

## *The Most Important Medical Theories and Works of Abu Sahl Masihi (11 century AD), an Iranian Scientist during the Golden Civilization of Islam*

### **Teori dan Karya Kedokteran Paling Penting dari Abu Sahl Masihi (Abad Ke-11) Ilmuwan Iran Pada Masa Keemasan Peradaban Islam**

Zahra Memariani<sup>1</sup>, Mohammad Hashemimehr<sup>2\*</sup>

<sup>1</sup> Department of Persian Medicine, School of Persian Medicine, Babol University of Medical Sciences, Babol, Iran

<sup>2</sup> Department of History of Medicine, Traditional Medicine and History of Medical Sciences Research Center, Babol University of Medical Sciences, Babol, Iran

\*Corresponding author: [paul\\_wetmore@yahoo.com](mailto:paul_wetmore@yahoo.com)

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#### **Abstract**

Abu Sahl Masihi is a physician of the 11th century AD. This study aims to introduce the most important medical theories and works of Abu Sahl Masihi. The method of this research is the library. He focused on the scientific and theoretical part of medicine including General basics and principles of prevention. In his works, Abu Sahl has explained the theoretical part simply and the therapeutic part briefly. He has rejected other physicians' opinions that considered menstrual bleeding to be fetal food and said that this blood cannot be the source of fetal food. He considered the healthy blood of the mother as the source of fetal food. Like Aristotle, Abu Sahl has regarded the heart as the life force center, innate heat, and vital spirit. He also had a significant view of the heart structure and the vessels connected to it. We can introduce Abu Sahl as one of the pioneers of the theory of the beginning of digestion of food through the mouth due to being impregnated with saliva by the enzymes in the secretions of the digestive system. More research on the noteworthy ideas of this great scientist is needed by scholars and researchers.

**Keywords:** Abu Sahl Masihi, Digestion, Heart, Medical history, Persian medicine

#### **Abstrak**

Abu Sahl Masihi adalah seorang dokter abad ke-11 Masehi. Penelitian ini bertujuan untuk memperkenalkan teori-teori medis yang paling penting dan karya Abu Sahl Masihi. Metode penelitian ini adalah perpustakaan. Ia fokus pada bagian ilmiah dan teoritis kedokteran termasuk dasar-dasar umum dan prinsip-prinsip pencegahan. Dalam karyanya, Abu Sahl menjelaskan bagian teoritis secara sederhana dan bagian terapeutik secara singkat. Ia menolak pendapat dokter lain yang menganggap darah haid sebagai makanan janin dan mengatakan bahwa darah tersebut tidak bisa menjadi sumber makanan janin. Ia menilai darah ibu yang sehat sebagai sumber makanan janin. Seperti Aristoteles, Abu Sahl menganggap hati sebagai pusat kekuatan hidup, panas bawaan, dan semangat vital. Dia juga memiliki pandangan yang signifikan tentang struktur jantung dan pembuluh darah yang terhubung dengannya. Abu Sahl dapat kita perkenalkan sebagai salah satu pionir teori awal mula pencernaan makanan melalui mulut karena air liur diresapi oleh enzim-enzim dalam sekresi sistem pencernaan. Penelitian lebih lanjut mengenai ide-ide penting dari ilmuwan besar ini diperlukan oleh para sarjana dan peneliti.

**Kata Kunci:** Abu Sahl Masihi, Pencernaan, Jantung, Riwayat Kesehatan, Pengobatan Persia

## INTRODUCTION

Iranian scholars in the Golden Age had a remarkable role in the scientific field by conserving and developing ideas and knowledge in the past ages. Some of them like Rhazes and Avicenna were known to add and improve the existing information and knowledge on the medicine of the time by their own precise observations and experimentation (Elgood, 1951). These intellectual physicians including Muslim, Jewish, and Christian, were worth to be studied in their own right because of their contribution to the systematization and development of medicine in addition to preserving Galenic medicine. One of the Iranian-born physicians who played an important role in the history of medicine was Abu Sahl Masihi (Tabrizi, 2004). Abu Sahl Isa Ibn Yahya Masihi was a famous physician, mathematician, philosopher, and astronomer in the second half of the fourth century AH and a contemporary of Abu Ali Sina (Beihaqi, 1972, Shahrzouri, 2005).

