Mirroring Michelangelo, finding Galen: the ancient anatomical theory of the soul and its possible influence on The Creation of Adam

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Initially submitted February 15, 2023; accepted for publication April 1, 2023

Abstract
Galen of Pergamon (129 – c. 216) was a Greek physician, surgeon, and philosopher in the Roman Empire, whose views dominated Western medicine for thirteen centuries until the Renaissance. Starting from the theories of Hippocrates and Plato, Galen supposed how the soul was distributed within the human body. Galen’s method of investigation was the archetype of medical-scientific thought for his time. More generally, his visions were very practical and he managed to summarize and refine the contemporary knowledge in medicine.

Michelangelo Buonarroti (1475–1564) was a “key figure” of the Italian High Renaissance. For centuries, his masterpieces have been studied in many disciplines, including the medical field, especially Anatomy. One of Michelangelo’s most studied works of art has been The Creation of Adam. In recent years, scientists from different fields of study have found hidden messages inside this work. Some theories are extremely interesting, and other meanings may have been included by Michelangelo in what many consider to be his greatest work.

This paper suggests a new hypothesis of an anatomical observation of The Creation of Adam, based on Galen’s theory about the soul. This is to reason that the medical research carried on by Galen could have influenced many fields and also Michelangelo’s work. More generally, the study of human anatomy since ancient times has undoubtedly influenced many fields of research and development in important ways.

Keywords: Galen; anatomy; soul; Michelangelo; art

1. INTRODUCTION
Every Era has its own medical-scientific thought. Medical discoveries in History have influenced successive eras and historical periods. What we experience today also depends on that History.

Pneuma, according to ancient Greeks and Romans, was a driving force in the body that was necessary for maintaining bodily functions. Pneuma was said by Aristotle (384–322 BCE) and Plato (c. 428 – c. 347 BC) to be a liquid-like substance forced through tubular nerves, causing the muscles to move. Plato depicted life as involving multiple levels of pneuma which he meant a person's soul or spirits. All levels arose from the vital organs. Inhaled air, emanating from God was transformed in the lungs into the first form of pneuma. Another form of pneuma or natural spirit was in the veins, which moved through the alimentary canal. When this venous fluid entered

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the heart, it became transformed into a third, and higher form of pneuma, the vital spirit. This enriched pneuma passed to the base of the brain where it was again transformed into the highest form of pneuma: the animal spirit. Animal spirit, the essence of life, was, according to Plato, distributed through the body via the hollow nerves. (Quin CE 1994). “Tripartite Anthropology” is a name for the concept, held by the pre-Socratic philosophers 2500 years ago, that humans consist of body, soul, and spirit. Aristotle spoke of pneuma (spirit) psyche (soul), and soma (body) (Boardman Terry 2008). The tripartite system of soma-psyche-pneuma was initially established by Aristotle. Then, Galen (129 – c. 216) theorized a tripartite system consisting of similar aspects. He used the same terms as Plato, referring to the three parts as rational, spirited, and appetitive (Schiefsky Mark 2012). Each of these parts started from a localized area of the human body. The rational soul started in the brain, the spirited soul started in the heart, and the appetitive soul started in the liver; these pneumas were produced in these governing organs and, according to the philosophical thinkers of that time, they would be distributed in the entire organism. Aristotle thought that the centre of the soul (self-conscience) was in the heart. However, Galen placed it into the brain. Galen's assignments set the precedent for future localization theories and medical research. In short, Galen promoted great advances concerning knowledge of the anatomy and physiology of the heart. However, he made some mistakes, most of them because of ancient knowledge of reproduction and the few opportunities for human body dissection. His progress was essential and permeated a great part of the knowledge present in medieval Western Europe until the 16th century, but his mistakes were also reproduced (Ranhel, André; Mesquita, Evandro 2016). Michelangelo di Lodovico Buonarroti Simoni (6 March 1475 – 18 February 1564), known simply as Michelangelo, is one of the most famous artists of the High Renaissance. He was a sculptor, painter, architect, poet, and more; he was the archetypal Renaissance man along with his contemporary Leonardo da Vinci. During his career, Michelangelo received permission to study human anatomy by dissecting cadavers. In particular, Michelangelo’s thirst for anatomical knowledge led to selective permission from the Catholic Church to study cadavers (Pearce JMS 2019). According to some sources, indeed Michelangelo would have been more like his contemporary, Leonardo (whose anatomical studies extended prolifically to viscera and internal organs) (Kleinbub Christian K 2020). For example, a particular representation in this regard is the mantle of the Creator in his painting of the Separation of Land and Water in the Sistine Ceiling, which is in the shape of a bisected right kidney. His use of the renal outline in a scene representing the separation of solids (Land) from liquid (Water) suggests that Michelangelo was likely familiar with the anatomy and function of the kidney as it was understood at the time (Eknoyan Garabed 2000).

