

History of Ancient Medicine

The Influence of Gondeshapur Medicine during the Sassanid Dynasty and the Early Islamic Period

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The development of the most active period of Persian medicine occurred in the ancient city of Gondeshapur, between the third and seventh centuries. Rebuilt between 256 and 260 by Shapur I, the second Sassanid monarch, Gondeshapur is said to have welcomed the first hospital and the consequent study of medicine, mainly based on the Greek system. It has also been mentioned that these teachings would be expanded by his successor, Shapur II. However, both statements need solid confirmation. Nestorian priests-professors and other academics expelled from the Byzantine Empire gave fundamental encouragement to cultural and medical development in Gondeshapur. With Khosrow I, Gondeshapur became a cosmopolitan city with studies of medicine, philosophy, eloquence, and music. The medical studies were conducted in an academic setting, and practiced in a hospital, with the documentary support of a library which would be provided with the main texts, mainly of Greek, Syrian, and Indian origin. The Byzantine-inspired hospital system of Gondeshapur with its own management, organic system, and differentiated personnel, was later reproduced in several cities of the Middle East and medieval Europe under Islamic rule. The academic prestige and functionality of Gondeshapur, which peaked in the seventh century, began to decline in the following centuries apparently due to the creation of similar intellectual and hospital centres in Baghdad, by the Caliph al-Mansur, and the subsequent transfer of doctors, technicians, professors and other personnel from Gondeshapur, to ensure there the operation of hospitals and also medical studies. This cultural policy was continued and expanded by al-Mansur successors, in particular by the Caliph al-Ma'mun, until the tenth century.

Keywords: Ancient Persia, Early Islamic Period, Gondeshapur, Medical studies and practice, Nestorian influence

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Introduction

Clarifying the methodology used in antiquity for teaching and practicing medicine has been a difficult task. In ancient Persia, similar to contemporary societies, medicine was based on a mixture of rational knowledge, magical and religious procedures. However, with the founding of a hospital school and an academy in the city of Gondeshapur (in Middle Persian *Gondēšāpūr* or *Gundēšāpūr*) during the Sassanid dynasty, innovative processes of school education and medical performance were consolidated and reached their peak from the 8th century onwards. This type of training was essentially based on knowledge and philosophical thinking of Greek origin, representing a prototype for the initial period of apprenticeship of medicine in the Islamic world and subsequent extension into Medieval Europe.

Origins and Evolution of Gondeshapur

The city of Gondeshapur was located in south-western Persia, near the modern city of Ahwaz, in the province of Khuzestan. Gondeshapur was rebuilt in ca. 260, in the reign of the second monarch of the Sassanid dynasty, Shapur I (c.241-272),^{1,2} apparently on the site of an

old Parthian fortress³ and where, previously, would have existed an Aryan prehistoric settlement known as *Genta Shapira* ("Beautiful Garden").⁴

The reconstruction/re-foundation of Gondeshapur, given the original name in New Persian of *Bih-az-Andiyu Sabur* ("the Saber's city which is better than Antioch"),^{1,2,5} also called *Bet-Lapat* in Classical Syriac, would have been destined to commemorate the conquest of the city of Antioch from the Romans, and perhaps also the imprisonment of the Roman Emperor Valerian III, and all of his army and entourage of 70,000 men.⁶⁻⁹ Here in Gondeshapur, Valerian became ill and died,^{2,7} and Mani, prophet, and founder of the new religious movement (*Manichaeism*), was executed in 276, under the fifth Sasanian king, Bahram II.^{7,10}

Roman legionnaires imprisoned in the wars of 256 and 260 were settled and used in the construction of Gondeshapur,^{2,5,10} according to its architectural structure, comparable to a Roman fort.^{9,11} The city was initially populated by a large number of captives, prisoners of war of many peoples and deportees from the Roman territories, in particular from Syria.^{10,12} The tactic of Shapur I, on employing Roman soldiers and, among them, architects,

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engineers and technicians in the construction of cities, palaces, bridges, dams, roads and other structures,⁹ was followed by Shapur II (the 10th Persian monarch and the one who had the longest reign from his birth in 309 until his death in 379) and Khosrow I (twenty-second Sasanian king, from 531 to 579).¹³ It is also worth highlighting that, under Shapur I and, also, Shapur II and Khosrow I, Roman captives, especially the more learned men, artisans, and skilled workers, contributed to the development of Persia's urbanization, economy and new industries.^{1,13}

