

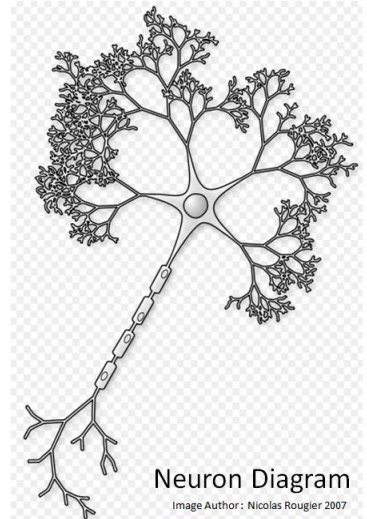
# Brain Health Fact Sheet

## Brain Facts

The human brain weighs slightly less than 1.4 kg. This is only about two per cent of our body weight, however the brain is the most active organ that we possess using 20% of the body's oxygen and 25% of the body's energy (*glucose*) consumption. The brain is also the most complex structure known to man. It contains more than 100 billion brain cells (*neurons*), each of which is connected to around 10,000 other neurons. That's one million billion connections that need to be maintained - a truly astounding number. So far no one has ever managed to find a limit to either our brain's processing power or all that it can remember.

Our Brain's neural network extends to all parts of our body through our nervous system. This is because our nervous system is also entirely constructed of neurons and our brains are part of the same network or body system. This vast network of neurons controls all of the body's functions, from our heart rate, breathing and moving, to our sight, hearing, touch and emotion, and onto our consciousness, memory and thinking. Ultimately, it shapes our thoughts, hopes, dreams, and imagination. It is what makes us human.

Different parts of our brain handle all the different capabilities and skills we have. Separate sections of our brain are specialised for each part of our body, both to operate (*motor functions*) and for feedback (*touch functions*). Different segments of our brain also process each of our five senses. The portion of our brain that deals with emotion is separate from the piece that has planning and organisational skills. The section of the brain that performs math is different from the area that understands the language we hear, which is different from the area that forms the words we speak, which is different from the part that helps generate our memories, and so on. So far neuroscientists have mapped hundreds of discrete brain areas.



## Brain Plasticity

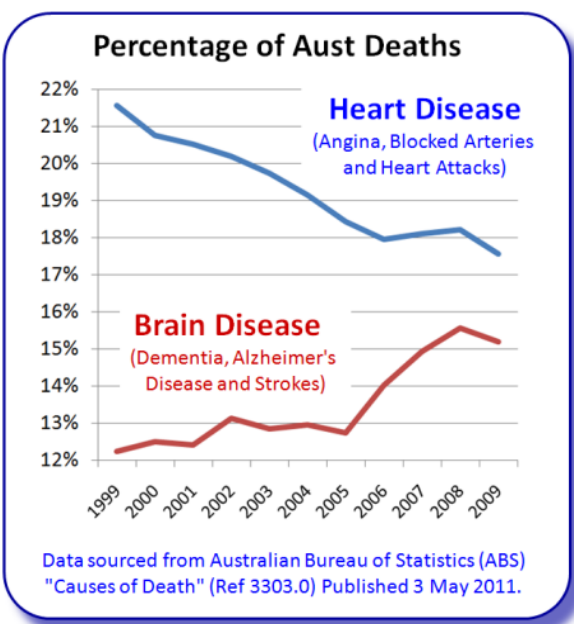
The brain possesses the ability to modify and strengthen its network connections. This is how we learn. Brain cell connections (*synapses*) are always forming and dying. This ability of the brain to change and adapt is known as *brain plasticity* or *neuroplasticity*. This is the same principle as our muscles, each time we exercise, our muscles get bigger. If we don't exercise, our muscles deteriorate. The same is true of our brains the more we use each of our mental functions the stronger that capability becomes.

**Positive Plasticity** occurs when you create and strengthen your network connections by challenging your brain with novel activities. This creates new pathways and engages quieter parts of the brain. **Negative Plasticity** occurs when you weaken and lose your network connections by not performing activities that you once did. Unused parts of the brain decline and stop working.

Neuroplasticity works both positively and negatively. It cleans out old connections as frequently as it enables the creation of new ones. This process is called *synaptic pruning*. The brain assumes that what is not used is not needed. Connections that are infrequently used are allowed to diminish, while neurons that are highly active are strengthened and preserved. The more regularly each brain function is used, the more network connections are made, the stronger that mental skill becomes and the longer it takes for it to diminish.

Just as the sedentary lifestyle of most modern people does not provide sufficient physical exercise, it also does not provide sufficiently varied mental exercise with similar long term health risks. According to the Australian Bureau of Statistics (ABS), Brain Disease (Dementia and Strokes) was the third highest cause of death in 2009 and with its current rate of increase will likely overtake Heart Disease (Angina, Blocked Arteries and Heart Attacks) sometime in the near future. We need both physical and mental exercise.

However the good news is that the brain's ability to reorganise itself and build new network connections (*brain plasticity*) and the brain's ability to grow new brain cells (*neurogenesis*) continues throughout our lives. Age doesn't matter, the process of change is always happening. Adult brains continue to adapt and have the capacity to develop new connections until we die. By being mentally active in many more and new areas, the brain develops additional capacity, called **Cognitive Reserve** which protects it from deterioration and helps to delay the risk of dementia later in life.



You are welcome to attend a Free Presentation on **The Science of Neuroplasticity**  
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