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The contribution of Islamic culture to the Development of Medical Sciences

Majed Chamsi-Pasha MBBS, SBIM,
Department of Medicine,GNP Hospital, Jeddah, Saudi Arabia

Hassan Chamsi-Pasha FRCP, FACC,
Consultant cardiologist, King Fahd Armed Forces Hospital, Jeddah, Saudi Arabia

Correspondence: Dr Hassan Chamsi-Pasha *drhcpasha@hotmail.com*

Abstract

The impact of Islamic civilization on Western science and medicine between the 9th and 13th centuries is not well remembered by many in the West. While Europe was in the so-called Dark Ages, Muslim physicians like Avicenna, Al-Razi, Al-Zahrawi and others, were building on the work of the Greeks and Romans, making discoveries that continued to influence the medical practice for several centuries. Islam stressed the importance and respect of knowledge and cultureprohibiting the demolition and destruction of previous cultures. Islamic civilization has played an invaluable role in preserving the continuity of scientific progress of other nations, contrary to what was done by Mongols and others. For many centuries, Arabic remained the most important scientific language of the world and preserved the knowledge and culture that might otherwise have been lost forever.

Introduction

In the history of medicine, Islamic medicine, refers to the science of medicine developed in the medieval Age, and written in Arabic.[1] Buildings in Andalusia such as the Alhambra in Granada, and the Mezquita in Cordoba are reminders of the architectural imprint of Islamic civilization left on Western Europe. Less well remembered, however, is the impact of this civilization on Western science, technology, and medicine between the years 800 and 1450.[2] Many Western historians underestimate the contribution of the physicians of the medieval Islamic world.By some, they are perceived as purveyors of the Greek science to the scholars of the Renaissance.However, the facts show completely the opposite.[3]Islamic civilization' greatest contribution was in the preservation of knowledge and culture in a critical period for humanity, when numerous barbarians destroyed the world's cultural heritage. Rescuing the original books of ancient civilizations, Muslims, unlike many conquerors, showed a remarkable respect for the human knowledge. These books were accumulated on the soil of this Empire, translated into Arabic and consequently, built magnificent advances on these foundations.[1] However, when the Islamic Empire became weak, most of the contributions in medicine and science were destroyed. The Mongols burnt Baghdad (1258 A.D.) out of barbarism, and the Spaniards demolished some of the Islamic heritage in Spain out of hatred. Muslim scholars, later, hit the source ball of knowledge over the fence to Europe.[4] During this period, many students and professionals residing in a country outside the Islamic Empire, dreamed to go to the Arabian universities to learn, and then work and live in the most advanced and civilized society.4

What lead to Golden Age?

Arabic language became a unifying factor, and translations from Greek & Latin into Arabic were innumerable, removing language barrier for scholars. Besides, major libraries were established in Cairo, Aleppo, Baghdad, central Asia, and Spain and bookshops with thousands of titles opened in several cities.[5, 6]

Muslim physicians and scholars also laid down the basis for medical practice in Europe.Before the Arabian era, medical care was largely provided by priests in sanatoriums and annexes to temples.

For centuries, the main Arabian hospitals were centers of medical education and introduced many of the concepts that we encounter in modern hospitals, such as separate wards for menand women, medical records, pharmacies and personal and institutional hygiene.[2] Famous Muslim physicians defined medicine as skill that dealt with keeping good health, coping with illness and aiming at health recovery. They modified many Greek writings and established the pillars of the art of medicine.What is significant is that, regardless of historical past and modern technological presence, these principles are still accurate for the understanding of medical science nowadays.[1]

Licensing Examinations

Many historians claim that the Western world pioneered in the setting of ethical, legal and professional standards in the practice of medicine.[7] In Baghdad, in 931 A.D. Caliph Al-Muqtadir learned that a patient had died as the result of a physician's error.He then ordered the chief physician, Sinan-ibn Thabit bin Qurrah to examine all those practicing the art of healing.In the first year, more than 860 were examined in Baghdad alone. Licensing examinations were required and administered in various places. Licensing Boards were set up under a government official called “Muhtasib” or “Inspector General” who monitored qualifications, ethics and legal standards.[7, 8] The chief physician gavethe young physicianfull practical examination, and if successful, the “Muhtasib” would administer the Hippocratic Oath and issue him the license to practice.After 1000 years, licensing of physicians has been implemented in the West, such as the State Licensing Board in Medicine or surgery etc.[4]