The decision of Shapur I to disperse the war captives among several Persian cities, in parallel with his tolerance policy towards religious minorities in the empire,⁸ might explain the spread and strife of the Christianity community throughout Persian territory, predominantly in Khuzestan, despite the position of Zoroastrianism as the Sasanian "state religion".^{2,7} Later on, building monasteries and churches, and led by priests also deported from Antioch, the Christians would scatter throughout most of the country and be very numerous especially in the East.²

It is said that two years before his death, Shapur I married a daughter of the Roman Emperor Aurelian, according to the terms of peace between both empires. Gondeshapur became the royal winter residence, the capital of the province of Khuzestan, a center of learning¹⁴ and, apparently, the first place in the East where the Hippocratic system of medicine was taught by Greek doctors who were integrated within the entourage of Shapur's bride.^{4,12,15} Shapur I, following the example of his father, Ardashir, the first Sasanian king, had collected various books from India, Byzantium, Egypt, Syria, and Greece that were used to teach people in their original languages, and had them translated to Persian,¹⁶⁻¹⁸ and ordered that a copy of each work be deposited in the Royal Treasury, (*Ganj-i-Shaspigan*).^{16,18} Therefore, the medical teachings by the Greek doctors might have been supported by that specialized documentation, particularly from Greek and Indian medicine.⁹ In *The Shāhnāma of Firdausi* ("Book of Kings"), a famous epic poem of the tenth century, reference is made to the existence of the first hospital in Persia, with a school of medicine.¹⁰ However, the foundation date of medical studies and, specifically, of the hospital in Gondeshapur between the third and fourth century AD, still remains an elusive matter.¹⁹

The enlargement of Gondeshapur is also attributed to Shapur II and, approximately halfway through his reign, the founding of a primitive university in Gondeshapur,⁴ which would include a medical school. However, these statements also require confirmation from reliable sources.

With the consolidation and renewed influences of Zoroastrianism, recovered from the reign of Shapur II, Greek texts and their respective teachings began to be translated and taught mainly in Syriac (Ancient Syrian language), with a mixture of Persian and Arabic. Such a change occurred in parallel with the peace treaty between

the Roman emperor Jovian and Shapur II, under which terms the city of Nisibis became Persian territory.²³

Under the new situation, afraid of persecutions from Shapur II and the Magi, Christian teachers and influential inhabitants of the Nisibis School moved to join the congregants of the nearby city of Edessa, on the extreme eastern frontier of Roman territory, where they founded (363–364 A.D.) the so-called "Persian School of Edessa".^{4,21} Effectively, both Mesopotamian cities, located in old Assyrian territories, cultivated a common tradition of study and investigation along with Christian beliefs and Greek scholarship.²¹ There, in Edessa, teaching was based on works of literature, science, philosophy, and medicine that Christian priests of Semitic origin translated from Greek to Syriac or Aramaic. Theology represented the main study matter. However, medical subjects, although secondary, began to receive growing interest. Apparently, theology and medicine were kept separate in Edessa, such that medical instruction was not allowed at the school. This rule might express the ancient ambiguity of the Christian church towards the secular "healing" of medicine, not accepted by the "spiritual healing tradition".^{20,21} Later on, the growing interest in medicine was supported by the founding of a hospital, which enabled the students to receive clinical preparation.^{4,21} It seems probable that this medical training took place through individual apprenticeship, that is, one student to one teacher physician.²⁰

Constantinople Christian orthodoxy was at the origin of Nestorianism, a radical form of dyophysitism founded by Nestorius, patriarch of Constantinople, deposed in 431 by the Council of Ephesus on the charge of heresy. He and his followers, then called Nestorians, founded the Assyrian Church. Mainly concentrated in upper Mesopotamia, Edessa was the main seat of the Nestorians until expelled in 489 by the Byzantine Emperor Zeno, to abolish the school and so to please the monophysites.^{4,21-23} The Greek traditions and influence came back with many Nestorians (among them physicians, priests, teachers, students, and missionaries) from Edessa, who sought asylum in Sasanian Persia.²¹

