

How three minds of the body - Brain, heart, and gut work together for producing Happiness

[Anil K. Rajvanshi](#)

anilrajvanshi50@gmail.com

Since dawn of civilization, humans have always expressed love, feelings and emotional pain coming from the heart and basic feeling or intuition coming from the gut. Hence the expressions broken heart, gut feeling, etc. has been used in describing emotions. Rationalists and scientists have scoffed at these expressions saying they are only metaphors, but recent research suggest that they may have scientific explanations.

It seems both heart and gut have a mind of their own and besides communicating with the brain about their activities they might also be helping in brain development, reducing depression, and just increasing the level of well-being of a person and happiness.

The Gut Mind

On an average a brain has nearly 100 billion neurons and is the seat of all our thinking [6]. The gut (digestive system of the body) has close to 500 million nerve cells and 100 million neurons and is almost the size of a cat's brain [1]. Not only does the gut “talk” with the brain chemically (by releasing chemicals which are then taken to the brain by blood) but also by sending electrical signals via the vagus nerve. Vagus nerve is one of the longest nerves inside the body whose central purpose is to relay the information and status of internal organs like gut and heart to the brain [5] and vice versa. It is a communication highway for all internal organs. It starts from the head and after going through all the organs ends near anus.

Most of the gut neurons are used in the daily grind of digestion [2]. Gut system is an extremely complex chemical processing machine which breaks down the food, absorbs nutrients and moves the waste down (via muscular contraction) towards anus for expelling it. Thus the autonomous nervous system of gut allows it to work independently of the brain.

Nevertheless recent research have revealed that there is a tremendous amount of information flow from the gut to the brain via the vagus nerve and this flow is mostly one sided – almost all of it is from the gut to the brain and not the other way around [2]. This is how it should be since gut works continuously whether we are aware of it or not.

The reverse interaction (from the brain to the gut) is when we get hunger pangs and the brain tells the body to get food or when something goes wrong in the gut like pain or diarrhea, necessitating medicines for its cure. Sometimes these signals go haywire. For example even if there are hunger pangs the brain overrules the gut and this leads to Anorexia!

Recent scientific evidence also suggests that a big part of our emotions are probably influenced by the chemicals and nerves in the gut. For example 95% of body's Serotonin is found in the gut [2]. Serotonin is an important neurotransmitter which is a well-known contributor towards feelings of well being. Sometimes it is also called a “happiness hormone”.

Similarly research has found that a bacteria-free gut in early childhood leads to adults with less anxiety and general cheerfulness. Interestingly the effect of early childhood gut bacteria has the maximum impact on the developing brain and peters off by the age of 2-3 years just when the brain expansion also starts slowing down. Recently scientists have also discovered that the genesis of Parkinson's Disease is in gut [7]. Keeping gut clean and healthy produces a healthy brain.

Apparently, the ancients knew something about the gut-brain connection. Hence the colon cleaning process of Ayurveda (including enema etc.) or “gut wrenching” exercises of *Nauli* in Hath Yoga help in cleaning the gut thereby increasing the feeling of wellness. Similarly the yogic exercise of *Mayur Asana*, where the body is balanced on the navel and this pressure on it stimulates the vagus nerve, helps improve the brain-gut connection.

There are also many instances of people experiencing extrasensory perception (ESP) or clairvoyance after colon cleansing has taken place. One of the reasons for this could be that a clean gut frees its neurons to help the brain increase its processing power. This extra neural power may help the brain process more information and help it in *Samadhi* or *Sanyam*. In nature every process has multiple uses. Though the gut neurons are used most of the time for gut activity, they also interact with the brain via the vagus nerve.

In Patanjali Yoga gut occupies the center of body-universe! It says that by *Sanyam* on navel (*Nabhi*, gut etc.), a yogi gains the knowledge of the constituents of the body!

The Heart Mind

Heart is one of the most important organs of the human body. Life starts when it starts beating (21 days after conception) and ends (clinical death) when it stops. Heart has nearly 2 billion muscle cells and 40,000 neurons. The heart neurons are very few in number compared to those in the brain (100 billion) or gut (0.1 billion). Nevertheless these neurons transmit heart's signals and its condition to the brain.

The heart-mind interaction takes place both by electrical signals (via the vagus and the spinal chord nerves) and through chemicals (heart is an endocrine gland also).

Recent studies have shown that heart sends signals to the brain that are not only understood by it but also obeyed. Scientists have discovered neural pathways and mechanisms whereby input from heart to brain inhibits or facilitates brain's electrical activity – just like what gut is capable of doing. Thus both gut and heart mind help in overall thought process and creating well-being.

Besides the electrical signaling, heart is also an endocrine gland releasing peptides which help in blood pressure modulation and improving the functioning of kidneys [3]. These peptides also stimulate the pituitary gland thereby helping it to release hormones like oxytocin commonly referred to as “love” or bonding hormone. Oxytocin also helps in increasing the well being of a person. This could be the basis of saying that happy feelings emanate from the heart!

Nevertheless the point of interest is the rhythm patterns of the heart which result when two billion muscle cells are triggered by AV and SA nodes which are like electrical switches. These nodes which are inside the heart send electrical signals to the heart muscles for contraction and are one of the most important organs of the heart. When they do not function properly the electrical signals to the muscles go haywire and the heart starts to flutter. A pacemaker attached to these nodes streamlines the signals and can restore the proper working of the heart.

The speed of heartbeat or its contraction changes depending upon our emotions. For example when we are aroused either by passion or anger then the heart speeds up and in more quiet times or in meditation it slows down. This electrical input to the AV and SA nodes from the brain comes via the vagus nerve and is reflected in the ECG patterns of the heart.

Pranayama or breathing exercises can stimulate the vagus nerve and this could have a very beneficial effect both on the heart and gut. Similarly the chanting of mantras or deep throat singing as practised by Buddhist Lamas

also stimulates the vagus nerve. It has been shown that this stimulation helps in reducing blood pressure and improves the rhythm patterns of the heart. The neural information from both these activities facilitates the cortical function and the effect is heightened mental clarity, improved decision making and increased creativity.

Similarly the stimulation of the vagus nerve helps the gut to perform better and improves the cleaning process of the colon. For example the ancient Indian custom of applying pressure on cheeks by fists while sitting on toilet seat helps in the bowel movement. The pressure on cheeks stimulates the vagus nerve since its branches pass through the face. This could also be the basis of children's cheek pinching by adults!

Recently scientists have also discovered that heart is involved in the processing and decoding of "intuitive information" [4]. Tests done on the subjects showed that the heart appeared to receive the intuitive information before the brain. This could be the basis of saying "Follow you heart and you will never go wrong".

This brain/heart interaction was also known to the ancients. In Patanjali yoga it is written that by *Sanyam* on the heart a yogi acquires the complete knowledge and contents of his mind.

Thus in order to produce deep thought which helps in producing happiness and improving the well-being of a person [6], it is necessary that the gut and heart brains work together with the main brain. When all of them work together harmoniously then it creates a healthy body and a powerful mind.

SUGGESTED READINGS

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Published as an [article in Speaking Tree](#) (Times of India), October 2011.

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