

Review Article

Qalb e Saleem (Pure Heart) and Qalb e Mareez (Diseased Heart): Insight from Scriptures and Medical Science

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Abstract

Human heart, "a wondrous magic casket", has been believed to be the seat of intelligence, emotion and sensation in ancient scriptures and non-Abrahamic religions. According to monotheistic religions, it has psychological, moral and spiritual functions. It could either be healthy or diseased. The modern scientific research has proved that an emotional brain is formed long before a rational one, and the heart has its own independent complex nervous system known as 'the brain in the heart.' The heart sends out electromagnetic field which controls our emotions. Whereas the theory of cellular memories states that memories, as well as personality traits, are not only stored in the brain but may also be stored in organs such as the heart, it has been reported that the heart transplant recipients seem to be the most susceptible to significant changes in personality, the possible mechanism being the transfer of memory through heart. The heart also manufactures and secretes oxytocin, referred to as "love or social-bonding hormone". Moreover, its role in cognition, tolerance, trust and friendship and the establishment of enduring pair-bonds has been well recognized.

INTRODUCTION

"Man's perceptions are not bounded by organs of perception; he perceives far more than sense (tho' ever so acute) can discover".

William Blake (1757-1827 CE), Philosopher

Human heart, the hardest working muscle in the body, is the most vital organ where the life begins and comes into an end. The Ancient Egyptians were cardio-centrists who treated the heart with reverence during their embalming rituals [1]. Taking it much more than just a pulse generating organ, they believed it to be the seat of intelligence, emotion and sensation [2]. Ancient Chinese medical texts recognized "Heart: The King of All Other Organs" to be "sovereign" over all organs, representing the consciousness of one's being. An ancient Sanskrit Vedic text "Mundaka Upanishad" (knowledge that shaves, or liberates, one of errors and ignorance) emphasizes that the heart must be tranquil and pure to experience the highest bliss. According to Abrahamic Religions (Judaism, Christianity and Islam), it has psychological, moral and spiritual functions. The human hearts can either be healthy (unburdened by weight of sin and corruption) or diseased (veiled, headless, sinful).

Following are some verses from the Poem "Human Heart" by Valsa George:

"What incredible wonder is the human heart!

The great powerhouse that stores up blood

Through pipelines of arteries and veins

Blood is pumped unceasingly from head to foot

The most vital organ, so integral to keep us alive

The great fulcrum of the human machine

That works incessantly day and night

Neither taking rest nor seeking respite

A wondrous magic casket holding love and hate

A pouch that can contain so much of treasure

A sponge that can absorb so much of pain

A hidden cave to stash away so many secrets

Sometimes it is hard and resistant as a rock

Insensitive and unfeeling as a clump of wood

There is nothing greater vouchsafed to man

Than the gift of an ever-loving palpable heart!"

HEART IN ANCIENT SCRIPTURES

Egyptian

"O my heart which I had upon earth, do not rise up against me as a witness in the presence of the Lord of Things; do not speak against me concerning what I have done, do not bring up anything against me in the presence of the Great God, Keeper of the Balance".

"Book of the Dead" ca 2670 - 2400 BCE [3]

The Egyptian Book of the Dead, considered by many “the Bible of the Ancient Egyptians”, was part of a tradition of funerary texts which includes the earlier Pyramid Texts and Coffin Texts. It was placed in the coffin or burial chamber of the deceased. To them, the heart or *ib*, rather than the brain, was the source of human wisdom, as well as emotions, memory, the soul and the personality itself [3]. During the process of mummification, the heart was left intact while the remaining internal organs were taken out. This was based on their understanding that the heart survived in the Netherworld, where it gave evidence for, or against, its possessor [4].

Chinese

The Heart is “a holistic-comprehensive structure in which all human faculties are unified and integrated” [5].

The Chinese conceptualization of the heart as the central faculty of cognition was established in ancient Chinese philosophy and traditional Chinese medicine [6]. The “distinction between ‘heart’ and ‘mind’ in the Western sense does not exist in Chinese philosophy” [5]. The heart, as “the site of both affective and cognitive activities” and organ of thinking and reasoning, makes moral judgments and issues authoritative commands [7]. However, it does not receive commands because it is the ruler of the body [8]. This is also considered the locus of a person’s moral sense and moral character.