The general mobility of physicians already existed long before this, between the Byzantine world and Sassanian Persia, which would contribute to the influence of Greek medicine in this other empire.²⁰ In fact, Persia had been in constant contact (war, trade, and travel) with the Roman/Byzantine world as well as with Greek and Hellenistic culture for about one millennium, mainly since Alexander imposed the Greek language as the official Persian language and the reconciliation between Greeks and Persians.^{9,13,20} Therefore, the Nestorians that arrived in Persia would from the Byzantine side carry on the basis of an infirmary or hospital (*xenodocheion*/bimarestan), as well as from the Persian side the influence of Greek culture associated with the traditions of Greek medicine. In order to understand

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the clinical situations, to make a diagnosis and prescribe treatment, this rational system would require knowledge of natural sciences and philosophy.

The Nestorians and the Scientific and Cultural Apogee in Khosrow I's Reign

Khosrow I, given the name Just or Immortal Soul (Anōšīravān), was the last of the great Sassanid monarchs (he reigned between 531 to 579) and praised as one of the most brilliant monarchs of Persia, both by the political, social and military governing bodies of the Empire, as well as for his interest in culture, science and the arts,⁷ although such a royal profile was not trusted by others.²⁴ However, one thing seems incontestable. Khosrow became the center of total authority during his reign, intending to govern by his will and refraining from the pretensions and interferences of the principal dignitaries, as had happened before.²²

The cultural success obtained by a school founded in Seleucid-Ctesiphon by the Nestorian patriarch Mar Aba I, once an eminent Zoroastrian,²⁵ decided Khosrow I to recreate an institution in Gondeshapur inspired on Zoroastrianism, specially orientated to the teachings of medicine but also including studies of literature, philosophy, eloquence, and poetry.^{7,26}

Through his command, both Greek and Indian cultures were re-seen in a new light in Persia through the translation of their important books into Persian,^{13,26} although *Avesta* (the sacred texts of the ancient Aryan religion founded by the prophet Zoroaster) continued to be called the main source of all sciences.²² Sergius de Ra's al'Ayn (d.536), a Syrian physician, philosopher, priest and translator, is said to have been the first to translate philosophical and medical works from Greek to Syriac.^{18,27} Khosrow considered him the wisest of all translators and it is possible he invited him to stay at his court.²²

The interest that Khosrow I had in medicine and philosophy²⁸ agreed with a previous Galen affirmation spread throughout the ancient world, wherein *every physician should be a philosopher*²⁹ so both were to be understood and cultivated together.²⁸ Thereby, the enthusiastic welcome and expectations of Khosrow were not surprising when a group of seven philosophers with high reputation, expelled from Athens by the Byzantine Emperor Justinian I after closure (in 529 A.D.) of the Neoplatonist academy (then regarded as the "headquarters of paganism"), asked to be accepted in Persian territory,²³ obtaining refuge at Ctesiphon.²² The expulsion and request meant that those sages might provide Khosrow I with extra-motivation to encourage and support culture and sciences.¹²

Those ex-professors had chosen Persia by considering it much superior (through the general opinions heard, as the "land of Plato's philosopher king in which justice reigned supreme"), compared with the official religion and

subsequent restraints of the Byzantine Imperium.²⁴ Soon, however, they were disappointed, both by the practices and low human nature of those in authority, as well as by the king himself, who affected high culture and to be a student of philosophy, although he was ignorant in those matters.^{23,24} This disillusion made them decide to go back to Byzantine lands, although incurring the risk of severe punishment.²⁴ However, Khosrow imposed on Justinian, as a clause included in one more peace treaty between the Persians and the Byzantines, the personal safety of the returned philosophers, as well as the freedom to keep their religious convictions without any contrary imposition.^{23,24} In the terms of this peace treaty, Justinian I, in addition to the considerable amount of gold received in compensation for the release of large numbers of Byzantines who had been captured by the Persians, authorized the refugee Tribunus of Palestine, a Greek physician, to remain in the court of Khosrow for one year.³¹ On a previous occasion, Tribunus had treated him for a severe disease very well. At the end of the year of stay, instead of claiming his due remuneration, Tribunus appealed to Khosrow I to replace this with a release of Byzantine prisoners. About three thousand prisoners, more than Tribunus had specifically named, were then released, which earned him great public recognition.³²

