

## The Incredible Brain!

Let's take a few minutes to consider this amazing organ we have that literally affects everything we do. Your brain is the most complex, mind-boggling organ in the universe. It is estimated to be only about 3 pounds, which is usually around 2 percent of your body's weight. Unbelievably, given that it is the bedrock of your personality, some think even your soul, it is 85% water! The brain uses 20% of the oxygen we breathe and about 20% of the calories we consume. When whole body scans are performed on people, the brain is so active, compared to the rest of the body, that it looks like a small, powerful heater, while everything else appears almost ghostlike.

It is estimated that we have over 100 billion neurons (also called nerve cells or brain cells), which is about the number of stars in the Milky Way Galaxy. Here are also trillions of supportive cells in the brain called glia. Each neuron is connected to other neurons by up to 40,000 individual connections (called synapses) between cells. Multiplying 100 billion neurons times 40,000 synapses is equivalent to the brain having more connections in it than there are stars in the universe. A piece of brain tissue the size of a grain of sand contains 100,000 neurons and 1 billion synapses, all "talking" to one another.

Many people have heard that we only use 10 percent of our brains. Nonsense! You may not use every neuron in your brain at the same time, but each is important. The brain never turns off or even rests through your entire life. It is very active at night, especially during dreaming.

Brain development is a fascinating construction tale, where genes and environment collaborate to make us who we are. At times during pregnancy, the baby's brain makes 250,000 new nerve cells per minute. Babies are born with 100 billion neurons; however, only a relatively small number of neurons are connected. In the first decade of life, a child's brain forms trillions of connections.

Brain development is especially rapid during the first year. Brain scans show that by twelve months, a baby's brain resembles that of a normal young adult. By age three, a baby's brain has formed about 1,000 trillion connections—about twice as many as adults have. Also, the areas of the brain that develop early, such as vision, are the first areas to become myelinated (wrapped in myelin), which helps that part of the brain become more efficient.

The "years of promise" between three and 10 are a time of rapid social, intellectual, emotional and physical development. Brain activity in this age group is more than twice that of adults, and although new synapses continue to be formed throughout life, never again will the brain be able to easily master new skills or adapt to setbacks.

At age 11, the brain begins to prune extra connections at a rapid rate. The circuits that remain are more specific and efficient. The brain is one of the best examples of the "use it or lose it" principle. Connections that are used repeatedly in the early years become permanent; while those that are not used are pruned.

During late adolescence and into the mid 20s, the front third of the brain, called the prefrontal cortex (PFC) or executive brain, continues to develop. Even though we think of 18 year olds as adults, their brains are far from finished. Myelin continues to be deposited in the PFC until age 25 or 26, making the executive part of the brain work at a higher and more efficient level. Were you more mature at 25 than 18? I sure was. It is ironic that the car insurance industry knew about maturity and brain development long before society. Typically, car insurance rates change at 25 because drivers are more thoughtful and get into significantly less accidents.

After about 25, just as we reach peak development the brain starts slowly shrinking. Some research has suggested that the male brain shrinks faster than the female one. I think it is because men do more

stupid things to their brains, such as they have more problems with alcohol, play tackle football and hit soccer balls with their heads. In college, 70% of football players and 62% of soccer players get at least one concussion per year.

When it comes to the brain, SIZE MATTERS. The stegosaurus (a 30 ft long colossus weighing up to 7000 lbs) brain was about the size of a walnut. The adult human brain weighs about 1,300 to 1,400 grams. The average cat brain weighs only about 30 grams. This is why human curiosity helps invent space travel and cures for cancer, while curiosity requires cats to have nine lives.

If, as it says in the New Testament of the Bible, that the body is the temple of the Holy Spirit, certainly the brain is the inner sanctum. The brain is involved in everything we do and must be considered whenever we look at the motivation or reason behind human behavior.

As a neuropsychiatrist for 25 years, (...) I can tell you this for sure ... your brain affects your work, your relationships, your physical well-being and your attitude about everything.

Knowledge is power and the more you know about your brain the better equipped you'll be to have a better life - isn't that what we all want?

To your brain health,

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