Mencius (circa 327-289 BCE), the famous Confucian philosopher, distinguished heart, the thinking organ, from the organs of ears and eyes, which do not think and which tend to be deceived by external things when in contact with them [9]. At the energetic or spiritual level, it, as master of Spiritual Light, offers a house for the Shen or Spirit which might be considered the “connector spirit” [10]. Xunzi (circa 313- 238 BCE), another Confucian philosopher, argued that the heart is master of the “spiritual light” which enables people to “see” [6].

According to Wenzhi (The Perfect Book Penetrating the Mystery), “Sovereign is the heart of the state. When the heart is under control, all parts of the body are in order; when the heart is disturbed, all parts will be in disorder”. When it is affected by selfish desires, things passing across the eyes will not be seen, and sounds coming to the ears will not be heard [8].

HEART IN NON-ABRAHAMIC SCRIPTURES

Hinduism

“The heart, O Emperor, is the abode of all things, and the heart, O Emperor, is the support of all beings. On the heart, O Emperor, all beings rest. The heart truly, O Emperor, is the supreme Brahman. His heart does not desert him, who, knowing thus, worships it.”

Sage Vajnavalkya (floruit 8th-7th BCE)

The Sanskrit word for heart is “*Hridaya* or “*Hridayam*”, which is usually translated as “the mind, the soul, the heart, the chest, the bosom or breast. It is also used to refer to the emotional state of love, or affection, or the essence of things” [11].

Hridaya with the stored energy, is not just the physical heart, but the spiritual heart. It contains the intelligence of God or the transcendental mind.

The heart has a great significance both as a place where the soul rests and as a representative location of the abode of Brahman: The Ultimate Reality [12].

According to Brihadaranyaka Upanishad (a key scripture of Hinduism), the Self resides in the space in the heart. It is also the source of intelligence and where perceptions rest [13].

Buddhism

Buddhism, a philosophy of life expounded by Gautama Buddha (“Buddha” means “enlightened one”) has long asserted a connection between the heart and the mind. The Sanskrit word *citta* and the Japanese word *kokoro* each translate to English as both “heart” and “mind.”

According to the Buddhism, the real heart is *Prajna* (direct insight into the truth), which consists of discernment, insight, wisdom and enlightenment. Wisdom will emerge if the mind is pure and calm.

HEART IN ABRAHAMIC SCRIPTURES

Judaism

“Watch over your heart with all diligence, for from it flows the springs of life”.

Proverbs 4:23 (NASB)

The heart (*Lev, Lub*), primarily refers to the ruling center of the whole person, the spring of all desires which plays a moral, psychological and spiritual role.

In the Jewish *Qabalah* (the set of esoteric teachings), the heart (“*Lev*”), is also taken as a metaphor for the Tree of Life as a whole, representing the totality of Divine wisdom available to (re)connect the human world with God.

It is seat of volition (the faculty or power of using one’s will), seat of all morality and of all moral and spiritual functions, the seat of the intellect, the seat of good and evil impulses and the seat of all emotions.

Amongst the over 60 emotions of the heart, enlisted by *Midrash* (an ancient commentary on the part of Hebrew Scriptures), the heart sees, hears, speaks, falls, stands, rejoices, weeps, comforts, sorrows.....

Christianity

“People look at the outward appearance, but the Lord looks at the heart.”

Samuel 16:7 NIV

The heart of man, as described in Holy Bible, is primarily a spiritual organ that drives man’s behavior. It is seen as the seat of the will, intellect and feelings. It is the Center of Hidden Emotional-Intellectual-Moral Activity.

Spiritual life begins in the heart, and it begins with God. God also has a heart (Acts of the Apostles 13:22), and has emotions and desires which drive His behavior toward His creatures. For example, He “desires all people to be saved and to come to the knowledge of the truth” (1Timothy 2:4-NIV).