Medical Ethics

Informed medical consent is proposed by some as a new invention. Others claim that patient rights and legal protection have been stated in the early decades of the 20th century. Al-ajlouni clearly demonstrated that during the golden era of Islamic world, the qualification of physicians was made according to a well-designed curriculum covering the science and humanity of medicine. The rules governing the quality control of health care delivery systemwere laid down.[7]

The principles of bioethics in the Western world were developed and outlined in 1979 by two American philosophers and bioethicists, Beauchamp and Childress in their book “Principles of Biomedical Ethics”.[9]Since then, the concept of bioethical principles has been regarded as a “Western” invention.These bioethical principles: autonomy, beneficence, non-maleficence, and justice have been basically legitimized by Muslims jurists as falling into the sphere of Islamic law.[10] Many prominent physicians of the Arabic civilization involved themselves with professional ethics. In his book “Akhlaq-Al-Tabib” (Medical Ethics), Al-Razi and his peer Al-Ruhawi, who authored “Adab Al Tabib”, are credited with laying the foundations of medical ethics a millennium before modern Western ethical medical principles were recorded.[11]

Famous Medieval Physicians

There are many worldwide famous Muslim Physicians: Al-Razi, Ibn Sina, Al-Zahravi, Ibn Zuhr, Ibn Ruzd etc. These names, among several hundreds of physicians, attributedto the "Golden Age" of Islamic science. That is why we have to be grateful to them.[12]

Al-Razi (865-925 CE) wrote a masterpiece entitled: “Kitab al-Hawi” (The comprehensive book on medicine), known also as "The large comprehensive or Continens Liber", a 23-volume textbook that provided the skeleton ofmedical curriculum for the European schools until the 14th century.

Ibn Sina (980-1037 CE), an exceptional physician, wrote al “Qanun fi al-Tibb” (The Canon of Medicine), which is considered as major encyclopedia of medicine, in which he combined his own observations with the medical knowledge he acquired fromGalen, and the philosophy learned from Aristotle.[13] Manṣūr ibn Ilyās (1380-1422 CE) wrote the first color illustrated book of anatomy.[14] These books and ideas provided the basis for medical care in Europe during its recovery from the Dark Ages.

Al-Razi (865-925 AD)

Abu Bakr Muhammad ibn Zakariya al-Razi, known also as “Rhazes”, stands among the Arabo-Islamic physicians as the most important medical figure of his time. Al-Razi wrote several medical books. In his masterpiece “Al-Kitab al Hawi” (The Comprehensive book on Medicine), al-Razi established gynecology, obstetrics and ophthalmic surgery during the medieval times (Fig1). He also wrote a 10-volume epic “Al-Mansuri”, complementing “Kitab al-hawi” as a reference in medical teaching. In his landmark “A Treatise on the Small-Pox

and Measles", al-Razi recognized that the two were separate diseases.(Fig.2)This book was printed forty times in English between 1498 –1866.[15] His books Qarabadain Kabir (The Great Book of Formulary), and QarabadainSaghir (The Little Book of Formulary) introduced over 800 novel drugs.

Al-Razi thoroughly studied many diseases including cancer, discussing its diagnosis and treatment. He was among the pioneers to introduce the notion of chemotherapy bycombining chemical, medical and pharmaceutical knowledge.[16] Besides, he emphasized the importance of psychological factors on health. Al-Razi wrote the first treatise on allergy and immunology.He was the first to attribute hay fever to the smell of roses at springtime in his manual on coryza (rhinitis). Al-Razi is considered the first who described what is called now Baker's cyst which is attributed to English surgeon William Baker (1839-1896) who described it in 1877.He is considered as one of the game changers in the field of dermatology.[17]

Al-Razi cared a lot for the poor, and he wrote a treatise to support them entitled: "For one who has no physician to attend him". He was the first to write a book on home remedies. In its 36 chapters, he described diets and drugs that can be found in the kitchens, pharmacies, and military camps. [17] In his book "Akhlaq-Al-Tabib"(Medical Ethics), he stressed the triumvirate of ethical responsibility—the physician to his patient, the patient to his physician and the physician to himself. His paradigm of an ethical physician, which was based on characteristics such as appearance, voice modulation, virtuosity, behaviour as a "role model" and a life-long desire to update his knowledge, resonate with our current 21st century ideas of "professionalism". Empathy, confidentiality, and psychological counselling were to him, essential components for healing and ethical practice. It is remarkable that he made special mention of the social nuances of medical ethics by preaching physicians to treat rich and poor alike and to treat women with respect.[11,18]