From 1508 to 1512, Michelangelo worked on the Sistine Chapel and of course on The Creation of Adam. The extraordinary fresco painting was unveiled on All Saints' Eve in 1512. There are many theories about hidden messages or hidden figures in Michelangelo’s artworks, also related to the medical field.
In 1990, U.S. neurologist Frank Lynn Meshberger published in the Journal of American Medical Association a study he conducted on the fourth sash of the Sistine Chapel (Meshberger Frank Lynn 1990). According to his hypothesis, the cloak and angelic court surrounding the figure of the Creator corresponded to a cross-section of a human brain. As a result of careful research and comparisons between human anatomy and Michelangelo's work, a striking similarity between the human brain and Michelangelo's depiction was noted. Again, in 2015, some Italian researchers compared the red cloth around God to a postpartum uterus (Di Bella Stefano et al 2015). Another example of possible hidden meanings is an article in which the authors demonstrate, through mathematical calculations, that Michelangelo would not only have included specific anatomical references but would have conducted his work under the Golden Ratio rule (De Campos Deivis 2015).

Now, it is very conceivable that Michelangelo for sure inserted hidden figures and possibly particular meanings inside his paintings (Suk Ian BSc; Tamargo Rafael J 2010), therefore it might be interesting to think from different points of view. The use of mirrors by Renaissance artists

In Italy, notably Florence, the late fourteenth and the fifteenth centuries witnessed the proliferation of texts that discuss the relationship between the mirror and painting. In them, the mirror is closely associated with major innovations of the time such as naturalistic representation and linear perspective (Yiu Yvonne 2005). During Renaissance, the mirror was considered both an instrument of artistic practice and an emblem of pictorial representation within the painting. In a conceptualization of art as mimesis, the mirror served the painter in the translation of the visible world of three dimensions into the flat plane of art. The close affinity between the mirror and the painting, as Leonardo’s notes make manifest, underpinned both the theory and practice of Renaissance art as constituted in the studied imitation of visual observation. The same researchers argue that the mirror reflection became, both within the Renaissance workshop and within representation, the instrument and the definition of what a painting was (Warwick Genevieve 2016). Moreover, the modern glass mirror (or looking glass) was born in the Renaissance. The success of mirror production can be attributed to more than its aesthetic appeal as a precious asset and fashion accessory; it is also attributed to how the mirror became a fantastic technical tool for Renaissance artists. Artists often used mirrors for self-judgement and critique because they provided objectivity by reversing the image (as argued by Alberti and Leonardo). The image of the mirror had many positive connotations: in this sense, it could be read as a symbol of prudence, clarity and fidelity. To an extent, it embodied the spirit of the Renaissance where “world reality and natural clarity overtake the metaphysical world of religion”, in the words of Benjamin Goldberg (Benjamin Goldberg 1985). The mirror represented truth and objectivity by reflecting a precise image. Most importantly, with the Socratic “Know thyself” principle in mind, the mirror was seen as a means to gain full knowledge of the soul (Kalach Maria 2012).
Galen’s points of view could have influenced also the Arts of the Renaissance times. The purpose of this work is to change the point of view, mirroring Michelangelo’s work, and look for what anatomical similarities may appear, taking Galen’s theories into consideration.

2. MATERIAL AND METHODS

Basic Hypotheses
The basic considerations and assumptions in this paper are the result of empirical work by the author of this manuscript. There are no prior sources on the analysis procedures used in this manuscript. As pointed out by some art historians, the basic idea of discovering coded messages of Renaissance frescoes and paintings is a traditional endeavour of the History of Arts while discussing their semi-open or even hidden meanings by multilevel interpretation. However, there is no reference in the History of Arts literature concerning the outlines of anatomical figures as a background frame of biblical or any other stories and situations. Although the mirrored procedure was widely used by Leonardo da Vinci in his writings, there are no sources stating that Michelangelo intended to paint one of his works using a mirrored meaning. Different, however, might be the anatomical meaning given by Michelangelo in some of his works, in which, as other sources have already shown, stylized anatomy would be visible having also a different orientation from natural reality (e.g., right kidney lying down of the cited Eknoyan Garabed 2000). As said, it is known that Renaissance artists used mirrors both as a technical object or as something to represent, therefore it is plausible that Michelangelo might have used the mirror as an instrument to work on some of his paintings.