The heart's reasoning, as well as its feeling, depends on its moral condition. The heart functions as the conscience.

Islam

Four different terms have been used, in Holy Quran, for heart:

i. Qalb: It is the generally used term for heart, appearing 168 times in Holy Quran. Its basic meanings are to keep something up and down or keep changing a thing. Whereas Ibn Hashaam (?- 833 CE), well remembered for his notable work "*The Life of the Prophet*", mentions four meanings of *qalb*: heart, intellect, the synopsis of everything and the best part of everything. Imam Abu-Bakar al-Jurjani (1009-1078 CE), renowned grammarian, calls it 'the true essence of a human being'.

In various Quranic Verses, it has been mentioned as a processor of information particularly concerning emotions. In addition, it denotes understanding and wisdom {7:179,16:22,18:57,22:46}, and reacts notably to the issues related to goodness and wickedness.

ii. Fuad: It appears 16 times in Holy Quran, having been derived from fa'ad which means to roast or heat up and is used when the heart is full of emotions thus called "Kindling Heart", as has been described in 'Quranic Sura- 28 *'al-Qassas'* in the story of mother of Prophet Moses when she put her neonate in the river Nile {28:10 a}. However, in the second half of the same verse, the term *Qalb* has been used to strengthen her faith on the Overseeing Protector {28:10b}. The plausible explanation, given by Az-Zubaidi (1732-1790 CE), renowned lexicographer, is when the depository of emotions are in question the term *Fuad* is used and where the mind is in reference the term *Qalb* is preferred. It has been interpreted as faculty of intellect, reasoning and insight in Sura-17 *'Bani-Israel'* {17:36}, Sura-32 *'al-Sajda'* {32:9}, Sura-45 *'al-Jasia'* {45:23} and Sura-46 *'al-Ahqaf'* {46:26}.

iii. Lubb: It appears 16 times in Holy Quran, equivalent to Hebrew "Lebab or Lev" and is also called "Pure Heart". It is the innermost place where the Light of the Unity of God resides. It is always used together with the folk of *albab* (the people of understanding and intellect) as mentioned in Sura -2 *'al-Baqra'* {2:179,197,269}, Sura-3 *'al-Imran'* {3:7,190}, Sura *al-Maaida* {5:100}, Sura-12 *Yousaf* {12:111}, Sura-13 *al-Raad* {13:19}, Sura-14 *Ibraheem* {14:52}, Sura-38 *'Saad'* {38:29,43}, Sura-39 *'al-Zumar'* {39:9,18,21}, Sura-40 *al-Moumin* {40:54}, Sura-65 *al-Talaq* {65:10}.

The Arabic equivalent for the English word core (which originally in Latin meant heart) is known as Lubb, which also refers to the heart, as well as the intellect and the essence of something.

iv--Sadr: Its plural is *sadoor* and has been used to mean heart, appearing 46 times in Holy Quran.

In Sura-114 *'al-Naas'* {114:5}, "*sadoor*" has been used in the meaning of "heart". In {3:29,7:2,11:5}, *Sadr* takes the meaning of chest. When God alludes to motives or secrets, He uses *Sadr* because it gives the impression of a treasure chest: something hidden and boxed up.

As argued by Laleh Bakhtiar, "*Qalb*" is consciousness, the *nafs al-mulhamah* (inspired soul) of the Quran "*Fuad*" is our

conscience or *nafs al-lawwamah* (blaming soul). "*Lubb*" indicates the *nafs al-mutma'innah* or 'aql (soul at peace, intellect, reason) and "*Sadar*" is mind which receives the temptations of the *nafs al-ammarah*" [14].

HEART:THE ORGAN OF ABRAHAMIC MYSTICISM

According to "The Three Monotheistic Religions" (Judaism, Christianity and Islam) forming a single monotheist tradition rooted in the revelations of Abraham, their arch-patriarch, the heart has psychological, moral and spiritual functions.