Ibn Sina (Avicenna) (980-1037 AD)

Ibn Sinais the most eminent Muslim physician, brilliant philosopher, and great thinker, andregarded as the "Father of Early Modern Medicine" and the "Father of ClinicalPharmacology".[19] By the age of eighteen, he was a physician who took care of the king. He wrote his first book at the age of twenty-one, and excelled in both Medicine and Philosophy. The "Kitab al-Qanun fi-al-Tibb", commonly known as the "Canon Medicine" is the most famous book in the history of medicine, and considered as "The First Textbook of Medicine on the Earth". It is the final act of all Greco-Arabic medical thoughts up to his time, enriched with his own contributions. The "Canon" was translated into Latin in the 12th century, and by the 16th century it was in its 35th edition.It remained an essential reference by medical schools in Europe from the 12th-17th century.[19, 20](Fig.3)

Ibn Sina also wrote "The treatise on cardiac drugs".(Fig.4)His description of cardiac diseases was logically presented, perhaps for the first time in the history of medicine. He was a pioneer in pulsology and the first correct explanation of pulsation was given by Avicenna, after he refined Galen's theory of the pulse.[21] He also created a system of medicine that we call it today "holistic", in which physical and psychological factors, drugs, and diet were combined in treating patients.[2,20]

Ibn Sina's poem on medicine ("Al-Urjuzah Fi Al-Tibb") consist of meticulous 1326 verses, and was considered as a summary of his great textbook "The Canon of Medicine"; hence it achieved its popularity as a tool in transmitting medical knowledge.(Fig.5) Since first translated by Gerard of Cremona (1114-1187), in the middle of the 12th century, the Latinized poem was frequently published in Medieval Europe.[22] Avicenna's definition and treatment approaches of migraine, for example, were considered to bebased on the current concepts and findings.Most of the plants mentioned by Avicenna for the treatment of migraine may have potentially significant effects on the central and peripheral sensitization.[23] Although most descriptions of senile dementia date back to Alois Alzheimer, who in 1906 described the first patient who suffered from this disorder, the contributions of Avicenna to the development of diagnosis and etiology of different forms of dementia cannot be ignored.[24] The importance of studying anatomy by the surgeons in training was greatly emphasized by Avicenna. He also advised surgeons to treat cancer in its earliest stages, ensuring the removal of all the diseased tissue. [25]

Al-Zahrawi (Albucasis) (963-1013 AD)

Abu al-Qasim Al- Zahrawi, called the father of surgery wrote an encyclopedia on surgery and developed many surgical instruments used in operations.

Al- Zahrawi summarized the works of ancient Greek and Roman physicians, with magnificent additions through his great discoveries. His descriptions and innovations

remained a work of reference in the West and East for many centuries to come.[26] Surgeons all over the world practice today, unknowingly, several surgical procedures that Al-Zahrawi introduced 1,000 years ago. He developed new surgical technologies such as “catgut sutures”, and wrote “Al-Tasrif” book that described surgical procedures, and gave detailed illustrations of about 200 surgical instruments, many of which were devised by al-Zahrawihimself.(Fig.6) We owe it to al-Zahrawi that surgery became integrated into scientific medicine, instead of being a practice left to cuppers and barbers.[2, 3]

Al-Zahrawi is thought to be the first surgeon in history to use “cotton” in surgical dressings, to control hemorrhage, or as padding in splinting of fractures, as well asvaginal padding in state of fractures of the pubis.He introduced the method for removal of kidney stones by cutting into the urinary bladder.

He was the first to advocate the “lithotomy position” for vaginal operations. Al-Zahrawi's treatise contained an illustration of a vaginal speculum and two types of forceps for extracting a dead fetus.(Fig.7) The description of varicose veins stripping by Al-Zahrawi ten centuries ago, is almost like what is encountered in modern surgery. Besides, he invented a cauterizing iron to control bleeding.[27,28]

In orthopedics, al-Zahrawi introduced what is known today as Kocher's method of shoulder dislocation reduction, over 1,000 years before Dr. Brooke reintroduced it in 1937.[27] He also described “tracheotomy” and distinguished between goiter and cancer of the thyroid.[29]

Al-Zahrawi pointed out that there is no good practice in surgery without a sound knowledge of anatomy. He and many other great physicians, considered that studying anatomy is not only indispensable to the profession, but also is a way tounderstand the perfection of the human being, God's supreme creation.[3]

Ibn al-Nafis (1210-1288 AD)