This great man was born around 972 AD in Jorjan and spent the first years of his life in Baghdad where he learned the sciences of his time. Since Abu Sahl wrote a book for Marzban ibn Rostam -one of the kings of Al-i-Bawand- (late 10th century AD), it can be said that he stayed with Marzban ibn Rostam sometime (before 999 AD) (Keramati, 1999). After that, he went to Jorjan and entered Abu Ali Mamun ibn Muhammad Kharazmshah's (995-997 AD) court and soon reached a high position there (Shahrzouri, 2005). Abu Sahl was known to be Christian due to adhering to Christianity. Abu al-Fazl Bayhaqi (995-1077 AD) included him among the Christians and said that he did not go to Christian places of worship and praised God at his home (Beihaqi, 1972). After going to Jorjan, Abu Sahl probably stayed there until 1010 AD and in the court of the Mamunids. About his scientific position, there are some contents from historians and scholars that all imply his high status in medicine and knowledge. For example, Abdul Rahim Ibn Ali (1097-1171 AD) has said: Among the early and late scholars of the Persian-Christian physicians, I did not find anyone to be eloquent and speak well like Abu Sahl (Shams Ardakani et al, 2013, Ibn Abi Usaybi'a, Qefti, 1903).

Several historians and many contemporaries have named Abu Sahl Masihi as the master of Avicenna in medicine or mentioned this honor. Many have emphasized his mastery of medicine and some even have considered him superior to Avicenna (Ibn Motran, 2007, Taghavi Shirazi et al, 2020, Bavafai Delivand, 2011). Qutb Al-din Shirazi (1236-1310 AD) in his great book *Al-Tohfah Al-Sa'adiyah* benefited from Abu Sahl's views more than the other scientists. In some cases, he preferred Abu Sahl Masihi's views to the others even Avicenna. Of course, sometimes he totally rejected Abu Sahl's opinions and it comes from his words that in some cases, Abu Sahl had ideas that were unique to him. Other popular physicians have also benefited from Abu Sahl's views among them Nafis Ibn Avaz Kermani (1409-1485 AD) is mentioned (Keramati, 1999, Safa, 1953).

According to Nizami's (1141-1215 AD) narrative, Abu Sahl was in the court of Kharazmshah along with some scholars such as Avicenna (980-1037 AD), AbuReihan Biruni (973-1051 AD), Abu Ali Meskuye (932-1030 AD), Ibn Khammar (943-1053 AD) and Abu Nasr Iraqi (970-1036 AD) until Mahmoud Ghaznavi (972-1030 AD) sent Hassan Ibn Mikal (?- 1032 AD) to take these scientists up to Kharazmshah, some of them accepted the King Mahmoud's forced invitation but some of them like Avicenna, Abu Reihan Biruni, and Abu Sahl Masihi chose to run away from Kharazmshah's territory before the arrival of Hasan Ibn Mikal and went through away the Kharazm desert (Samarghandi, 1954). Avicenna predicted that they would lose their way on the basis of astronomical rules and Abu Sahl also said they would not survive the trip. Eventually, due to the sandstorm, the two wandered in the desert of Kharazm, Abu Sahl died of thirst (Probably the year 1011 A.D) and Avicenna made it very difficult to reach Abyvard and he finally went to Jorjan (Shams Ardakani et al, 2013, Bosworth, 2000).