Psychological

Judaism: ".....Pharaoh hardened his heart ..." (Exodus, 8:32 NIV), "..... I know how conceited you are and how wicked your heart is; you came down only to watch the battle." (1 Samuel, 17:28 NIV)

Christianity: "deeply distressed at their stubborn hearts....." (Mark 3:5 NIV), "Be careful, or your hearts will be weighed down with carousing, drunkenness and the anxieties of life, and that day will close on you suddenly like a trap" (Luke 21:34 NIV), "For I wrote you out of great distress and anguish of heart and with many tears, not to grieve you but to let you know the depth of my love for you". (2 Corinthians, 2:4 NIV).

Islam: "(This negative attitude) is a disease in their hearts" ... Sura-2 *al-Baqra* {2:10} "Then, even after that, you persisted in defiance so much so that your hearts became as rocks, impermeable to reason or even worse...." Sura-2 *al-Baqra* {2:74}, and "Your God is one God; so (as for) those who do not believe in the Afterlife, their hearts refuse to admit, for they are proud." Sura-16 *al-Nahal* {16:22}.

Moral

Judaism: "These commandments that I give you today are to be on your hearts....." (Deuteronomy, 6:6 NIV)

Christianity: "But the seed on good soil stands for those with a noble and good heart, who hear the word, retain it, and by persevering produce a crop" (Luke, 8:15 NIV).

Islam: "If Allah knows anything good in your hearts, He will give to you better than that which has been taken away from you and will forgive you, and Allah is Forgiving, Merciful." Sura -8 *al-Alarafat* {8:70}.

Spiritual

Judaism: "..... and every skilled person to whom the LORD had given ability and who was willing to come and do the work" (Exodus, 36:2 NIV),

"Now then," said Joshua, "throw away the foreign gods that are among you and yield your hearts to the Lord, the God of Israel".

(Joshua, 24:23 NIV).

Christianity: "Jesus replied: "Love the Lord your God with all your heart and with all your soul and with all your mind." (Matthew, 22:37 NIV), " So that Christ may dwell in your hearts through faith; that you, being rooted and established in love ..." (Ephesians, 3:17 NIV), " We also have the prophetic message

as something completely reliable, and you will do well to pay attention to it, as to a light shining in a dark place, until the day dawns and the morning star rises in your hearts" (2 Peter, 1:19 NIV)

Islam: "Say, Will you think? If God took away yours hearing and your sight and sealed up your hearts, which god other than God could restore them to you? Note how we explain the verses by various facets and note how they still turn away- Sura-6 al-Aanam {6:46}, "Those who attain faith through reason, their hearts find rest in the practical remembrance of God, that is, in following His commands. Remembering God (by following His commands) ensures tranquility in the hearts-- Sura13-al-Raad {13:28}.

HEALTHY AND UNHEALTHY HEARTS

"As the physical heart has two chambers, so the moral heart has also two faces: a good inclination and an evil one. The latter is a heart dominated by the head, following the rule of reason only".

Wim van den Dungen (author of "The Window of the Good Heart")

The human hearts can either be healthy or diseased. Healthy (pure, soft, uncorrupted), can have their humane attitude and balanced rational, while diseased (hard, stony, veiled) hearts can lose both their humane touch and their capacity to see and understand.

Healthy/Pure Heart

Judaism: "Who may ascend the mountain of the Lord?

Who may stand in his holy place?

The one who has clean hands and a pure heart,

Who does not trust in an idol or swear by a false god"

(Psalm 24:3-4 NIV)

Christianity: "Blessed are the pure in heart, for they will see God."

(Gospel of Matthew, 5:8 NIV)

Islam: "As long as you are pure of heart, you speak the truth".

