move out of reactive mode and ask yourself:

- What thought did I have related to that situation?
- How have I interpreted the situation?
- What belief system has been activated?

C - Conscious Choice

- Can I choose to see the situation differently and let it go?
- Does this situation require me to consciously communicate something?
- Can I channel this adrenalised energy into something else?

Further reading:

Evolve your Brain by Joe Dispenza

The Buddha's Brain by Dr Rick Hanson

Behave by Robert Sapolsky