Following the closing of the School of Edessa and the University of Athens (529), the emigrating flux of Nestorian scholars and physicians headed for Persian territory and further on until Arabia, China, India and Siberia.^{21,32} In Persia, the Nestorian missionaries were invited by Khosrow I to teach in a renewed Gondeshapur academy and translate previous works of Greek, Syrian and Indian origin into Persian and vernacular Pahlavi. There, the studies of theology, philosophy, medicine, and other positive sciences received a great boost from the newcomers.⁴

The close association that prevailed between religion and medicine explains why many of the Nestorian clergymen were also physicians. In the territories where Nestorians migrated to, Christian theological schools were founded with medical studies included, as had been the case in the Mesopotamic cities of Edessa and Nisibis. There, the Hippocratic traditions and practices already taught in those schools were followed, like those in Alexandria where some of the Nestorian members were trained.²⁰

The teaching of philosophy and medical studies by the Nestorian teachers was based on their Syriac translations of Greek books, namely from Aristotle and Plato, Hippocrates and Galen.^{20,21} Such influence would happen in Gondeshapur, where the most famous of the medical schools with the teaching of Greek medicine was established.²² Gondeshapur would create a primitive university,¹ also entitled as the most important scientific center since the middle of the sixth century, with its academy including a medical school and a large hospital.^{24,33} There,

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the Nestorian scholars were joined by others of Persian, Greek, Jewish, and Indian origin, although the Nestorians were the most well-known.²¹ Via this intellectual group, and along with its work in medicine, the Academy of Gondeshapur would also attain great prestige in science, philosophy, theology, mathematics, and astronomy.

The cultural politics encouraged by Khosrow I was continued by Khosrow II, the last great Sassanid monarch (who reigned between 590 and 628). This was reflected in the functions carried out and in the wealthy collection assembled in the library of Gondeshapur.³⁴ In addition to documenting, conservation and the centralization of new acquisitions, that library also promoted translation, copying, preservation, illustration, and composition of other works. Medical texts, mostly of Greek origin or written in Sanskrit, were translated into the Syriac or Pahlavi languages, largely by Syriac-Nestorian physicians.^{1,20} From the beginning of the Islamic occupation until the subsequent replacement of Syriac by Arabic, the Persians benefited, by using those translations, from an incomparable propagation of their ideas, of cultural and scientific results throughout the three continents in which the Arab domain had expanded.³⁵

Characteristics of Medical Training and Activity in Gondeshapur

With the arrival of Nestorian refugees, the medical education in Gondeshapur obtained fame with a similar curriculum to that of Alexandria, and practical teaching in a Byzantine type hospital.^{21,36,37} The training, based on texts from Hippocrates, Galen, Plato, and Aristotle, was distributed over the three years of the course, as was followed in the school of Nisibis. In the first year, the preliminaries were taught featuring reasoning and mathematics, and the following years were occupied with studying Hippocrates, Galen and Dioscorides texts.³⁴

The diagnosis and treatment of the clinical situations were taught based on logic, Hippocratic ethics and anatomical knowledge,²⁰ wherein practice prevailed over theory.³⁸ Upon completion of the three-year curriculum, a final examination was required of all students before graduating. After that, they were given a certificate qualifying them to work as physicians.³⁴

The *bimaristan* (meaning “place for the sick”) were built in Persia following the model of those which had been installed, at the initiative of the Syrian church, in Byzantine territory.^{39,40} The “Chronicles of Zachariah, bishop of Mitylene, mentioned one of those hospitals that Khosrow I ordered to build and equip with physicians and means to operate.⁴¹ All the physicians at that hospital had responsibility for the training of the students and these students were authorized to practice on patients under the guidance of medical tutors.³⁴ One of these kinds of the hospital, and also a medical school, would be associated with the Gondeshapur academy.^{1,42}

The organization and other important details in the hospital’s functioning and the practice of medicine in Gondeshapur require better understanding.⁴³ The hospital’s activity as managed by the Nestorians depended on a director and medical personnel, pharmacist and assistant. The medical training, under the responsibility of the director of the hospital,⁴³ used Syriac as the official language, even though they used the local dialect when necessary.⁴ However, since most of the texts were written in Greek, which was the language used by the majority of the population and teachers, it was also admissible that this was also utilized in medical education.³⁴

