



JĀLINUS

JĀLINUS (Galen), the Arabic form of Greek Galenos, the name of the illustrious authority on medicine of ancient Greece, a physician, pharmacologist, anatomist, philosopher, physiologist, surgeon, and author of a good number of medical works. His fame grew in the following centuries and he became the most influential figure in the development of medical sciences in the Islamic world. He was born, in August or September 129 C.E., in Pergamon, a thriving city in northwestern Asia Minor. Until the age of fourteen, Galen studied literature, grammar, arithmetic, geometry, and rudiments of philosophy with his father, a rich and cultivated man. At the age of fifteen, he was sent to study the four main philosophical schools of the time with four masters, a Platonist, an Aristotelian, a Stoic, and an Epicurean (Sarton, p. 16). While pursuing his philosophical study, Galen began learning medicine at the age of sixteen, following his father's dream in which Asclepius, god of healing, had told him that he should guide the boy to the study of medicine (for Galen's biography see Wissowa, Kroll, and Mittlehaus, VII/1, cols. 578-91, tr., V, pp. 651-63; Nutton, 2004, pp. 216 ff.; Sarton, p. 16; Nuland, pp. 31 ff.).

In 151 C.E., after his preliminary medical studies in Pergamon, Galen went to Smyrna, where he stayed one year attending, among others, the anatomy lectures of Satyrus and visiting his clinics; from him Galen learned also surgery and internal medicine (Sarton, p. 40). Satyrus' lectures induced Galen to pursue his anatomical studies further, so he went to Corinth to attend the course of another anatomy master, Numisianus, according to some Greek traditions, Numisianus had just died (Boudon-Millot, 2007, p. xxxv; Nutton,



1987, pp. 235-39; Garcia-Ballester, chap. I, p. 16). Towards the end of 152 C.E., Galen reached Alexandria, which was famous for its tradition of human and animal dissection. Galen, later in his career, advised his students to go to Alexandria to observe a human skeleton (Kühn, II, pp. 220-22, cited in Vegetti, 1995, p. 77), as only in Alexandria were human bones still used for demonstration by the teachers of anatomy, while elsewhere any systematic dissection of human cadavers had ceased since the second part of the 3rd century B.C.E. (Temkin, pp. 3-4; Guerrini, p. 13).

Galen returned to Pergamon in 158; by then, he had, for about twelve years, studied mainly anatomy and written several books on the subject. In summer 161, Galen went to Rome, the capital of the empire, a city of a million inhabitants and several thousands of physicians of different persuasions. His public dissection of animals attracted a large audience and consequently aroused the hostility of many established physicians who saw in him a rival as well as an opponent to their methods and ideas. These incessant hostilities first brought an end to his public anatomical demonstrations and finally prompted his departure from Rome in summer 166 to Sicily and from there to Pergamon (Nutton, 2004, p. 224; Nutton, 1972; Wissowa, Kroll, and Mittlehaus, col. 580, tr., V, pp. 653-61). Galen stayed in Pergamon for about two years before being summoned in 168, by Emperor Marcus Aurelius (r. 161-80), to accompany him and his army in a campaign against the invasion of Germanic tribes. From this period onward, Galen served as one of the court physicians in Rome and took up residence there to the end of his life. There is no clear mention of the date of his death but, in his recent study on Galen, Vivian Nutton sets his death at about 216 (Nutton, 2004, p. 226). Neither is there any definite indication of the place where he was buried. According to an Islamic tradition, he was buried in Farmā in Egypt (Eṣṭakri, p. 53; Ebn Ḥawqal, p. 105, tr. p. 158), while other traditions hold that he was buried in Sicily or in Jerusalem. It is more likely, however, that he was buried in Rome, where in all probability he died (Boudon-Millot, pp. lxxv-lxxvii).

