I often ask my colleagues for an answer to the question of "how is the source of the functions of electrical pulses generated at the atrio-ventricular node in living organisms?". But I haven't got the scientific answer yet. Sam Kean's published article titled as “Heart and Head misfire together” gives some clues concerning the brain and the heart working together(2). Even in a recent study by a gambling task, single-trial electroencephalogram predicts cardiac acceleration(4).

The scientists, at Baylor College of Medicine in Houston, Texas, studied with mice that had a mutation in the KCNQ gene which builds potassium ion channels that set up an action potential across a cell membrane(1). These channels help the heart beat by resetting the potential after the cardiac muscle cells contract. The mutation--also found in humans--produces a faulty protein that delays restoration of the potential, resulting in erratic beating and sometimes even in death.

The ion channel had long been thought to operate only in heart muscle, but the above mentioned research implied that it functions in other tissues as well. Now Alica Goldman, a neurologist and one of the co-authors of the paper, has discovered the first definitive evidence for the fact that the channel has been working in mouse neurons. The researchers reported online in Science Translational Medicine that it has been active particularly in regions susceptible to seizures. The team also monitored the mutant mice with EEG and ECG machines and indicated that the seizures are often accompanied by abnormal heart rhythm(1).

We all know that total heart rate control occurs in scattered regions of the entire brainstem including the pons and mesencephalon(3).

On the other hand, in the traditional Chinese medicine, the heart is considered to be the benevolent ruling organ of the body. It is the seat of connection between the body and the mind and has a direct influence on decision-making and on clarity of perception. It turns out to be that this is not a farfetched notion. Some 30 years of medical research at the HeartMath Institute in Boulder Creek, California, has demonstrated that our brain is an extension of the heart and that the heart has its own intelligence. Half of the cells in the heart are neurons, or nerve cells--the same type of cells that exist in our brain. The heart starts beating in an unborn fetus before the brain is formed, and it has its own independent nervous system. The heart doesn't need to be connected to the brain in order to beat, as witnessed in heart transplants. Research at HeartMath has demonstrated that when we activate our heart intelligence and manage our mind and emotions, we achieve “energy efficiency, increased coherence, enhanced awareness and greater productivity.”(5)

Above mentioned quotations reflect mostly the spiritualistic views and need scientific evidence. There may be a remote control of the ways or the network in the nervous system as mentioned previously in the
molecular ion channels studies (calcium & magnesium) or maybe some special cells (dendritic & mesenchymal) may linked to neuro-immuno-modulation which were carried out both on the heart and on the brain\(^6\).

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