



# Change Your Brain - Neuroplasticity

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Historically, scientists thought that a person was born with a certain number of brain cells and then slowly lost them over a lifetime. Although brain activity is at its highest intensity for the first few years of life, recent studies have clearly shown that the brain can change at any age—for better or worse.



## Neuroplasticity

Neuroplasticity is the term that refers to the ability of the brain to adapt and change. It is your choice whether you want to direct it in a positive or negative direction. Your brain will develop wherever you place your attention. Several of the ways that changes occur are:

- Growth of new nerve cells (neurons)
- Shrinking of neurons from disuse
- Increasing or decreasing the number of connections per neuron
- Laying down or losing layers of insulation called myelin (This layer improves the speed of nerve conduction)
- Substitution of an injured part of the brain with an already functioning area, where the new area takes on new capacities.

The bottom line is that your brain is constantly in a dynamic state of change every millisecond, depending on how much it is stimulated—or not.

- There is an incredible upside potential because the nervous system has a large capacity to change positively, if it is kept active and creative.
- The dark side is that when your brain shrinks or atrophies, such as when you are suffering from chronic pain, you are less able to act rationally to pull yourself out of the hole. This is a solvable problem, but you need help and the right tools.

## My Brain is Shrinking??

Why would your brain shrink in the presence of chronic pain? When your nervous system gets stuck on repetitive thought and pain patterns, these grow into monstrous circuits, and less time is spent on forming creative pathways. The brain area that enjoys good friends, music, art, wine, etc. gradually shrinks with disuse. There is a huge amount of neural activity involved with these endeavors that just do not occur in the presence of unrelenting pain.

Once you know how to ride a bicycle or walk, you cannot unlearn the skill. Similarly, the moment pain circuits are laid down in your brain, they are permanent. They may become less functional, but they are not going to disappear

## Creating Detours



So, what is the solution?

You must lay down alternate circuits or detours around the existing problematic ones. This can also involve you creating a shift to more enjoyable ones. Once you learn the tools and choose the ones that are the best fit for you, it is remarkable how consistently the pain will diminish and perhaps even disappear.

The good news is that when you successfully treat chronic pain, your brain re-expands (3) Inflammation and hypersensitivity improve and the perception of pain diminishes. The key is to learn the tools that simulate your brain to develop in the manner and direction you choose. It is similar to learning a new language or any high-level skill. Repetition is key.

I am now convinced you can rewire your nervous system around almost any set of chronic pain circuits. The stories continue to border on unbelievable. Some stories of healing include people with:

- 55 years of pain
- 20 years of pain, high doses of opioids, and 27 surgeries
- Ten years of abdominal pain and headaches
- Four years of neck pain, 10 doctors, on narcotics, six neck injections

The metaphor that jumps out at me is that of building a virtual desktop on your computer. The other one is still there but it is not being used much and the new set of circuits don't create pain. A major aspect of solving chronic pain involves stimulating neuroplastic changes in your nervous system and there does seem to be a limit as to how far you can go with it.

1. Dragananski, et al. Temporal and spatial dynamics of brain structure changes during extensive learning. *The Journal of Neuroscience* 2006; 26: 6314-6317.
2. Apkarian AV, Sosa Y, Sonty S. Chronic Back Pain is associated with decreased prefrontal and thalamic gray matter density. *Journal of Neuroscience* 2004; 24: 10410 -10415.
3. Seminowicz DA, et al. "Effective treatment of chronic low back pain in humans reverses abnormal brain anatomy and function." *The Journal of Neuroscience* (2011); 31: 7540-7550.