Galen and Hippocratic medicine. Throughout the Hellenistic period various medical approaches developed including Hippocratic medicine (On Hippocrates [q.v.] and Hippocratic medicine, see Jouanna, 1992 and 1995). During the first four years of his medical studies, Galen attended the courses of almost all of the then-active medical schools (or rather approaches), the Dogmatic, Empiric, Methodic, and the Pneumatic in Pergamon. It seems, however, that from the time he was studying at Pergamon, he was more



influenced by the Dogmatics, who, while following principles of the Hippocratic teachings, believed that the mere observation of the exterior of the body was not sufficient and a knowledge of anatomy was critical to medical practice (Guerrini, p. 7). Although Galen criticized the Empirics, believing that knowledge of inner structures and functions was essential to successful medical practice (Guerrini, pp. 13-14), he combined the two approaches of dogmatism and scientific experimentation, a method that was followed by Islamic physicians (Ebn Rezwān, p. 21).

Works. Galen began writing from when he was a teenager (Sarton, p. 14) until nearly the end of his life. His surviving works include more than 120 titles, published in 22 hefty octavo volumes, by Carolus Gottlob Kühn in the original Greek with accompanying Latin translation. Ḥonayn b. Eshāq (d. ca. 873) provides details about 129 works of Galen that he and his collaborators translated from Greek into Syriac and/or Arabic (Savage-Smith and Pormann, p. 25). Donald Campbell (II, pp. 13-220) records 272 titles of Galen, including those that have been lost. None of these figures, however, represent the entirety of Galen's work, neither does the list provided by Galen himself, since, as noted by Ḥonayn b. Eshāq, some of them Galen had lost already (Ḥonayn b. Eshāq, apud Véronique Boudon, 2002, pp. 10-11; Galen, 2007b, pp. 134-73). Galen's works became known to the Medieval Islamic world mainly through the reliable translations of Ḥonayn b. Eshāq and his followers, such as his own son Eshāq b. Ḥonayn (d. 910) and Tābet b. Qorra (d. 901; see Sezgin, pp. 247-56, 260-63, 268-69). In the interest of clarity and readability, Ḥonayn intended his translations to be idiomatic rather than literal, at times achieving greater lucidity than Galen himself, but at the cost of occasional errors (Savage-Smith and Pormann, pp. 30 ff.; Montgomery, p. 119). The content of Galen's lost works can also be seen in the works of later physicians, such as Moḥammad b. Zakariyā' Rāzi who in his *Šokuk 'alā Jālinus* quotes Galen literally, or Ebn Sinā (Avicenna, q.v.), who in his *al-Qānun fi'l-ṭebb* (the *Canon*) paraphrases him without specifying from which book of Galen (Strohmaier, 1981, pp. 191-92). We might also find works that are wrongly attributed to Galen, for instance, the *Ṭāle'-nāma-ye Jālinus*, which obviously belongs to the genre of commentary in which Galen's ideas are presented through the prism of Islamic or folk astrology. In Iran, the number of those who knew Arabic varied depending on region and period and education, but, generally speaking, it was small and Arabic medical texts, including those of Galen, were more accessible in commentaries written in Persian (Elgood, 1970, p. 18).