Alauddin Ibn al-Nafis was the first to discover the "circulation lesser" and describe the blood flow from the right ventricle to the lungs, then back to the left ventricle, 300 years before William Harvey.[30,31] Citations in majority of western literature mention the other two "describers" or "discoverers" of pulmonary blood circulation: Miguel de Servet (1511-1553), and William Harvey (1578-1657).[32,33] The historical observations that the pulmonary circulation was discovered by European scientists in the 16th century should be changed.[32]Ibn Al-Nafis bravely rejected the theory of Galen (130-200 AD) and Avicenna (980-1037 AD), which stated that the blood from the right ventricle passes through "invisible" holes in the ventricular septum to the left ventricle. [30,31] His description included the observation that the wall of the septum is not porous, as was believed by earlier scholars.He stated that the blood from the “venous side” was directed through the pulmonary artery to the lungs ,where it is "mixed with air" and drained back to theleft side of the heart through the pulmonary veins.[31](Fig.8) In his book “SharhTashreeh Al-Qanun”, we find that he was the first to note that the nourishment of the heart muscle is coming from the coronary arteries, rather than from the inside of the ventricular cavity, as described by earlier scholars.[30, 33] He also stated that there must be small communications or pores (“manafidh” in Arabic) between the pulmonary artery and vein, a prediction that preceded by 400 years, the discovery of the pulmonary capillaries by Marcello Malpighi. [34] Ibn Al-Nafis also wrote a book “Kitab Al-Mujaz Fi Al-Tibb” which was meant to be a “handbook” for medical students and practitioners, not as an epitome of "Canon Medicine" of Ibn Sina.[35]

Ibn Zuhr (Avenzoar) (1092–1162 AD)

Merwan Abd al-Malik ibn Zuhr, a Muslim physician from “Al-Andalus”, also known as “Avenzoar” by the Europeans.His most distinguished work was the “Al-Taysīrfī al-Mudāwātwa al-Tadbīr (On Preventive Regimen and Treatment), whichwas in use for centuries in Europe, and was influential to the progress of surgery[36] (Fig.9). In his book, Ibn Zuhr enriched surgical and medical knowledge by describing many diseases and treatment innovations , not ever described before him. He provided the first clinical description of a “polypoid colorectal tumor” as well as the case of a “uterine cancer” and a “basal cell carcinoma”.[37] He drew the redlines where the physician should stop, in his management of a surgical condition; a stage toward recognizing general surgery as a specialty on its own.[36]

Ibn Zuhr’s unique experiment in performing “tracheotomy” on a goat, proved the safety of this operation in humans.[29] Avenzoar might have made one of the earliest records on the clinical state called "idiopathic adult hydrocephalus” and postulated liquid collection in the ventricles of the brain in hydrocephalus well before Vesalius.[38]

The Jewish physician "Maimonides" expressed his admiration of Ibn Zuhr, describing him as "unique in his era and one of the great thinkers" and he frequently quoted him in his medical texts. Both Ibn Zuhr'sdaughter and grand-daughter also became physicians, specializing in obstetrics.[39]

Ibn Rushd (Averroes) (1126-1198 AD)

Another Andalusian Muslim polymath, Abu al-Walid Muhammad ibn Rushd, or "Ibn Rushd", a noticeable figure during emergence of the European Renaissance. Ibn Rushd wrote a number of medical treatises. The most famous was "al-Kulliyat fi al-Tibb" (The General Principles of Medicine), known in the west as the "Colliget" or (Generalities in Medicine), which was a medical encyclopediawidely used in European universities.(Fig.10) Ibn Rushd showed interest in "Ibn Sina'sUrjuza fi 'I-tibb" (Poem on Medicine, Canticum de medicina), mentioned earlier, on which he wrote a commentary, "SharhUrjuzat Ibn Sina".[40,41]

Conclusion

Modern medicine is not purely the result of efforts of one civilization, but is the cumulative product of all cultures at all stages of history. Muslims, like other people have had their share in establishing its foundations, to alleviate the suffering of human beings.

Islamic medicine was not a passive conveyance of the Greek knowledge.The Muslim scholars preserved the knowledge and culture of the conquered lands. One thousand years ago, the Muslims were the great torchbearers of the international scientific research, and between the 9th to the 13th centuries, the Arabic language became the language of intellectual progress throughout the middle Ages. We hope that this review will be another call to all humanity-loving people to end prejudices against other people and to stop preconceived notions about of nations.