The method used was a visual comparison with ideal anatomical models starting from the mirrored artwork. Considering the mirror image of The Creation of Adam we can find a possible stylized anatomy in some details. In this way, for example, the form containing the Creator bears a resemblance to the shape of the human heart. Below, in Figure 1, there is graphic feedback of a comparison between the Creator “figure” (mirrored and rotated 90 degrees) aligned to a drawn model of a human heart, where the shape and the proportions of the two images present some similarities.
Then we could ask: assuming that Michelangelo voluntarily inserted the Creator inside a shape of a human organ, would he also insert Adam inside the shape of another organ? Visual similarities between the figure where Adam is located (the earth) and the human liver and between Adam and the pancreas can be found. Figure 2 shows a comparison between the Adam “figure” (mirrored and rotated 180 degrees) aligned to drawn models of the human liver and pancreas.
Fig. 2. The Adam “figure” and the models of human liver and pancreas. In (a), the rotated model of the Adam’s background (where Adam is leaning on) next to the drawn model of liver; in (b), the rotated Adam with no background next to the drawn model of pancreas. (This image was made by the author of this manuscript from copyright-free images. The copyright-free images were obtained through a free image sharing site).

3. RESULTS
Comparison of the mirrored artwork with the anatomical models shows some similarities that may include, basically, the shape of the figures, the proportions with the same anatomical models, but also the colours used in the artwork. It is plausible that, if Michelangelo had voluntarily drawn inspired by anatomical models, he would not have reproduced exactly all the details but would have drawn following a similar anatomical pattern.
Starting with the representation of the figure of the Creator (Fig.3): for example, in addition to the proportions and shape, there is a resemblance between the folds of the red cape that contours the Creator and the angels and the three branches of the aortic arch (highlighted in red). Then, the leg of the Creator seems to follow the same schematic disposition of the superior vena cava (highlighted in green), while his arm could remind a schematic disposition, albeit shifted, of the inferior vena cava (highlighted in blue).
Fig.3. Some visual resemblance between the Creator “figure” and a drawn model of heart. (This image was made by the author of this manuscript from copyright-free images. The copyright-free images were obtained through a free image sharing site).

Now, examining the Adam “figure” (Fig.4): again there are main similarities in the shape of the figures and the proportions; then, the positions of the anatomical models remind that of the Adam “figure” (mirrored and rotated). The shape of Adam's overall figure and the pattern of the image's borders seem to mimic the anatomical shape of a liver (highlighted in blue), while Adam itself seems to mimic the anatomical shape of a pancreas (highlighted in red). Then, the main part of the gallbladder and Adam’s head (highlighted in green) are in a similar position (if we consider Adam positioned on the ground as in the artwork).
4. DISCUSSION

The original masterpiece shows the right hand of the Creator that is going to touch Adam. Mirroring the image, however, we get the same result but with the left hand of the Creator. What we know is that Scripture contains little about God’s left hand. More is said about his right hand. This, however, has nothing to do with how badly History has treated “lefties”. The Latin word for “left-handed” means “sinister”. Scripture does not treat it so badly. It was an advantage in battle (Judges 3:15-30, 20:16; 1 Chron. 12:2). Although the left side was often opposed to the right in such matters as goats on the left and sheep on the right (Mt. 25:31-46), it is not necessarily intended to denigrate the left hand. For example, according to some studies, the same Michelangelo was an “innate left-hander” (Lazzeri Davide 2018).

In any case, by reasoning about what is reported in Scripture, God’s left-hand works to make people outwardly good, while God’s right-hand works to make people inwardly holy (Koch Aaron 2014). Of course, the truth is that other than anthropomorphically, God has no hands at all. He is a Spirit, and those who worship Him must worship him in spirit and in truth (John 4:24).