The translations of Galen's works were made from both Galen's original texts and from the summaries and commentaries used at the school of Alexandria in late antiquity. According to Šams-al-Din Moḥammad Šahrazuri (fl. 7th/13th cent.), "from nearly 400 small and large tracts of Galen, [a summary made in] sixteen volumes were [the most] read by medical students" (p. 332). Šahrazuri's reference here is evidently to the so-called sixteen books (*setta 'ašara*) of Jālinus, which 'Onšor-al-Ma'āli Kay-kāvus b. Eskandar and Nežāmi 'Aruzi recommended to medical students (Ebn al-Nadim, pp. 348-50; Ebn Qeḏḏi, p. 123; Kaykāvus b. Eskandar, pp. 179-81; Nežāmi 'Aruzi, text, p. 110, comm., p. 384). These sixteen books are sometimes mistaken for another set of text books based on Galen's works, called *Jawāme' al-Eskandarāniyin* or *Summaria Alexandrinorum* (for this book, see Sezgin, pp. 140-50). According to Savage-Smith (2002, pp. 126-27, 131, 138), these sixteen books were written by Galen himself for "the beginners" while, according to Ebn al-Qeḏḏi, the so-called *Jawāme' al-Eskandarāniyin* were the abridged versions of the works of Galen, made by four leading physicians (*'omdat al-aṭebbā*) of Alexandria who also compiled commentaries (Ebn al-Qeḏḏi, pp. 71-72, tr. p. 97; Savage-Smith and Pormann, 2007, p. 13; Sezgin, p. 143). Manfred Ullmann maintains that the prolixity and partial contradictions in the original Galen's works led the Islamic physicians to have recourse rather to their summarised or coherent translation (Ullmann, p. 10). It seems, however, that, as far as the *Jawāme'-e Eskandarāniyin* is concerned, its significance for the Islamic physicians was more fundamentally related to the importance of both Alexandrian medicine and Aristotelian philosophy in Islam.

Galen's influence on Persian medicine. Galen's long-lasting influence on Persian medicine is linked to the wider impact of Greek sciences in both pre-Islamic and Islamic periods in Iran. In pre-Islamic Iran, this was partly due to the introduction, or formation, of Hellenistic culture in the aftermath of the conquest of Iran by Alexander of Macedonia (q.v.) in 333 B.C.E., and partly to the translation of Greek sciences into Middle Persian under the Sasanians. The mention of the four humors (*āb*) – blood (*xōn*), phlegm (*drēm*), red bile (*wiš ī suxr*), and black bile (*wiš ī syā*) – by the 9th-century author, Zātspram, echoes Greek humoral physiology and may be indicative of Greek influence on Sasanian medicine (Savage-Smith and Pormann, p. 17). According to some scholars, the statement in the 9th-century Middle Persian text of *Dēnkard* (q.v.), which refers to Greek sciences as parts of the Zoroastrian canon, is an indication of the pre-Islamic origin of Greek influence in Iran (Gutas, p. 1998). The medical literature in Iran in the Islamic period, however, was a largely



different development. A possible continuation of an Iranian tradition in medical writings without passing through Arabic texts in this period remains to be ascertained (Richter-Bernburg, 1999, p. 142).

The question of why the Muslims assimilated Greek sciences and in particular Greek medicine continues to be an outstanding topic of historical research. It is often held that Greek sciences were transmitted to Islam through the Sasanian channel insofar as the 'Abbasid Caliphate inherited the Sasanian state apparatus and its scientific legacy (Ebn Reżwān, tr., pp. 5-8), deemed to be largely based on Greek science. This transmission, according to Dimitri Gutas, was structurally framed in what he called the "imperial ideology" that the 'Abbasid Caliphate borrowed from the Sasanians for the establishment of their own empire (Gutas, pp. 40-45). It should be noted, however, that the Sasanians were highly eclectic in acquiring foreign sciences, and that the Indian sciences, for instance, were no less introduced than the Greek sciences (Ebrahimnejad, 2004, pp. 19 ff.; Montgomery, pp. 79-80). The transmission of Greek medicine into Islam was an entirely Islamic phenomenon, and, despite Ullmann's assumption that "complete Greek medical works were translated into Pahlavi under Khorsrow I" (Ullmann, pp. 17-18), this was certainly not the major conduit of the introduction of Greek medicine into Iran in the Islamic period. Its predominance in Islam seems to stem primarily from the fact that the integration of Greek sciences was part of the ideological and intellectual process in the course of the development of Islamic sciences (Ebrahimnejad, 2005).