On adopting the traditional Hippocratic and Galenical medicine, Gondeshapur medicine would have been, in the sixth and seventh century, one of the most advanced in the ancient world,²¹ and so continued as a scientific center in the Islamic period.³³ Physicians who had graduated from Gondeshapur were asked after in Persia and Mesopotamia and, during the Islamic rule, also by the Caliphs.²⁵ The hospital function and activity processes followed in the practice of Gondeshapurian medicine apparently constituted an important model in the Islamic hospital system later implanted in Baghdad, Shiraz and other Middle Eastern and European cities.^{24,44} It is admissible that the popularity of Nestorian Christian physicians among the Zoroastrian and Muslim believers, in addition to their technical capabilities, would also have been due to the dyophysite fundamentals of their belief.²¹

In 638, Gondeshapur surrendered to the Arabs led by Abu Sabra that not only spared the city from destruction but also maintained the university and the hospital intact.^{4,45,46} From that point onwards, the Academy of Gondeshapur (in Arabic: *Jundaysābūr* or *Jundi Shapur*), continued as the scientific center of the new Islamic empire. The medical teachings, which had previously been administered in the Syriac language, were now taught in Arabic.³⁵ Knowledge of the other fields of science that had been translated into Arabic by Greek, Syrian, Persian and other academics that had dominated Aramaic, followed an identical path and would build up the bibliographic collection of the academy.

Effectively, the transition from the Sassanid to the Islamic period coincided with the important intervention of literate Persians in the translation of works about various themes in several languages into Arabic, also the common language for philosophical and scientific communication.³⁵ In this context, Gondeshapur remained as the inspiring center for biological sciences and Hippocratic and Galenical traditions in medicine, along with knowledge and practice of Persian and Indian medicine, which flowed in the early days of Islamic science.³⁵

The Decline of Gondeshapur and the Appearance of Islamic Medicine

It may be said that the ancient academy of Gondeshapur

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reached its greatest aura and importance from the 7th century,⁴⁷ losing these down through the following centuries, while the activity of its hospital was diminishing.^{34,48} The last contribution of the medical school to the knowledge of that time would have been a pharmacopeia of 17 or 22 volumes, written (c.869) by the Christian physician Sabur Ibn Sahl, used by the hospital and pharmacies and, later, adopted as a text for studies in all the Abbasid Caliphate.⁴⁹ Sabur, who was the last known director of the Gondeshapur hospital, knew these drugs, their powers, and means of preparation, and wrote *Aqrabadhin*, one of the first books on antidotes.⁵⁰

Gondeshapur's decline would have begun when the 2nd Abbasid caliph, al-Mansur (who ruled from 754 to 775), transferred the imperial capital and its intellectual center to Baghdad (originally, *Madinat-al-Salam*, ("City of Peace")).²¹ Near or on the site where there had been a village, in a circular area about twelve kilometers in diameter, a fortified city erupted (between 762 and 766) which communicated with the exterior by four strategically situated gates.^{51,52} Between these buildings, a hospital was apparently included (or, more probably, a hospice with an embryonic medical school),⁴ as well as a library where the great translation movement of the eighth century flourished, sponsored by al-Mansur.⁵³ Under his command, physicians and technical personnel from Gondeshapur were requested to work in the hospital, contrarily to the Umayyad dynasty, when most court physicians came from Syria and Egypt.¹² Around 707, the sixth Umayyad Caliph al-Walid (who ruled from 705 to 715) ordered the building of a leprosarium where the lepers of the city remained segregated from the rest of the population.³⁹ More recent data indicate that this leprosarium was not located in Damascus, as initially indicated, but in Medina.⁵⁴

However, another version suggests that the first permanent Islamic hospital in Baghdad was established before 803, by Yahya ibn Khalid ibn Barmak, (763/766-809),⁵⁵ who had become the tutor and then vizier of the fifth Abbasid caliph al-Rashid (who ruled from 786 to 809). The Barmakid hospital, as it became known, would have been directed by Ibn Dahn, one of the Indian physicians that Yahya commissioned to work in the hospital and translate medical texts from Sanskrit to Arabic. At the request of Barmak, himself an enthusiastic Persian-Indian medicine promoter, the hospital would include a reference to Indian medicine, written by another of the native physicians, Mankah (or Kankah); this physician also treated al-Rashid for a chronic disease.⁵⁶

