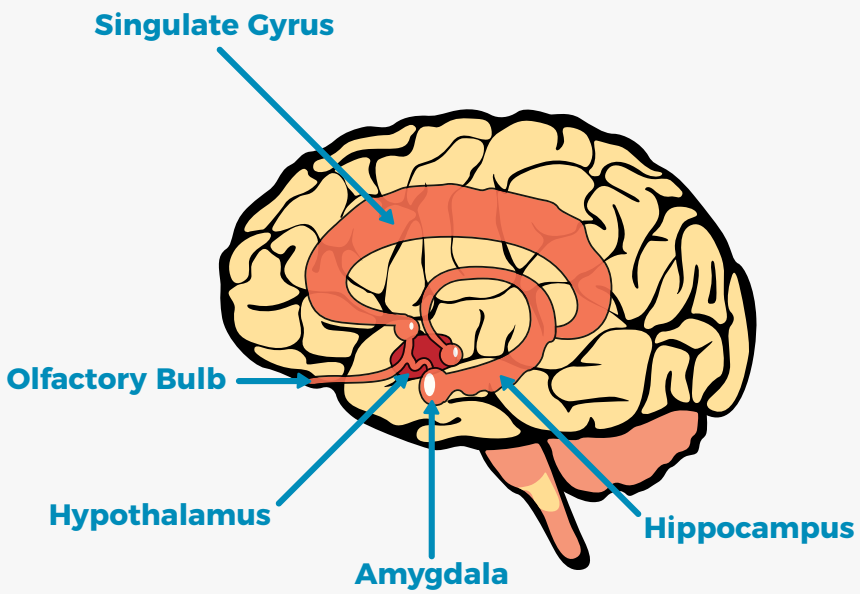
SELFHACKED
— LIMBIC SYSTEM REPAIR GUIDE —

What is the limbic system?

The limbic system is a part of the brain that is primarily responsible for controlling emotions, cognitive function, and memory processing. In addition, the hypothalamus also controls several important bodily functions.

Different parts of the limbic system communicate with each other to process emotion, cognitive function, learning, and memory processing. In addition, the limbic system communicates with other parts of the brain and the autonomic nervous system to ensure appropriate physiological responses to stress.



Components of the limbic system

- **Hippocampus** is the memory center of the brain
- **Amygdala** is the emotion center of the brain. It is also associated with emotional memories, such as the memory that is associated with major events or trauma
- **Thalamus** works to relay sensory information and pain perception
- **Hypothalamus** is involved in memory, wakefulness, sleep, and also a center that controls many important hormones (including the stress response hormone and sex hormone axes) and bodily functions
- **Basal ganglia** is responsible for reward learning, addiction, and task switching
- **Cingulate gyrus** is important for positive emotional responses and learning, as well as executive function and breathing

The limbic system communicates and works closely with other brain regions. Of relevance to discuss here is the **prefrontal cortex,** which is important for logical thinking, planning, and dissociating conditioned fear stimuli from the real threat.

How is the limbic system broken, or how is it linked to chronic health problems?

Various parts of the limbic system directly affect the hypothalamus-pituitary-adrenal (HPA) axis and the fight or flight system.

Generally, stimulation of the hippocampus reduces the HPA axis activation, whereas stimulation of the amygdala increases CRH release and activates the HPA axis (R).

The limbic system plays a role in your stress responses. Particularly, the amygdala is the almond-shaped part of your brain that makes you remember emotional events in association with fear and stress (R). The amygdala turns on your stress response system or keeps the stress response system from shutting down after a stressful event. This stressful event could include: a divorce, bereavement, an accident, or a trauma.

Brain imaging studies have shown abnormalities in the size, blood flow, or tissue density in parts of the limbic system in people with depression or PTSD regions. These abnormalities often change after the depression or PTSD are treated and in remission (R). Particularly, the hippocampus neurons are known to shrink or die in response to chronic stress, while the amygdala becomes more activated.

While the limbic system can stimulate the stress response systems, it is also subject to negative feedback by cortisol. All parts of the limbic system have receptors for cortisol, which is meant to cause reduction of cortisol levels. However, prolonged high cortisol levels cause cortisol resistance and reduce the number of cortisol receptors on these brain cells.

1. High CRH and cortisol resistance is inflammatory.
2. Persistent sympathetic responses reduce restorative functions in the body.
3. Cortisol and CRH activate the bad serotonin receptors, including 5-HT2A and 5-HT2C.

These factors can cause chronic health issues including anxiety, depression, IBS, chronic fatigue, insomnia, chronic pain, autoimmune diseases, and OCD.

What can be done to repair it?

Step 1: Identify the causes of limbic system dysfunction.

Step 2: Address the root causes.

If your stress-related health issue is related to a traumatic event, **exposure therapy** or a form of therapy that reduces your negative association with the stimuli that trigger your fear responses may help. Such therapies activate the prefrontal cortex, which helps with the dissociations of fear/anxiety from fear-triggering stimuli, while also helping with fear extinction.

Repeated Transcranial Magnetic Stimulation (rTMS), or the use of magnetic waves to activate the prefrontal cortex, seems to help with several disorders of the limbic system (R). It helps quiet down the fear responses, especially in PTSD and other anxiety disorders.

If your fear or stress responses are associated with sleep (e.g. such as fear of nightmares), it is very important that you speak to your physician to resolve this in order to resolve your health problems.

Other methods to disengage the imbalances in the limbic system from traumatic events include: **EMDR therapy** (R), **cognitive behavioral therapy** (R), and **meditation** and **mindfulness practices** (R).

Step 3: Ensure that other factors are in place to heal your limbic system.

You need to reduce inflammation and provide everything your brain needs to get healthy.

- An anti-inflammatory diet: see 'lectin avoidance diet'
- Work up to a few hours of sun exposure daily and ensure that your vitamin D is at a good level
- Anti-inflammatory supplements
- Ensure sufficient oxygen to the brain
- Ensure that your blood sugar is stable

Step 4: Use other biochemical means to normalize the overactive amygdala.

Oxytocin has been shown to shut down the amygdala's response to fearful events in humans, suggesting that it might be helpful if you may have a factor that predisposes you to an overactivated stress response from an emotional trauma. However, there is no large scale clinical trial available to report on effectiveness yet.

Ways to increase oxytocin include:

- Massage (R)
- Physical touch with humans or animals
- Sexual activity
- Positive social encounters
- Speaking about your past traumas or negative experience with someone you trust (talk therapy included)
- Oxytocin supplementation; oxytocin generally does not cross the blood-brain barrier, but the nasal spray does
- Some anti-depressants help restore cortisol sensitivity in the limbic system, which helps reduce inflammation and CRH levels

Antidepressants - desipramine, amitriptyline, clomipramine, paroxetine, sertraline, and citalopram (but not fluoxetine) (R, R2). We typically recommend our clients speak to their doctors about these in cases where no other solutions are effective enough to resolve their health issues.