The origin of the integration of Greek medicine in Iran after Islam should also be sought in the regions that had undergone hellenization since their conquest by Alexander of Macedonia before being conquered by Islam. It seems that the conquest of Egypt in the first decades of the Islamic expansion constituted the first major step in the integration of Galenic medicine into Islamic sciences, as Alexandria was by that time not only the cultural center of Hellenism (Garcia-Ballester, I, p. 17) but also the place where Galenism had become the predominant medical system. The fact that the region where Islamic medicine was first developed had already inherited a selective portion of Hellenistic sciences — Aristotle and Plato in philosophy and Hippocratic medicine at the expense of theoretical developments of other schools (Nutton, 2004, p. 140) — might explain why from a range of philosophical and medical schools of the Hellenistic period, Aristotelian, and then Neoplatonic, philosophy and Galenic medicine became predominant in the Islamic world. Already, by the middle of



the 4th century C.E., Galen's medicine had become completely dominant in the east of the Hellenistic world (Temkin, p. 61).

For Galen, philosophy and syllogistic reasoning were fundamental in medicine. His maxim that a good physician is a philosopher (Daremberg, in Galen, 1854, I, pp. 1-7), is reminiscent of the internal debates between "philosophical medicine" and medicine *tout court* during the pre-Hellenistic Hippocratic medicine (Jouanna, 1995, pp. 49-51). But more fundamentally, by accentuating the importance of philosophy, Galen represented the epistemological shift that occurred during the Hellenistic period, principally during the 3rd century B.C.E., under Aristotle's influence; a shift from the Hippocratic tradition that was centered on the "problem of illness and clinic" and therefore prone to "approximation and empiricism" to a medicine that dealt also with the state of health and was thus eager to penetrate the opacity of the body by anatomy and dissection (Vegetti, pp. 68-71, 78). Aristotelian anatomy had, for theoretical background, teleological approach that established relation between structure of the organs and their normal function, explaining each organ in terms of its purpose. Galen borrowed this approach and advocated it in his *De usu partium* or *Manāfe' al-a'zā'* and his other works (Sarton, p. 70; Temkin, pp. 41-42; Galen, 1854). It was this approach that was transmitted through translations of Galen's works to Islamic physicians. Several physicians, including Ebn Sinā, wrote treatises entitled *Manāfe' al-a'zā'*, emulating Galen's book (see the short treatise of Ebn Sinā, Arabic manuscript, Majles Library, Tehran, Ms No 14, pp. 27-36; Sezgin, pp. 106-8).

Anatomy was the foundation of Galen's physiopathology and it was this Aristotelian heritage, developed later on by Herophilus (ca. 320 to ca. 260 B.C.E.) and his contemporary Erasistratus (fl. ca. 260 B.C.E.) that revolutionized Hippocratic medicine, which was transmitted through Galen to Islamic medicine. The teleological approach of Aristotle was not only rooted in his philosophy but also resulted from the technical necessity of filling the gap that was created when zoological anatomy, practised by Aristotle, was to be used to explain organs and their functions in the human body. But the incapacity of the followers of Herophilus and Erasistratus to solve the other problem that resulted from Aristotle's influence, namely the lack of theoretical connection, or continuity, between anatomophysiology and clinical therapeutic, led to the abandonment of anatomy based on observation and dissection and a return to (the commentary of) Hippocratic texts (Vegetti, pp.



83-84).

It should be noted that the use of the terms *mošāhada* (observation) and *qiās* (analogical/syllogistic reasoning) in medicine were based on Greek concepts but, due to both philological problem coming from translation and epistemological and experimental gap between Islamic anatomists and Galen, to some extent they differed from Greek concepts. Galen insisted on dissection and anatomical experience, but they were exclusively carried out on animals (mainly apes, pigs, sheep, and goats) and not on human cadavers, as Roman authorities forbade human dissections and vivisections (Grant, p. 85). As a result, Galen's description of human anatomy was based on analogical reasoning. It is, however, safe to suggest that, unlike Galen, for whom observation meant both physically and theoretically observable practice, for Islamic anatomists, *qiās* (syllogistic reasoning) was predominantly at work, even in an original development such as Ebn al-Nafis' discovery of pulmonary transit of blood (Şafā, III, p. 275; Savage-Smith, p. 1995; for a detailed discussion, see Savage-Smith and Pormann, pp. 46-48).