## METHOD AND RESEARCH FOCUS

The research focuses on the significant contributions of Abu Sahl Masihi, an Iranian-born physician during the Golden Age, with particular emphasis on his theories, works, and views in the field of medicine. The methodology involves a thorough literature review encompassing

historical texts, medical manuscripts, and scholarly works related to Abu Sahl and the broader medical context of his time. Primary sources, including Abu Sahl's writings and contemporaneous works, will be analyzed to extract information about his medical theories, practices, and overall contributions. The study aims to provide a comparative analysis of Abu Sahl's work with other renowned physicians of the Golden Age, such as Avicenna and Rhazes, to highlight his distinctive perspectives. Additionally, the research will contextualize Abu Sahl's life within the historical, political, and cultural milieu of the Golden Age, exploring interactions among scholars in the court of Kharazmshah and their impact on medical knowledge. Textual analysis of specific medical works by Abu Sahl, particularly "Al-miaat fi-Tib," will be conducted to identify key theories and methodologies in the field. The interdisciplinary aspects of Abu Sahl's contributions as a mathematician, philosopher, and astronomer will also be explored. The study will assess the reception of Abu Sahl's ideas by later scholars and examine instances where his views may have influenced or diverged from the works of subsequent medical thinkers. The results and discussion will culminate in a comprehensive presentation of Abu Sahl Masihi's most important medical theories and their lasting impact on the development of medical knowledge during the Golden Age.

## RESULTS AND DISCUSSION

### The position of Abu Sahl's medical theories

The mechanism of blood circulation has long been an interesting issue for scientists and they have had comments in this regard. Hippocrates (460–370 BC) considered the liver and the spleen to be the two main organs of the body that are responsible for the constant production of blood. In his opinion, the left ventricle was where the body's warmth was established and the heart's function was to warm or cool the blood (Azizi, 2008, Cattermole, 1997). After Hippocrates, Aristotle (384–322 BC) described the heart as an organ with three ventricular chambers and illustrated a main artery which he named "Aorta", originating from the heart (Azizi, 2008, Yarmohammadi, 2013).

In the fourth century AH, Haly Abbas said about the structure of the heart, the heart is composed of two main cavities, left and right. He introduced the left side of the heart as the origin of arteries and noted the existence of two atriums. He also pointed out the tricuspid, mitral and aortic valves, and their one-way action (Majūsi Ahvazi, 2009, Dalfardi, 2014).

Abu Sahl was a follower of Galen in medicine with some disagreements over the "origin of life", the "forces of the body" and the "center of feeling" which have been one of the most important topics of ancient medicine. Unlike Galen and his followers, who knew the brain as the most important organ and the center of feeling, Abu Sahl has considered the heart as the center of life, innate heat, and vital spirit (originating from the heart). Abu Sahl also had an interesting view of the heart structure and the vessels connected to it. He has said about it: "The 4 big vessels go to the heart, First is a vessel that transfers blood from the liver to the heart and the other is the artery that blood and spirit (can be interpreted as oxygen mixed with blood hemoglobin) go through it into the lungs and these two are on the right side of the heart, third the artery which the heart receives the spirit from the lungs through it and the fourth is the artery through which blood and spirit go to the whole body and these two are on the left side of the heart". In a way, you can consider it a part of Ibn Nafis's very important theory of the pulmonary circulation of blood which has a particular importance (Safa, 1953). Ibn al-Nafis (1210-1288), considered pulmonary circulation as the only way through which blood could pass from the right ventricle to the left one. In addition, he believed that small communications connected pulmonary arteries and veins (Yarmohammadi, 2013, West John, 2008, Androutsos, 2012).

### Abu Sahl's emphasis on theoretical scientific topics and the principles of disease prevention

Abu Sahl did not agree to go into too many details about therapeutic issues. In most books written on medicine, the therapeutic part is much longer and the scientific and theoretical parts (general basics, principles of prevention, etc.) are shorter. He considered medical science as was usual at that time, to complete and editing in the theoretical part and to summarize and explain the therapeutic part. Also, in his two major works, *Al-miaat* and *Al-Tibb- Alkoli*, he has not paid much attention to identifying and expressing symptoms of the disease. This might indicate that he placed more emphasis on basic scientific studies than on empirical therapy. Abu Sahl also had a particular dignity in philosophy. Fakhr Al-din Razi (1149-1209 AD) has been named one of the greatest philosophers in the Islamic world. Abu Sahl is one of those who have considered astronomy issues unfounded and free of reason (Masihi, 1991). Fakhr Al-din Razi has ascribed a treatise to him for rejecting astronomical issues (Safa, 1953).