References

1- Masic I, Skrbo A, Naser N, Tandir S, Zunic L, Medjedovic S, Sukalo A. Contribution of Arabic Medicine and Pharmacy to the Development of Health Care Protection in Bosnia and Herzegovina - the First Part. Med Arch. 2017 ; 71(5): 364-372

2- Majeed A. How Islam changed medicine. Arab physicians and scholars laid the basis for medical practice in Europe.BMJ. 2005 Dec 24; 331(7531): 1486–1487

3- Hehmeyer I, Khan A. Islam's forgotten contributions to medical science. CMAJ. 2007 May 8; 176(10): 1467–1468.

4- Syed IB. Islamic Medicine 1000 years ahead of its time. JISHIM 2002,2: 2-9

5- Halilović S. Islamic Civilization in Spain - a Magnificent Example of Interaction and Unity of Religion and Science. PsychiatrDanub. 2017 Apr; 29 Suppl 1:64-72.

6- Falagas ME, Zarkadoulia EA, Samonis G Arab science in the golden age (750-1258 C.E.) and today. FASEB J. 2006 ;20(10):1581-6.

7- Ajlouni KM. Values, qualifications, ethics and legal standards in Arabic (Islamic) medicine. Saudi Med J. 2003 Aug;24(8):820-6.

8- Al-Bar MA, Chamsi-Pasha H. Contemporary Bioethics: Islamic Perspective. New York (NY): Springer; 2015. http://link.springer.com/book/10.1007/978-3-319-18428-9

9- Beauchamp TL, Childress JF. Principles of Biomedical Ethics. 7th ed. New York (NY): Oxford University Press; 2013.

10- Chamsi-Pasha H, Albar MA. Western and Islamic bioethics: How close is

11- the gap? Avicenna J Med. 2013 Jan; 3(1): 8-14

12- Chamsi-Pasha H, Albar MA. Islamic medical ethics a thousand years ago. Saudi Med J. 2013 Jul;34(7):673-5.

13- Masić I, Domres BD, Hadziahmetović Z, ToromanovićS.[Abu al-Qasim Az-Zahrawi--a great Arab surgeon] . Med Arh. 2000;54(3):187-8.

14- Edriss H, Rosales BN, Nugent C, Conrad C, Nugent K. Islamic Medicine in the Middle Ages. Am J Med Sci. 2017 Sep;354(3):223-229.

15- Zarshenas MM, Zargaran A, Mehdizadeh A, MohagheghzadehA.Mansur ibn Ilyas (1380-1422

AD):A Persian anatomist and his book of anatomy, T ashrih-i Mansuri. J Med Biogr. 2016 ;24(1):67-71.

16- Band IC, Reichel M. Al Rhazes and the Beginning of the End of Smallpox. JAMA Dermatol. 2017 May 1;153(5):420.

17- Tsoucalas G, Karamanou M, Laios K, Androutsos G. Rhazes' (864-925) views on cancer and the introduction of chemotherapy. J BUON. 2019; 24(2):868-871.

18- Hashempur MH, Hashempour MM, Mosavat SH, HeydariM. Rhazes-His Life and Contributions to the Field of Dermatology. JAMA Dermatol. 2017 Jan 1;153(1):70.

19- Lakhtakia R.A trio of exemplars of medieval Islamic medicine: Al-Razi, Avicenna and ibn Al-nafis. Sultan Qaboos Univ Med J. 2014 Nov;14(4):e455-9.

20- Khan MA, Raza F, Khan IA. Ibn Sina and the roots of the seven doctrines of preservation of health. Acta Med Hist Adriat. 2015;13 Suppl 2:87-102.

21- Zahabi SA. Avicenna's Approach to Health: A Reciprocal Interaction between Medicine and Islamic Philosophy. J Relig Health.2019 Oct;58(5):1698-1712.

22- Chamsi-Pasha MA, Chamsi-Pasha H. Avicenna's contribution to cardiology. Avicenna J Med. 2014 Jan;4(1):9-12.

23- Rabie El-Said Abdel-Halim. The role of Ibn Sina (Avicenna)'s medical poem in the transmission of medical knowledge to medieval Europe. Urol Ann. 2014 Jan-Mar; 6(1): 1–12.

24- ZargaranA , Borhani-Haghighi A, Faridi P, Daneshamouz S, Mohagheghzadeh A. A review on the management of migraine in the Avicenna's Canon of Medicine. Neurol Sci. 2016 Mar;37(3):471-8.