Galen always recommended physicians to see nature by carrying out individual dissection rather than accepting the ideas and writings of their predecessors or contemporaries. Almost all of Galen's principles and rationale for the necessity of anatomy and dissection were accepted and underlined by Persian physicians. Abu'l-Majd Ṭabib Bayzāwi (writing before 1056/1646) in the introduction to his book on anatomy (*tašriḥ*), sets two reasons why anatomy is important: First, because by knowing the human body one realizes the power of God; and second, if a physician knows about description of the human body, he would avoid mistakes when providing cure and medication. Bayzāwi in fact repeats here exactly the two reasons put forward by Galen for the necessity of anatomy, but he does not give any indication as to how a physician should proceed to acquire anatomical knowledge or surgical skill and, unlike Galen, does not refer to any dissections that he might have undertaken (Bayzāwi, fols. 1-2).

ʿAbd-al-Razzāq, in his *Kolāṣat al-tašriḥ*, underlines the priority of anatomy in medicine by stating that without this knowledge a physician cannot accurately carry out his practice, but, just like Bayzāwi, his source is not his own anatomical experience but the writings of Ebn Sinā, ʿAli b. ʿAbbās Majusi (d. ca. 994, q.v.), Ebn al-Nafis Qoraši (d. 1288), etc. (ʿAbd-al-Razzāq, fol. 3). Likewise, Aḳawayni (4th/10th century, q.v.) states that the number of mussels were observed by Galen and that he did not [need to] proceed himself to observe



them (p. 60). Almost all anatomical texts by Persian physicians are compilation from other books and do not reflect any practice of anatomy and surgery (e.g., ‘Aqili, p. 31).

While theoretical exercise in Hellenistic medicine was grounded on anatomical observation, which after a period of abandonment from the second part of the 3rd century B.C.E. was taken up by Galen in the 2nd century C.E., in Islamic medicine, anatomy-based theoretical innovation practically did not occur. This may explain why ‘Abd-al-Razzāq, just as Ebn Elyās (q.v.), accepted the incorrect theories of Galen and Ebn Sinā rather than the correct one of Ebn al-Nafis on blood circulation (‘Abd-al-Razzāq, fol. 51; Elgood, 1966, p. 336; idem, 1970, p. 136). Lack of anatomical observation led outstanding physicians, such as Bahā’-al-Dawla Nurbakṣī (d. 1508-9) and ‘Emād-al-Din Maḥmud Širāzi (physician of Shah ‘Abbās I), to continue repeating, following Ebn Sinā, the millenary theory according to which the arteries carried blood and the soul (*ruh*; Ebn Sinā, tr., IV, p. 5; ‘Emād-al-Din fol. 1; Bahā’-al-Dawla, fol. 35). The hiatus between medicine and/or anatomy on the one hand, and philosophy, on the other, finds an expression in Rāzi’s *Šokuk ‘alā Jālinus*, where Rāzi, who is known for his clinical/experimental approach, addressed and criticized Galen’s thought from philosophical dimension and not from medical viewpoint (Moḥaqqueq, p. 53).

The fact that Galen was the most respected medical reference in Iran did not prevent the development of a gap between Galen’s ideas, on the one hand, and the application or perception of these ideas, on the other. This might explain the fact that, although Galen was more referred to in Iran than Hippocrates was, Hippocratic bedside medicine was favored at the expense of practical anatomy and surgery, which were fundamental for Galenic physiology. Bahā’-al-Dawla Nurbakṣī (died in 1508-09; see Richter-Bernburg, 1978, p. 64), for instance, did not practice surgery but advised calling in a surgeon for a surgical case (Elgood, 1970, p. xiv.). This was in conformity with Hippocratic Oath that advised physicians not to undertake incision and to confer such practice to specialists.