### **Enzymatic digestion of food in saliva**

If Abu Sahl is not the first person to raise the issue of digestion from the mouth due to food impregnation with saliva, he should be considered at least the pioneer theorist of digestion by enzymes available in the gastrointestinal secretions (Tabrizi, 2004).

### **Abu Sahl's view on the origin of menstrual blood**

Abu Sahl declined other physicians' theories who have considered menstrual blood to be a fetal food and therefore its discontinuation in the menopause period caused pregnancy termination and he has mentioned that such blood that the body repels cannot be the source of the fetal food. He believed the mother's healthy blood was the source of the fetal food (Ashkevari, 2019). Abu Sahl gave his best opinion on pregnancy and fetus formation. He also gave the idea of the participation of both males and females in Zygote formation.

### **Abu Sahl's important Works**

One of his most important works is the book of *Al-miaat fi-Tib* (One Hundred Speeches in Medicine). The value of this work is such that Nizami in the book *Chahar Maghali* considers it as the study requirement for physicians and Avicenna laid the foundation of his book "*Qanun*" based on his master's work. Amin Al-Dawlah Ibn telmiz (1074-1165 AD) who has written some margins on this book also has said: "You have to trust this book, because it is a book of much research, low repetition, clear expressions and elected for the cure" (Shams Ardakani et al, 2013). His other works are: *Asnaf Al-Oloum Al-Hekmiah* (In the classification of sciences) that Dimitri Gutas (1945-...) has summarized this treatise into English which contains a relatively complete list of outlines (Gutas, 2014). *Tashrih Badan al-Ensan* (Anatomy of the human body), The book *Fi Izhar Al-Hikmat Allah Taala Fi Khakq Al-Insan*, The book *Al-Tibb Al-Koli*, The article *Fi-Aljodari* (Chickenpox), The book *Fi Al-Vaba* (Cholera), The book *Fi Al-bah* (Sexual), The book *Fi Taoon va Fi Nabz* (Plague and Pulse), *Risalah Al-Adviah* (Drugs), *Osool Elm Al-Nabz* (Principles of pulse), *Favaiid Fi Shar* (Hair Benefits) and *Research on dis-temperament* (Tabrizi, 2004, Keramati, 1999).

Abu Sahl Masihi has also written several books on natural sciences, astronomy, and mathematics, which we refrain from introducing due to the lack of connection with the title of this research.

### **A glance introduction to the book *Al-Miat fi al-Tibb* (the most important work of Abu Sahl al-Masihi)**

*Al-Miat fi al-Tibb* contains a hundred discourses in the field of medicine and medical knowledge, written in Arabic by Abu Sahl al-Masihi (Fig. 1). The value of this book is on the one hand because of its age and on the other hand because of some initiated ideas of Abu Sahl. In these hundred articles, the author has compiled and organized the most important topics of medical science. This book is actually a medical encyclopedia, most of which covers general

medical issues. At the beginning of each book, he explains the topic of that book and his motivation for writing it and then enters into a discussion about that topic. This work consists of one hundred parts, and the author has given a book title to each part. About the writing style of this book, Abu Sahl says: "I wrote each part as a separate book so that each part of this book can be used independently." In *Al-Miat fi al-Tibb*, topics such as nature, natural body parts, benefits of parts, temperaments, weather conditions, houses, waters, food, sleep and awakesness, etc. have been discussed. This work, after its compilation, has attracted the attention of many physicians after him and has been explained and annotated by them (Fig. 2). "*Al-Miat fi al-Tibb*" was printed and published in Hyderabad, India, in 1963 AD by the efforts of Mohi al-Din Qaderi (Masihi, 2005).