Umar Ibn al-Khattab (584-644 CE), The 2nd Rightly-guided Caliph of Islam

The 'Qalb e Saleem' (Pure, Noble, Spotless, Immaculate Conscience), is perfectly clean, neat, safe and sound heart', absolutely free from *Kufr* (disbelief), *Nifaaq* (hypocrisy), *Kibr* (pride), *Hasad* (envy) and *Hiqd* (hatred). It means that all the qualities (latent or manifest), which Almighty God has bestowed to the human heart are intact and are adequately used, and not misused. {26:89}, {37:84}. The other descriptions of the heart, in Holy Quran, include *Qalb e Munib* (Penitent Heart, Repenting Heart, Contrite Heart) {50:33}, *Qalb e Mutmina* (Assured Heart, Contented Heart), {13:28} {16:106}, {2:260}. {13:28}, *Qalb e Aaqil* (Wise and understanding Heart {22:46}, and *Qalb e Skina* (Tranquil Heart) {48:4}, {48:18}. {48:26}.

Unhealthy / Diseased Heart

Judaism: "The heart is deceitful above all things and beyond cure. Who can understand it"?

Jeremiah 17:9 NIV

Christianity: "For although they knew God, they neither glorified him as God nor gave thanks to him, but their thinking became futile and their foolish hearts were darkened".

Romans 1:21 NIV

Islam: The various descriptions of a diseased heart, by Holy Quran, include *Qalb e Mareez* (Negative approach., receptive of negativity,{2:10}, {8:49}, {9:125} , {24:50}, {33:12},{33:32},{33:60}, {39:45}, {47:20}, {47:29},{74:31}, *Qalb e Munkira* (Denying Heart {16:22}, *Qalb e Ikkina* (Sheated/Veiled Heart {18:57}, *Qalb e Aami* (Blinded Heart {22:46}, *Qalb e Makhtoom* (Sealed Heart, a seal of closure on their hearts as they use not faculty of understanding, to grasp the Divine Message) {2:7}, {45:23}, *Qalb e Ism* (Sinful Heart) { 2:283}, *Qalb e Ghafil* (Headless Heart), {18:28} and *Qalb e Ghaleez* (Harsh, Hard-heart, Stern Heart) {3:159}.

THE HEART IN MEDICAL SCIENCE

Physiology of Human Heart

"The heart is truly a multidimensional organ, undoubtedly the beating engine of our life".

Marco Cirillo [15]

The embryological development of the heart is one of the most fascinating phenomena in nature and so is its final structure and function [15].

The various functions attributed to the heart are:

- i. To receive deoxygenated blood and carry metabolic waste products from the body and pump it to the lungs for oxygenation.
- ii. To pump oxygenated blood to different parts of the body.
- iii. To carry hormones and other vital substances to different parts of the body.
- iv. To maintain arterial blood pressure.

Pathology of Human Heart

The Heart diseases/ Cardiovascular diseases refer to various types of conditions that can affect heart function. These types include:

- i. Coronary artery (atherosclerotic) heart disease that affects the arteries to the heart.
- ii. Valvular heart disease that affects how the valves function to regulate blood flow in and out of the heart.
- iii. Cardiomyopathy that affects how the heart muscle squeezes.
- iv. Heart rhythm disturbances (arrhythmias) that affect the electrical conduction.

- v. Congenital heart diseases where the heart has structural problems that develop before birth.

From Claudius Galenas to Doc Childre: Promising Avenues of Research

"Dare to connect with your heart".

Doc Childre- Founder of Heart Math Institute

Claudius Galenas (129-216 CE), Greek Physician, had concluded in his treatise *"On the Usefulness of the Parts of the Body"*, that the expansion and contraction of the heart was a function of its role as an intelligent organ: "The complexity of [the heart's] fibers... was prepared by Nature to perform a variety of functions... enlarging when it desires to attract what is useful, clasping its contents when it is time to enjoy what has been attracted, and contracting when it desires to expel residues. He was of the opinion that the heart was most likely to contain the soul. He wrote that *"The heart is a hard flesh, not easily injured. In hardness, tension, general strength, and resistance to injury, the fibers of the heart far surpass all others, for no other instrument performs such continuous, hard work as the heart"* [1].

The HeartMath Institute (HMI), since its inception in 1991, has to its credit high quality research on emotional physiology. It explains:

- i. the heart begins beating in the unborn fetus before the brain has even been formed, a process, scientists call auto rhythmic.
- ii. A mother's brainwaves can synchronize to her baby's heartbeat.
- iii. We humans also form an emotional brain long before a rational one, and the heart has its own independent complex nervous system known as 'the brain in the heart.'
- iv. Positive emotions can help us make good decisions.

v. The heart can also create a level of coherence in the body just through its rhythm, which regulates all the systems, and corrects even diseased cells.