The philosophical and medical importance of Galen’s legacy consisted primarily in the fact that he was one of the first ancient thinkers to create a scientific method that embodied philosophical theorizing, supported by the results of empirical research. Galen’s empirical methods and synthetic thinking, based on Hippocrates’ principles of rational medicine and Plato’s natural-philosophical ideas, became the basis of his theoretical and practical system and ensured its dominance and the

Fig. 4. Some visual resemblance between the Adam “figure” and drawn models of liver and pancreas. (This image was made by the author of this manuscript from copyright-free images. The copyright-free images were obtained through a free image sharing site).
specific character of the development of natural science until the scientific discoveries of the
XVIIth–XIXth centuries (Balalykin DA 2015).

It is known that Michelangelo was a devout Catholic. Historically, we know that medical
knowledge stagnated in Europe in the Dark Ages in large part due to the Church which forbade
dissection and encouraged prayer and superstition. It emphasized the following of “authority”
rather than observation and investigation. The Church insisted that people follow Galen's writings
(the Church favoured Galen because his writings show that he believed in the soul) (Hajar Rachel
2021).

About the comparison with the heart and considering the aortic arch: even the prolific Leonardo
mostly used ox heart for his studies and his illustration of the aortic arch vessels is typical of that.
So, even if there is a resemblance in Michelangelo’s artwork with the shape and the proportions
of a human heart, there could be contradictions resulting from these same facts. Furthermore,
Michelangelo surely never saw Leonardo's sketches, partly due to the fact that the two were rivals
both in their profession and in life. In any case, as already reported, Michelangelo probably
actually had a good understanding of the shape of human internal organs and viscera, from which,
perhaps, he may have drawn for his inspiration. However, it is essential to keep in mind that in the
Galenic system, the heart only consisted of the ventricles. The right atrium belonged to the hepatic
veinous system and the left atrium to the lungs.

About the pancreas: the first description of this organ in literature is found in Aristotle's Historia
Animalium, but it is modified by "so-called". Galen also uses the "so-called pancreas" to designate
the human pancreas. Galen's descriptions, that is, "Nature created 'so-called pancreas' and spread
it beneath all vessels" are not generally acceptable but propose the very rare portal vein anomalies
(Tsuchiya R; Kuroki T; Eguchi S 2015). The pancreas is, like the liver, a large gland connected to
the digestive system. The biliary tract, which carries bile from the liver to the intestines, passes
through the head of the pancreas in its last section.

As for the liver, the ground where Adam is leaning has a shape that reminds that of a human liver
and the colours used in the artwork give a sense of depth similar to that we can find if we observe
an anatomical model of a liver.

For the representation of the brain in the form containing the Creator, as the cited article of
Meshberger described, someone could speculate about some “conflicting” implications: for
example, could Michelangelo have already been aware of the higher cortical functions? Could he
have already understood the importance of the frontal lobe (right where God extends his arm)?
And with that, could he really have been so clear about the concept of consciousness and the
cognition of self-consciousness (a gift God would give us)? What was the gift of God: the
consciousness, or the soul (which opens to us the hope of an afterlife)?

In this sense, considering the gift of the soul, we would consider the organs of the heart and liver.
Thinking about the anatomical resemblance hypothesized in this work and about the localization
from Galen’s theory: the Creator and Adam, probably, are in their appropriate locations. Even if
the position of Adam’s body is similar to that of a pancreas, he is located where the liver may have

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been represented, perhaps, as the appetitive spirit, the part of the soul that controls the living forces of our body, especially the blood. The appetitive spirit, according to Galen, also regulated the pleasures of the body and was moved by feelings of enjoyment. This part of the soul is the animalistic, or more natural, side of the soul; it deals with the body's natural impulses and survival instincts. Adam, as the first man, could be considered the representation of human primal instincts. Then, the representation of the Creator is located in the heart. Where would it be if not in the heart? The functions of "growing or being alive" reside in the spirited soul. The spirited soul also contains our passions, such as anger. As in the Scripture: 1 Samuel 16:1-13 “The Lord does not see as mortals see; they look on the outward appearance, but the Lord looks on the heart”.

Therefore, if this interpretation based on the anatomy of Michelangelo’s Creation of Adam is possible, where is the location of the rational soul from Galen’s theory? The rational soul could be the spectator. The spectator, perhaps, rationalizes the magnificence of the work and using the brain, possibly becomes the “anatomical” location of the rational soul.