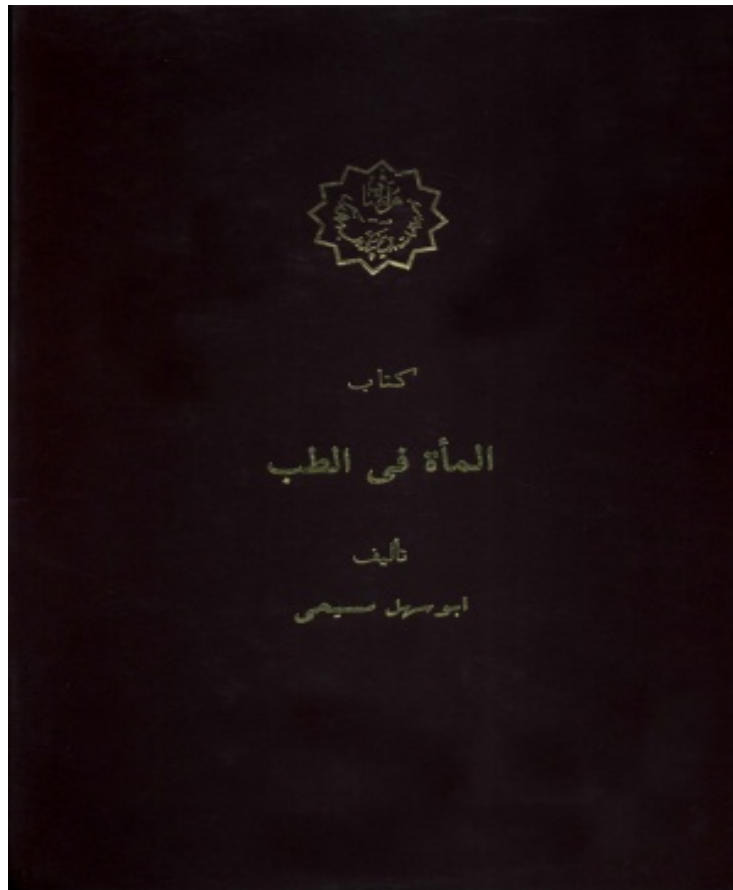


Figure 1. Cover of *Al-Miat fi al-Tibb*



Figure 2. The first page of the book "Al-Miat fi al-Tibb" (kept in the library of the National Council of Iran)

## CONCLUSION

Abu Sahl is one of the Iranian scientists who has been unfortunately forgotten and was not recognized as he deserved. The importance of Abu Sahl Masihi's works among Persian physicians, his name and writings almost remained unknown to the Europeans in his time and his medical books were not translated into Latin or other languages. European translators were more likely to translate books like Qanun giving more importance to the therapeutic section. By considering Abu Sahl's theories, it can be concluded that he knew prevention was better than cure because he was more interested in the scientific and theoretical discussion that included general basics and principles of prevention than the therapeutic part. He believed that the first step in medicine is to correct, complete, and understand the theoretical contents and the next step, if necessary, is to address therapeutic issues. This valuable scientist's view on the heart's position as the center of life force and vital spirit and his ideas on the heart structure and the vessels connected to it is remarkable. Abu Sahl's opinions on digestion by enzymes in the gastrointestinal secretions and also the introduction mother's healthy blood as the fetal food could be the subject of discussion and more detailed research areas in future studies to be identified particular positions and exquisite views of this great scientist.