The electromagnetic field of the heart is about 60 times greater in amplitude than the brain and permeates every cell in the body. The magnetic component is approximately 5,000 times stronger than the brain's magnetic field and can be detected several feet away from the body with sensitive magnetometers. The heart, being particularly sensitive and responsive to changes in a number of other psychophysiological systems, plays an important role in emotional experience [16]

The different patterns of heart activity, accompanying different emotional states, have distinct effects on cognitive and emotional function. For example, during stress and negative emotions inhibition of higher cognitive functions, by the corresponding pattern of neural signals, limits ability to act impulsively and wisely. Moreover, the negative emotions, through resultant stress, have been linked to increased risk of cardiovascular disease [17]. Conversely, positive emotional state facilitates cognitive function and reinforces positive feelings and emotional stability. They are associated with increased efficacy

and stability in cardiovascular functioning [18], The HMI's research has coined the term psychophysiological coherence, which is body-wide shift to a specific, scientifically measurable state, facilitated by sustained positive emotions.

INTRINSIC CARDIAC NERVOUS SYSTEM (ICNS)

The anatomy and functions of the intrinsic cardiac nervous system and its connections with the brain have been explored extensively by a relatively new discipline called "Neurocardiology" (comprising of psychophysiology, cardiology, neurophysiology and neuroanatomy). The "brain on the heart" or "heart-brain", as it is commonly called, is an intricate network of complex ganglia, neurotransmitters, proteins and support cells, the same as those of the brain in the head [19]. The ICNS is made up of 700-1500 intracardiac ganglia (ICG), each composed of 200-1000 neurons. Contrary to common notion that the heart is constantly responding to neural signals from the brain, the heart, in fact, sends more signals to the brain than the brain sends to the heart. The two way dialogue between the heart and brain are such that each organ continuously influences the other's function. The Four distinct ways of communication are: [20].

- i. Neurologically: that is communication through nervous system.
- ii. Biochemically: that is the communication through hormones, which are carried by heart.
- iii. Energetically: that is communicating through electromagnetic field reactions. This can help build social relationships.
- iv. Biophysically: that is communication to the brain through pulse beats.

THE HEART AS A HORMONAL GLAND

In 1983, with the discovery of "Balance Hormone", produced and secreted by atria, the heart got entry into the hormonal system. This hormone has several names: atrial natriuretic factor (ANF), atrial natriuretic peptide (ANP), and atrial peptide.

In addition to its significant role in electrolyte balance, it helps regulating blood vessels, kidneys and adrenal glands [21]. Moreover, inhibits the release of stress hormones [22], interacts with the immune system [23], and influences motivation and behavior [24].

The heart also manufactures and secretes oxytocin, which, in addition to its well-known functions in childbirth and lactation, acts as a neurotransmitter. Although it is referred as "love or social-bonding hormone", its role in cognition, tolerance, trust and friendship and the establishment of enduring pair-bonds has been well recognized. Of imp, the concentrations of oxytocin produced in the heart are in the same range as those produced in the hypothalamus and secreted into the blood stream by the posterior pituitary gland [25]. Hence with each beat, that the heart not only pumps blood but also continually transmits dynamic patterns of neurological, hormonal, pressure, and electromagnetic information to the brain and throughout the body [26].

HEART TRANSPLANTATION AND THE RESULTANT PERSONALITY CHANGES

"It helps a man immensely to be a bit of a hero-worshipper, and the stories of the lives of the masters of medicine do much to stimulate our ambition and rouse our sympathies."

Sir William Osler, "Chauvinism in Medicine" in *Aequanimitas* (1889)

On the historic day of December 3, 1967, Louis Washkansky (53 years old male with end stage ischemic cardiomyopathy), received the first human heart transplant at Groote Schuur Hospital in Cape Town, South Africa. The donor was Denise Darvall (25-year-old female) who was fatally hit by a drunk driver. The honor of this daring surgical procedure went to Charismatic Cardiac Surgeon Christiaan Barnard (1922-2001).

