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Neurons in the Heart, Brain is Major Seat of Emotion

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Abstract

Neurons have been found in the heart, gut and spinal cord, but this does not mean that the brain is not the control center for emotions. Some authors would like to hook on to the story that this discovery is scientific proof that the heart is the seat of emotions as assumed and elaborated by literature and poetry of many cultures throughout the ages. This work looks logically at the findings and understanding at this time, based on a public case study. The objective is to erase any myths related to bad science and questionable deductions

Keywords: Heart; Brain; Gut; Conversation; Decision; Meditation; Relaxation

Background

Brain cells comprise neurons and glia. Neurons are dedicated cells of the nervous system that employ the electrical potential across the membrane of all cells (which in neurons have evolved a special function) to activate depolarizations that transmits an electrical signal to their axons which then transmits a signal to another cell.

There are neurons in other parts of the human body besides the brain [1-8]. There are neurons in the spinal cord and in the peripheral nervous system as well [7,8].

Further, these neurons outside the brain do not contribute directly to the mind - conscious processes - or even subconscious processes, except for some basic sensory feedback to the brain. There is, for example, the autonomic nervous system, which (as the name implies) is engaged not with thinking but with controlling basic bodily function. This includes the function of the gastrointestinal system and the heart.

It is logical to expect that the heart and the guts will contain their own dedicated neurons that participate in autonomic function [1-6].

The function of the heart is highly regulated, because the demands on the cardiovascular system can fluctuate quickly and greatly. Just standing up requires a delicate adjustment in cardiac output and vessel tone in order to maintain perfusion pressure to the brain. Without this rapid adjustment we would get light-headed and possibly faint every time we stood up (this is a disorder some people have when there is a problem with autonomic function)

The heart responds to three systems that work together to regulate its function. These are the autonomic nervous system, the hormonal system (chemicals that are secreted in the blood that affect heart function, like adrenaline), and an intrinsic nervous system. The heart comprises its own electrical system that controls itself so as to keep the heart pumping in a coordinated fashion. This function is then further fine-tuned by the autonomic and hormonal systems.

A recent review of the evidence [3] indicates that the heart contains a complex essential nervous system made up of multiple ganglia that communicate with each other.

Case of Good Physical Health and Emotional Setbacks

Reference [9] was a journalistic article, which, besides presenting other factual matters about 'Hearts and Minds', reported about Conrad Anker, the U.S. rock-climber, mountaineer and author. Gifford [9] reported on the physically fit 53-year old Anker, and the medical emergency which happened on his ascent of the unconquered peak called Lunag-Ri in the Himalayas. This peak is 22,621 feet tall. Anker was very self-aware, and had helicopter assistance called by his partner when he suddenly felt very exhausted. He was found to have had a sudden heart attack, but he did not completely pass out at the face of the mountain, as most others who are less physically-fit might have.

Anker claimed that this sudden heart attack came on because of his grief for an event which occurred five months earlier. He had gone up Tibet's 26,335-feet Shisha Pangma in Tibet, with a team to recover the body of his best buddy, Alex Lowe, who had passed away

in a 1999 avalanche. "When Anker said his friend's death touched his heart, it probably did." [9] was a statement made in the article. This statement bears examination and scrutiny.

In [9], there are four ways elaborated in which a heart can fail. These are the 'Widowmaker'. The 'Sudden Cardiac Death', the 'Takotsubo Cardiomyopathy', and the 'Aortic Dissection'. From the risk factors listed for each kind of failure [9], it can be deduced that Anker's incident was probably the 'TakotsuboCariomyopathy'. From the fact that the risk factors for this type of heart failure include the loss of a close friend, and that Anker's incident was a 'sudden heart attack' [9], it is the deduction of the current work that the evidence does not add up. There were many years between the news of Anker's best friend's death, and his own sudden heart attack. In other words, the time period between the events was too long. As a matter of fact, Anker had been part of the expedition, in which his best friend was killed [10] in 1999.

It is thus deduced that Anker's sudden heart attack did not arise from an emotional response to a close friend's death. From the information in [9], 'Takotsubo Cardiomyopathy', the 'body loads adrenaline into your body bloodstream, which can weaken your heart's left ventricle and temporarily cause it to lose its shape'. If this is indeed Anker's case, it is clear that the brain is still very much in control under this very emotional situation. The neurons in the heart have their role, but the adrenaline release sources from the brain.

Discussion and Conclusion

There are neurons in the heart, the gut, the spinal cord, besides the brain. This modern finding has opened the doors to attempted voluntary control of the heart for instance, to protect oneself from disease. For another example, consider a highly difficult and emotional situation for which one is seeking a solution, or immediate path of action. Practicing psychologists have suggested that one could pose the situation to the heart, and then to the brain (by physically sitting in 2 different side-by-side chairs, for instance.) By listening to the answers from the heart in one chair, and the answers from the brain in the other, one would be able to come across the most optimum path of action which is typically one that have characteristics from both answers. This exercise (if carried out successfully) teases out the role of the heart in an emotional response, but it does not tell anything about the brain being in a subordinate role.

With regards heart failure, the practice and acquiring of the skill in trying to control one's heart's neurons, may only lead to positive results for one of the four types of heart failure as listed in [9].

Meditation brings about relaxation. Repetition and disregard of everyday thinking is the two-step response for relaxation. This relaxed state is one with reduced rate of metabolism, with reduced blood pressure and reduced heart rate. This state is apparently a desirable state, conducive to a healthy heart. When looking at the risk factors listed for the four methods a heart can fail [9], meditation may only be effective to combat the 'Takotsubo Cardiomyopathy' type of heart failure. Two of the four seem to be highly correlated to hereditary traits. The fourth is associated with high blood pressure and atherosclerosis [9].

Acknowledgment

This paper is dedicated to all the peoples in the world who with information from this article, will try to influence their neural networks in their organs besides their brain, so as to reach the best level of health possible for themselves.

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