25- Taheri-Targhi S, Gjedde A, Araj-Khodaei M, Rikhtegar R, Parsian Z, Zarrintan S, Torbati M, Vafaee MS. Avicenna (980-1037 CE) and his Early Description and Classification of Dementia. J Alzheimers Dis. 2019 Sep 9

26- Behbahani FA, Dadmehr M, BahramiM.The importance of anatomy on viewpoint of Avicenna. Int J Cardiol. 2017 Nov 15;247:46.

27- Markatos K, Mavrogenis A, Brilakis E, Korres D, Karamanou M, ChronopoulosE.Abulcasis (936-1013): his work and contribution to orthopaedics. IntOrthop. 2019 Sep;43(9):2199-2203

28- ElgoharyMA.AlZahrawi: The Father of Modern Surgery. Annals of Pediatric Surgery, Vol 2, No 2, April 2006, PP 82-87

29- NabriIA.El Zahrawi (936-1013 AD), the father of operative surgery. Ann R Coll Surg Engl. 1983 Mar;65(2):132-4.

30- Golzari SE, Khan ZH, Ghabili K, Hosseinzadeh H, Soleimanpour H, Azarfarin R, Mahmoodpoor A, Aslanabadi , Ansarin K. Contributions of Medieval Islamic physicians to the history of tracheostomy. AnesthAnalg. 2013 May;116(5):1123-32.

31- Numan MT. Ibn Al Nafis: his seminal contributions to cardiology. PediatrCardiol. 2014 Oct;35(7):1088-90.

32- Loukas M, Lam R, Tubbs RS, Shoja MM, ApaydinN.Ibn al-Nafis (1210-1288): the first description of the pulmonary circulation. Am Surg. 2008 May;74(5):440-2.

33- MasicI.On occasion of 800th anniversary of birth of Ibn al-Nafis--discoverer of cardiac and pulmonary circulation. Med Arh. 2010;64(5):309-13.

34- Bestetti RB, Restini CB, Couto LB. Development of anatomophysiologic knowledge regarding the cardiovascular system: from Egyptians to Harvey. Arq Bras Cardiol. 2014 Dec;103(6):538-45

35- West JB. Ibn al-Nafis, the pulmonary circulation, and the Islamic Golden Age.JAppl Physiol. 2008 Dec; 105(6): 1877–1880.

36- Abdel-Halim RE. Contributions of Ibn Al-Nafis (1210-1288 AD) to the progress of medicine and urology. A study and translations from his medical works. Saudi Med J. 2008 Jan;29(1):13-22

37- Abdel-Halim RE. Contributions of Ibn Zuhr (Avenzoar) to the progress of surgery: a study and

translations from his book Al-Taisir. Saudi Med J 2005 Sep;26(9):1333-9.

38- Karamanou M1, Tsoucalas G, Saridaki Z, Iavazzo C, Androutsos G.

39- Avenzoar's (1091-1162) clinical description of cancer. J BUON. 2015 Jul-

40- Aug;20(4):1171-4.

41- Aciduman A, İlgili Ö, Aşkit Ç, TuzcuK.Did Ibn Zuhr (Avenzoar) postulate before Vesalius that liquid collects in ventricles in the Hydrocephalus? World Neurosurg. 2019 Mar;123:363-370

42- Azar H. The Sage of Seville: Ibn Zuhr, His Time, and His Medical Legacy.2008. Cairo: American University in Cairo.

43- Delgado F.The neurosciences in Averroes principles of medicine. Ann Saudi Med. 2012 May-Jun;32(3):327-31

44- Tbakhi A, Amr SS. Ibn Rushd (Averroës): Prince of Science. Ann Saudi Med. 2008 Mar-Apr;28(2):145-7.