With the enhancement of post-transplant survival from 18 days in the first recipient to 33 years in John McCafferty, the popularity and acceptability of the revolutionary procedure has dramatically increased. Heart transplantation has now become the standard clinical treatment for refractory heart failure. The Global Observatory on Donation and Transplantation, a collaboration between the World Health Organization and the Spanish Transplant Organization, estimated that there were 8,311 heart transplants globally, in the year 2018 [27].

Personality Changes in Heart Transplant Recipients

Whereas adverse psychological, psychosocial and medical consequences of heart transplantation are well documented, there is, additionally, good bank of knowledge regarding changes in the personal characteristics of the post-transplant persons.

Such changes have been categorized as:

- a. changes in preferences
- b. alterations in emotions/temperament,
- c. modifications of identity
- d. memories from the donor's life [28]

According to the observations of Dr. Paul Pearsall, the heart transplant recipients seem to be the most susceptible to significant changes in personality. He has published the accounts of seventy-three patients. A few "cardio-sensitive" cases are discussed here with relevant verbatim statements, wherever appropriate [29].

- i. A 18-year-old female recipient, with pre-transplant diagnosis of endocarditis and subsequent heart failure, had an interesting story to share. The 18-year-old male donor, fatally hit in a motor vehicle accident, was a musician who played the guitar and wrote poetry. His parents, while cleaning his room a year after his death, found a song "Danny, My Heart is Yours". When his pictures and poetic verses were shown to the recipient she exclaimed "I know he is in me and he is in love with me. How would he know my name is Danielle? And then, when they played me some of his music, I could finish the phrases of his songs. I could never play before, but after my transplant, I began to love music. I felt it in my heart.

My heart had to play it. I told my mom I wanted to take guitar lessons; the same instrument Paul had played".

Her mother told that "when she wrote her first song, she sang about her new heart. She said her lover had come to save her life".

- ii. Carter, the recipient, was a 7-month-old boy, with pre-transplant diagnosis of Tetralogy of Fallot. The donor was Jerry, a 16-month-old boy drowned in a bathtub. The donor's mother (a physician) said "when Carter (at the age of five years) first saw me, he ran to me and pushed his nose against me again and again. It was just exactly what we did with Jerry.....He said the same baby-talk words that Jerry said.....". The recipient's mother reported "Carter is very, very shy, but he went to donor's mother just like he used to run to me when he was a baby..... Jerry's mom told me that Jerry had mild cerebral palsy mostly on his left side. Carter has stiffness and shaking on that side (only showed up after the transplant) When we went to church together, Carter had never met Jerry's father. We came late and Jerry's dad was sitting with a group of people in the middle of the congregation. Carter let go of my hand and ran right to that man. He climbed on his lap, hugged him and said "Daddy." We were flabbergasted. How could he have known him? Why did he call him dad? He never did things like that. He would never let go of my hand in church and never run to a stranger".
- iii. A 9-year-old male recipient, with pre-transplant diagnosis of myocarditis and septal defect, developed an aversion to water. He described the imaginary picture of the donor "She seems very sad. She is very afraid. I tell her it's okay, but she is very afraid. She says she wishes that parents wouldn't throw away their children. I don't know why she would say that". His mother explained, "Jimmy is now deathly afraid of the water. He loved it before. We live on a lake and he won't go out in the backyard. He keeps closing and locking the back door walls. He says he is afraid of the water and does not know why". The 3- year-old female donor had died of drowning at her mother's boy-friend's house. They left her with a teenage babysitter who was on the phone when it happened.
- iv. The recipient was Ben, a 56-year-old male college professor diagnosed with atherosclerosis and ischemic heart disease while Carl, a 34-year-old male police officer shot attempting to arrest a drug dealer, was the donor. The recipient reported "A few weeks after I got my heart, I began to have dreams. I would see a flash of light right in my face and my face gets real, real hot and actually burn". The donor's wife made comments: "This is exactly how Carl died.....shot right in the face. The last thing he must have seen is a terrible flash."
- v. An 8-year-old-girl who received the heart of a 10-year-old girl who had been murdered. After the transplant, the recipient had horrifying nightmares of a man murdering her donor. The images were so specific that the attending psychiatrist and the mother notified the police. According to the psychiatrist, "...using the description from the little