Galen undoubtedly helped lay the foundation for scientific thinking in the medical field. Although many interesting interpretations of Michelangelo's masterpiece have already been provided by the medical scientific community, and although more will likely come from passionate researchers, none of these will ever be conclusive, but perhaps we could think about interpretations by contextualizing what was actually believed in the Renaissance.

In recent years, some interpretations of Michelangelo's own work have probably been misrepresented. Given the enormous interest in the subject and the fascination it creates in the general public, it is worth mentioning the monologue in a famous television series by one of the main characters. In "Westworld" (an American dystopian science fiction western television series created by Jonathan Nolan and Lisa Joy) Dr. Robert Ford (Anthony Hopkins), while speaking to another character, an android, says: “...You're probably right, Dolores, Michelangelo did tell a lie. [Ford points to a painting by Michelangelo, The Creation of Adam] See, it took 500 years for someone to notice, something hidden in plain sight. A doctor, he noticed the shape of the human brain. The message is, that divine gift does not come from a higher power but from our own minds. ...

(episode 10, season 1, The Bicameral Mind). This monologue of Westworld's character quoting Dr Frank Meshberger's interesting article, altering its meaning, is evidently adapted to a precisely fictional series. However, the topic is very sensitive precisely because of its impact on the general public. The fact that the Lord would be depicted inside a human brain could be interpreted as: “...the Lord is a product of the human mind”.

Then it is preferable to think of what Johann Wolfgang von Goethe said about the Sistine Chapel: “Without having seen the Sistine Chapel one can form no appreciable idea of what one man is capable of achieving”.

4. CONCLUSION

The interpretation described in this paper is not intended to disavow other theories and interpretations but to reason in parallel keeping in mind the similarities reported. However, one
conclusion can be proposed: probably Michelangelo voluntarily included anatomical messages based on the medical knowledge of his time in his works taking inspiration from Nature, which he perhaps considered the best expression of all Creation.

If the analogies described here were true, surely many questions remain unanswered; for example, for what reason would Michelangelo have chosen exactly that kind of orientation (a stylized anatomy repurposed for his work, often with a rotated position in relation to reality)? Why do the anatomical similarities become clearer when we mirror Michelangelo's masterpiece?

The point, however, probably remains that Michelangelo could have taken his cue from Nature (the best expression of God) without necessarily creating an exact copy of Nature itself. The ultimate concept would be: "By taking inspiration from Nature to represent God's gift, the result will surely be grandiose". All without creating a duplicate, which would still turn out to be impossible, because the Lord is the greatest artist (Isaiah 64:8: “But now, Lord, You are our Father; We are the clay, and You our potter, And all of us are the work of Your hand.”).

This is why the mirrored images, discussed above, actually find what appear to be similarities rather rich in interesting visual details, but which would still fall within the conceptual medical beliefs of the time and the full meaning of Michelangelo’s work. Certainly, as already pointed out, this all starts from an author's point of view, and like so many other theories and interpretations, may or may not prove to be true; undoubtedly, future studies and proposals by researchers could further clarify and deepen even the considerations expressed in this article.

Thus, having arrived at this point and taking into account all the considerations described, when we think of medical-scientific thought today, we must necessarily acknowledge Galen's fundamental contribution, a contribution that in History has certainly influenced the medical thought that has brought us to today, but perhaps also other areas in different eras.

ACKNOWLEDGEMENTS

The author would like to thank “MuScLE - Medical & Sports Engineering” for all the support received for this manuscript. The author would like to thank Professor Dr Judit Forrai and Professor Dr Laszlo Kiraly for their invaluable input in the revision of this manuscript and for suggestions and advice in the drafting of the article.

REFERENCES


RANHEL AS, MESQUITA ET: The Middle Ages Contributions to Cardiovascular Medicine, Brazilian Journal of Cardiovascular Surgery, volume 31 (2), 2016. https://doi.org/10.5935/1678-9741.20160031


KALACH, Maria: The Mirror in Renaissance Paintings, Atelier Balbec, Issue 6, 2012 - online at link: https://atbalbec.tumblr.com/post/24476662806/the-mirror-in-renaissance-paintings(date of last access: 14/03/2023)


KOCH, Aaron: God's Right and Left Hands, Mt. Zion Lutheran Church, 2014 - online at link: https://www.mountziongreenfield.org/posts/sermon/gods-right-and-left-hands(date of last access: 06/04/2023)