The Figures

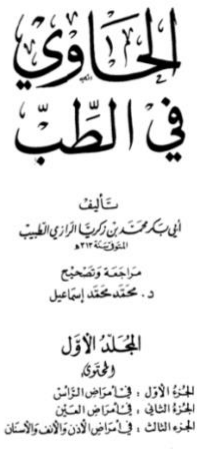


Fig.1 Kitab al Hawi (The Comprehensive book on Medicine) by al-Razi

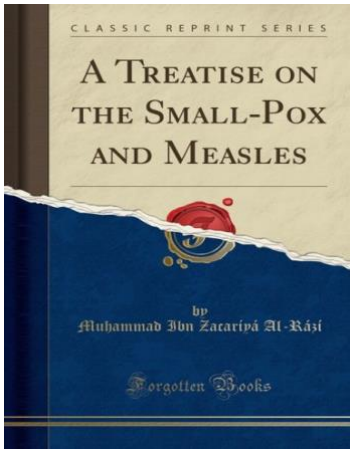


Fig.2 A Treatise on the Small-Pox and Measles by al-Razi

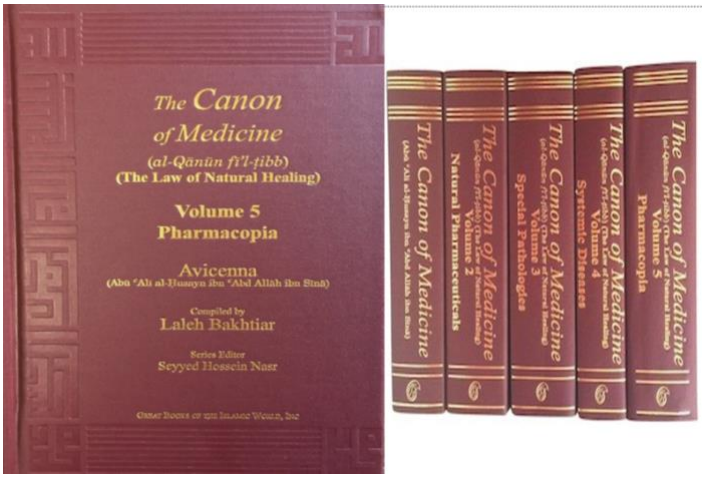
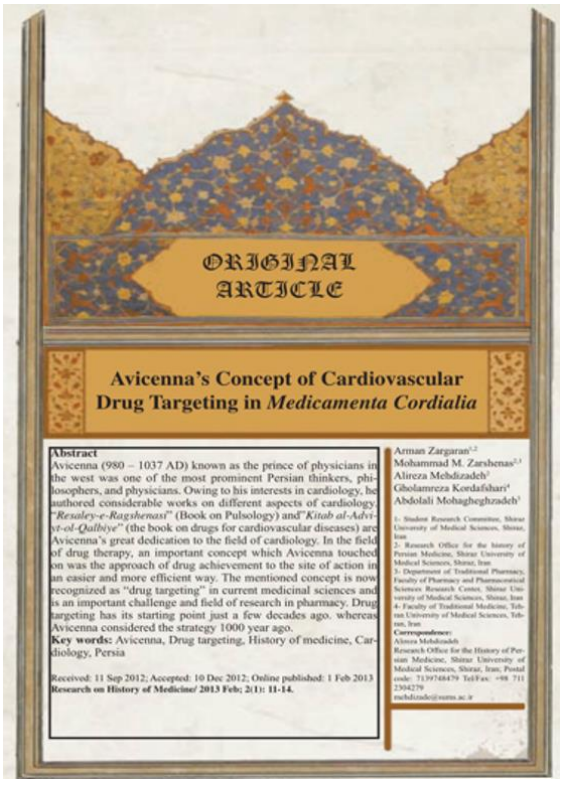


Fig.3 The Canon of Medicine by Avicenna

Fig.4 Avicenna poem on Medicine



ORIGINAL ARTICLE

Avicenna's Concept of Cardiovascular Drug Targeting in *Medicamenta Cordialia*

Abstract

Avicenna (980 – 1037 AD) known as the prince of physicians in the west was one of the most prominent Persian thinkers, philosophers, and physicians. Owing to his interests in cardiology, he authored considerable works on different aspects of cardiology. "*Resaley-e-Ragshenasi*" (Book on Pulsology) and "*Kitab al-Adviyt-ol-Qalbiye*" (the book on drugs for cardiovascular diseases) are Avicenna's great dedication to the field of cardiology. In the field of drug therapy, an important concept which Avicenna touched on was the approach of drug achievement to the site of action in an easier and more efficient way. The mentioned concept is now recognized as "drug targeting" in current medicinal sciences and is an important challenge and field of research in pharmacy. Drug targeting has its starting point just a few decades ago. whereas Avicenna considered the strategy 1000 year ago.