It seems that Islamic anatomists, despite the Aristotelian influence, never grasped the epistemological link between animal dissection and medical knowledge. Often lack of dissection in Islam is attributed to religious prohibition, but this prohibition has always been a matter of interpretation rather than based on a formal and legal ban. Galen did not proceed to human dissection either, no matter what was the rationale behind such avoidance.



The fundamental difference between Galen and his Islamic followers resided, however, in the fact that the former widely practiced animal dissection and the latter did not. The reason seems to be that not only Muslim anatomists in general based their anatomical knowledge on text rather than on experience, but more importantly, unlike Galen who, given his pagan culture, or his attachment to Aristotle's anatomy, established a biological affinity between animal and human structure and extrapolated the function of human body from his research on animal cadavers, the Islamic anatomists never believed in any affinity between animals on the one hand and the human body, on the other, which they considered as the noblest creature of God.

In the matter of humoral theory too, Galen's influence was represented with speculative repetition or, in a few cases, reinterpretation or misinterpretation. The theory of humors that goes beyond Hippocrates took its final shape in Galen's works (Sarton, pp. 52-54). Just as in anatomy, Galenic humoral theory was influenced by Aristotelian philosophy (Nutton, 2004, p. 145). Galen conceived of things as composed of the four elements of fire, air, earth, and water that are formed by the union of matter and the four qualities of hot, cold, dry, and moist. These elements are not found as such in the body but represented by the four humors respectively, blood, phlegm, black bile, and yellow bile (*kun*, *balġam*, *sawdā'*, and *ṣafrā'*). These humors are produced by the process of digestion of food and drink and only air enters the body through respiration. What is found in the vein is in fact a mixture of the four humors and not only blood (Temkin, p. 17). The balance between the quantities or qualities of the humors maintains health and their imbalance caused disease (see HUMORALISM).

According to Galen, there are nine types of temperaments: One ideal, in which all qualities are balanced; four, in which one of the qualities, hot, cold, dry or moist predominates; and four others, in which the predominating qualities appear in couples of hot and moist, hot and dry, cold and moist, cold and dry. Following Galen, Persian physicians believed in nine types of nature (*mezāj*). The absolute balanced nature (*mezāj-e mo'tadel-e ḥaqiqi*), in which all humors are equal in quantity and quality, does not exist in ordinary people. In reality, however, natures are twofold, *baṣiṭa* (simple) and *morakabba* (compound). Simple natures are four: hot, cold, moist, and dry. The compound natures are also four: hot and dry, cold and dry, hot and moist, cold and moist (Bahā'-al-Dawla, fol. 2a; Solṭān-'Alī Ṭabib fol. 13; Kaykāvus b. Eskandar, pp. 175-76; Temkin, p. 19). For both Galen and Persian physicians, the balanced-



temperament was a point of reference to diagnose illness but, while for the former balanced temperament could be found in ordinary people, for the latter, it was the characteristic of the saint Imams (Bahā'-al-Dawla, fol. 2a).

Humoral theory permeated also folk medicine and Galen's influence is clearly discernable in manuals of popular medicine. In the anonymous *Ḳawāṣṣ al-ašyā'*, (written in or before the 17th cent.), a short treatise on the medicinal properties of objects, animals, and various parts of animal and human bodies, references are also made to Galen's idea about humoral qualities of the substances discussed (St. Petersburg MS, fols. 4, 12, 13, 36). A mixture of natural properties and magical powers of drugs is mentioned in Pliny's work (1st cent. C.E.), indicating that the origin of this influence predates Galen (Keyser, p. 179)

Quite similar to the Roman Empire, where the compilation, summaries and commentaries on Galen's works dominated medical literature (on the analogous social and intellectual context between Byzantine and the Medieval Islamic world see Strohmaier, 1995, pp. 124-25; Ullmann, p. 22), in Iran compilation rather than creation characterized medical literature. Commentary became the dominant form of medical literature, especially after Ebn Sinā, on whose *Canon* several commentaries were written (Elgood, 1951, pp. 336-37, 375; Elgood, 1970, p. 77; Ṣafā, III, pp. 274-77). Some commentaries were written in order to make the original text more readable, while others were instigated by spirit of criticism.