girl, the murderer was searched. The time, weapon, place, clothes he wore, what the little girl he killed had said to him . . . everything the little heart transplant recipient had reported was completely accurate." The culprit was easily convicted.

Possible Mechanisms for Personality Changes following Heart Transplantation

The memory is what remains forever, what stays during our life (individual memory) and is preserved in the next generations (species memory).

Marco Cirrilio[15].

The issue of inheriting the memory experiences and emotions of their deceased donors with resultant significant changes in the personality of heart recipients is fascinating.

Cellular Memory: The theory of cellular memories states that memories, as well as personality traits, are not only stored in the brain but may also be stored in organs such as the heart. Cellular memory has been suggested to explain the transfer of personal memories from donor to recipient following heart transplantation [28,29]. The various types of cellular memory include Epigenetic memory, RNA memory and Protein memory. The other types of memory which, in addition, could contribute to the transfer of memories, from donor to recipient are:

Cardiac neurological memory: It is known that the heart has two distinct networks of nerves, one consisting of nerve cells within the heart (intracardiac nervous system), and the other made up of nerves originating outside the heart. Whereas both the networks have the potential to encode, store, and retrieve memories, only the nerves within the intracardiac nervous system are transplanted with the heart [28].

The intracardiac nervous system remodels itself after cardiac transplantation, a process known as neuroplasticity. Possibly, the stored memories (within the intracardiac nervous system) are transferred to the recipient at the time of transplantation. [30].

Energetic memory: Pearsall suggested that the personality changes following heart transplantation may result from changes in the energy of the heart. He equates energy with information, explaining: "energy and information are the same thing. Everything that exists has energy, energy is full of information, and stored info-energy is what makes up cellular memories" [29].

Descriptions from different cultures describe two types of information or knowledge, one located in the brain and the second centered in the heart. The ancient Greeks described these two types of knowledge as diakresis (i.e. rational or deductive knowledge), and gnosis (i.e. intuitive or spiritual knowledge). The source of the latter was attributed to the nous, an organ located in the region of the heart, which was also referred to as the "eye of the heart" [28].

One type of energy is electromagnetic energy and one source of electromagnetic energy is the heart. The heart generates its own electromagnetic field, which is the largest such field in the body, producing an amplitude 60 times greater than the amplitude of the brain's electromagnetic field [20]. The heart

transplantation changes the recipient's electromagnetic field with resultant alteration in his personality via changes in preferences, emotions, temperament, memory, and identity [29].

CONCLUSION

Human heart, "*a wondrous magic casket*", is the most vital organ where the life begins and comes into an end. In ancient scriptures and non-Abrahamic religions, it has been believed to be the seat of intelligence, emotion and sensation, much more than just a pulse generating organ. According to the monotheistic religions, it has psychological, moral and spiritual functions. The heart's reasoning, as well as its feeling, depends on its moral condition. The heart functions as the conscience. It can either be healthy or diseased. In a Prophetic Tradition, its importance has been highlighted as:

"Indeed, there is a piece of flesh in the human body. If it stays alright, the whole body stays alright, when it goes astray, the whole body goes astray! Listen with open ears, that is the Heart".

The modern scientific research has proved that an emotional brain is formed long before a rational one, and the heart has its own independent complex nervous system known as "the brain in the heart". It has been reported that the heart transplant recipients seem to be the most susceptible to significant changes in personality, the possible mechanism being the transfer of memory through heart.

Antoine de Saint-Exupery (1900-1944 CE), French Writer, has beautiful words to share:

"It is only with the heart that one can see rightly; what is essential and what is invisible to the eye".

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