Key words: Avicenna, Drug targeting, History of medicine, Cardiology, Persia

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Arman Zargaran[1,2]
Mohammad M. Zarshenas[2,3]
Alireza Mehdizadeh[2]
Gholamreza Kordafshari[4]
Abdolali Mohagheghzadeh[3]

1- Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran
2- Research Office for the history of Persian Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
3- Department of Traditional Pharmacy, Faculty of Pharmacy and Pharmaceutical Sciences Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
4- Faculty of Traditional Medicine, Tehran University of Medical Sciences, Tehran, Iran

Correspondence:
Alireza Mehdizadeh
Research Office for the History of Persian Medicine, Shiraz University of Medical Sciences, Shiraz, Iran; Postal code: 7139748479 Tel/Fax: +98 711 2304279
mehdizade@sums.ac.ir

Fig.5 The treatise on cardiac drugs by Avicenna

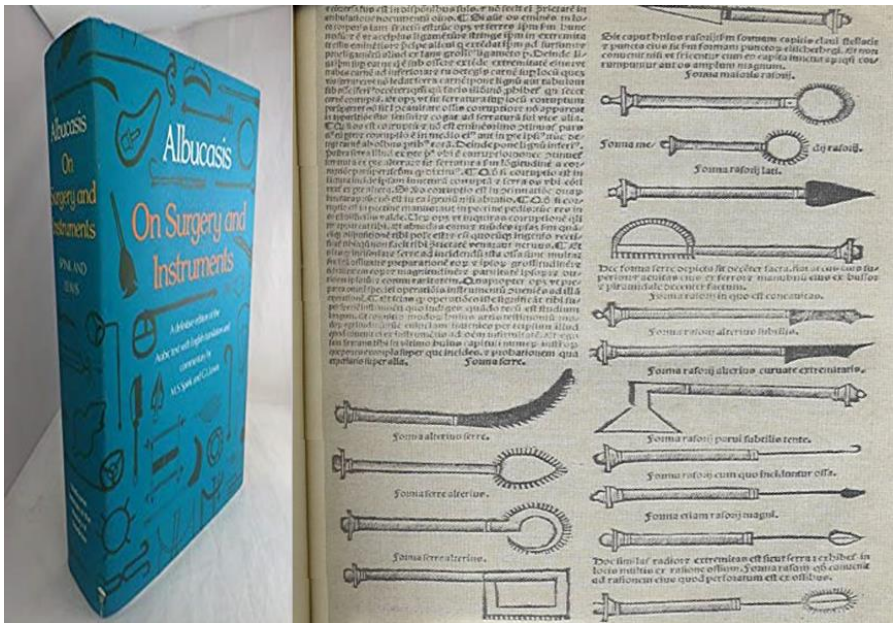

Fig.6 Surgical instrumentsdescribed by Al-Zahrawi

Fig.7 Vaginal speculum described by Al-Zahrawi

Fig.9 Al-Taysīr book by Ibn-Zuhr (Avenzoar)

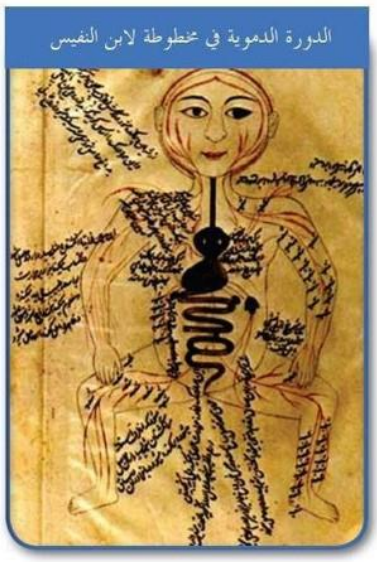

Fig.8 Pulmonary circulation described by Ibn al-Nafis

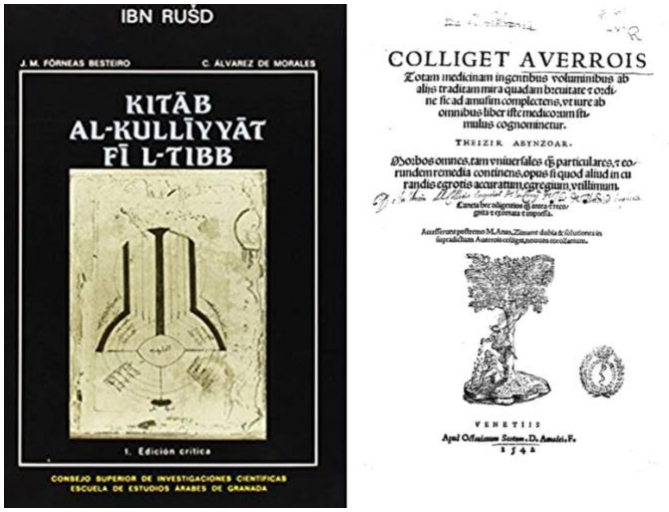

Fig.10 The Colliget book by Ibn Rushd (Averroes)