Occurrences of new ideas within the framework of humoral theories were rather exceptions to the predominating exercise of compilation and respect for tradition. The common presumption dividing Islamic medicine into two periods of Golden Age and stagnation appears to be mistaken insofar as "relative independence from transmitted learning or textual authorities" (Richter-Bernburg, 1994, pp. 387-88) did not end with Rāzi and Ebn al-Nafis. For instance, one finds this independence in Bahā'-al-Dawla Nurbakṣi, who gave the first description of whooping cough (Elgood, 1970, pp. xii, xiv) and in Mirzā Qāzi b. Kāṣef-al-Din Moḥammad Yazdi (d. in c.a. 1664-65), who, refuting 'Emād-al-Din Maḥmud's idea that the chinaroot was hot, contended first, that the chinaroot was cold, and second, that it was not the quality of hot or cold in the drugs that operated but another property that had nothing to do with hot and cold. He also refuted the dominant Galenic theory, according to which every disease should be cured by its opposite. As proof, he mentions the curing effect of *teryāq-e fāruq* that is hot but is good for typhus (*ḥaṣba-ye siāh*) that is



also hot (Mirzā Qāzi Yazdi, fol. 2). Thus, by objecting the idea of ‘Emād-al-Din Maḥ-mud about chinaroot, Mirzā Qāzi seems to be suggesting a new concept, if not a new reading, of humoral pathology that obviously differed from that of the Galenic hot-cold paradigm, for he maintained that each drug had its own quality made of a specific composition of different properties (*morakkab al-qowā*).

The two trends, one guided by the spirit of criticism and research and the other characterized by respect of tradition and authority, continued rather side by side. Despite criticisms, however, the humoral paradigm was never called into question until Šāleḥ b. Naṣr-Allāh Ḥalabi (d. 1670-71), called Ebn Sallum, the physician at the court of the Ottoman ruler, Sultan Moḥammad IV (r. 1648-87), introduced the Paracelsian notion of iatrochemistry (chemical medicine) into Islamic medical literature and developed pathology not based on Galen’s humoral theory but on three basic substances, salt, mercury, and sulphur (Ullmann, p. 50; Savage-Smith, 1987). The first Persian translation of Paracelsian medicine was made by Zayn-al-‘Ābedin Mašhadi Ṭabāṭabā’i in the second part of the 18th century from the Arabic translation of the work of Oswald Croll by Ebn Sallum. Several other Persian translations of Paracelsian medicine were made in the first part of the 19th century, including the *Kimiā-ye bāsāliqā* made from the Arabic text of Ebn Sallum (1225/1810), and the *Kimiā-ye šefā* translated by Moḥammad-‘Ali Širvāni from a Turkish text (1252/1836; see Richter-Bernburg, pp. 167-71).

The preference of Islamic medicine for Aristotelian universals to the detriment of Galenic experimental medicine played an enduring role in the way that medicine developed in Iran in the Islamic period until the sweeping waves of modernization in the 19th century, and the pressure of the increasing number of soldiers injured by gunshot, emphasized the importance of surgery and anatomy in medicine. An army physician of traditional education in mid-19th-century Iran, advocating the improvement of surgical skills, criticized Hippocrates for downgrading the importance of surgery in medicine (*Dar koṣuṣ-e ta’sis*, apud Ebrahimnejad, 2004, pp. 227-28). Significantly, he did not blame Galen, who not only, based his medical knowledge on *tašriḥ* (dissection/anatomy) but also practiced surgery in military campaigns (Ebn al-Qeṭṭi, tr., p. 172) and took care of the gladiators in Pergamon by cleaning and stitching their wounds (Sarton, p. 20; Nutton, 2004, p. 223).

See also [GREECE x. GREEK MEDICINE IN PERSIA](#).



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