## REFERENCE

- Androustos G KM, Stefanadis C. William Harvey (1578–1657): discoverer of blood circulation. *Hellenic Journal of Cardiology*. 2012;53(1):6- 9. doi.org/10.2307/1307276.
- Ashkevari Q. Mahboub Al-Gholoub. Tehran, Mola publication, 2019.
- Azizi MH NT, Azizi F. A brief history of the discovery of the circulation of blood in the human body. *Arch Iran Med*. 2008;11(3):345- 50.
- Bavafai Delivand E. Etizal School of Kharazm during the time of Kharazmshahids (1097-1231 AD). *Historical research (scientific research)*. 2011;3(2):17-50.
- Beihaqi A. Tatemeh Savan al-Hikmah. Lahor, Lahore publication, 1972.
- Bosworth CE. (2000). *History of civilizations of Central Asia*. Vol 4, Paris, UNESCO Publication, 2000, p. 306.
- Cattermole GL. Michael Servetus: physician, Socinian and victim. *J R Soc Med*. 1997;90(11):640- 4. doi: 10.1177/014107689709001115.
- Dalfardi B, Mahmoudi-Nezhad GS, Mehdizadeh A. How did Haly Abbas look at the cardiovascular system? *International Journal of Cardiology*. 2014;172(1):36-9. doi: 10.1016/j.ijcard.2013.12.171. Epub 2014 Jan 8.
- Elgood C. *A medical history of Persia and the eastern caliphate*. London: Cambridge University Press; 1951.
- Gutas D. *Avicenna and the Aristotelian Tradition*, London, Braille Publications, 2014.
- Ibn Abi Usaybi'a, A. *Oyoun al-Anba fi Tabaqat al-Attiba*. Cairo, Al-Hayat al-Mesriah, 1882.
- Ibn Motran A. *Bostan al-aAtiba va Rozat al-Alba*. Tehran, Association of Cultural Works and Honors, 2007.
- Keramati Y. *The Great Islamic Encyclopedia*. Vol 5. Under the supervision of Mousavi Bojnourdi MK. Tehran, Publications of Islamic Encyclopedia Center, 1999. p. 574-578.
- Majūsi Ahvazi A. *Kāmil al-Sinā'ah al-Tibbiyah (The Perfect Book of the Art of Medicine)* Tehran, Tehran University/ McGill University, Institute of Islamic Studies, 2009.
- Masihi, AS. *Al-Miat fi al-Tibb*. Vol. 1, Tehran, Iran University of Medical Sciences Publication, Institute of Medical History, Islamic and Complementary Medicine Studies, 2005, p. 111-114.
- Masihi AS. *Asnaf Al-oloum Al-hekmiah*. Tehran: Islamic Research publication; 1991.
- Qefti J. *Tarikh Al-hokama*. Germany, Leipzig publication, 1903.
- Safa Z. *History of Iranian literature*. 17 ed. Tehran, Ferdos publication, 1953.
- Shahrzouri SH. *Nozhat al-Arvah va Rozat al-Afrah*. Tehran, Scientific and cultural publication; 2005.
- Shams Ardakani, MR, Velayati A, Ghasemlou, F, Mokhber Dezfouli MR. *Calendar of history, culture and civilization of Islam and Iran*. Tehran: Amirkabir publication; 2013.
- Samarghandi NA. *Chahar Maghaleh*. Tehran, Tehran publication; 1954.
- Tabrizi A. *Matrah al-Anzar*. Tehran, Publications of the Institute of Medical History Studies, Islamic and Complementary Medicine Iran University of Medical Sciences, 2004.
- Taghavi Shirazi M, Ghods R, Hashem-Dabaghian F, Zargaran A. Abu-Sahl al-Masihi (died circa 1010 AD): The Persian physician in the early medieval era. *Journal of Medical Biography*. 2020;28(3):132- 5. doi.org/10.1177/0967772017720372.
- West John B. Ibn al-Nafis, the pulmonary circulation and the Islamic Golden Age. *J Appl Physiol*. 2008;105(6):1877- 80. doi: 10.1152/jappphysiol.91171.2008. Epub 2008 Oct 9.

Yarmohammadi H, Rezaian J, Ghanizadeh A. Al-Akawayni's description of pulmonary circulation. *Int J Cardiol.* 2013;168(3):1819- 21. doi: 10.1016/j.ijcard.2013.07.040. Epub 2013 Jul 25.