After the mysterious political fall of the powerful Barmak family, c.803,³² the activity of the Barmakid hospital would have been terminated, substituted by another hospital built by al-Rashid according to the Gondeshapur model and, also, where Greek medicine would be practised.⁵⁷ For the functioning of this hospital, and also the first

Muslim medical school, physicians, pharmacists, teachers, and other personnel came from Gondeshapur.³⁴ With the construction of the new hospital in the suburbs of the old circular city, the former would be almost forgotten and perhaps accessed only by the poor population of ancient Baghdad.⁴

Still during his reign, in the so-called *Islamic Golden Age*, Harun al-Rashid continued to support the personal library, known as the *Khizānat Kutub al-Hikma* (translated as Storehouse of the Books of Wisdom), that his predecessor, al-Mansur, had created and installed in the palace, in the mold of the Sassanid imperial library.^{58,59} In the reign of al-Rashid, the arrival of academics from Gondeshapur to Baghdad, although this was already common practice, became an official policy of the Abbasid caliphs.³⁴ The translation of texts written in several languages (such as Greek, Persian, Syriac, Chinese, and Sanskrit) into Arabic was also encouraged, especially those concerning medicine, mathematics, philosophy and astronomy.⁵⁹ Later on, during the time of al-Rashid's son, al-Ma'mun, notable academics were invited to work in this library, known as the "House of Wisdom" (*Bayt al-Hikma*),⁵⁹ a term apparently translated from the Sasanian term for the library. However, there are doubts about the location, construction characteristics, and date of foundation of that institution,⁵⁹ which have been resumed by some scholars in a short sentence: "In reality, we have absolutely no mention in our most reliable sources of any such 'founding'".¹⁸

Baghdad had become a cosmopolitan city and a central point of exchange inside and outside the Islamic Empire, where cultures, knowledge, languages and religions intersected, until the beginning of its decline, in the tenth century.^{4,60} With al-Rashid, the separation of the Empire and subsequent civil war also began and, after his death, this exploded between his two main heirs,⁵⁶ ending favorably for al-Ma'mun.⁶¹

The Influence of Gondeshapur Physicians on Baghdad Medicine

In general, the first medical figures in Islamic history were Persian Christians and Jews, some of whom were distinguished as personal physicians to successive caliphs.³⁵ In fact, physicians and, in addition, pharmacists from Gondeshapur, were, because of their professional competence and published texts, a reflection of a hospital and medical school with alleged superior teaching.^{62,63} The Persian custom of hiring Greek physicians was continued by the Arab conquerors of Persia.

The proximity between Gondeshapur and Baghdad favored the exodus to the new Islamic capital of Nestorian Syrian-Persian Christian physicians and academics, among whom of note were the families Bakhtishu and Masawayh, al-Tayfuri, Sabur ibn Sahl and Yahya b. Sarafyun (Serapion).^{18,35} Because they had their origin, religion and

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language in common, these emigrants formed an important social nucleus, consolidated by marriages between them. In addition to practicing medicine at the Abbasid court, which guaranteed them wealth and high status, they also researched, wrote medical books and, especially, commissioned translations from various languages into Arabic, reinforcing their scientific superiority.¹⁸ However, from an Islamic perspective, the study of medicine, as well as medical treatments, were merely tolerated or, from a more radical perspective, showed disrespect towards religious orders.⁶⁴ In the former of those options, the cures were more the result of miraculous effects than of the treatment itself, which, moreover, resembled the beliefs associated with Christianity and Judaism at that time.⁶⁵

The first of the emigrants from Gondeshapur was the patriarch Jurjis ibn Jibrail ibn Bakhtishu, a Christian and director of the hospital.^{18,43,64} His coming to Baghdad had been suggested by the physicians at the court of al-Mansur when they saw that they were unable to treat another of his usual crises of chronic dyspepsia.²⁷ Although reluctant to leave his city, family and job, Jurjis saw himself forced to run to the caliph's call, heading to Baghdad in 765 with two of his pupils, Ibrahim and Isa, while leaving the hospital's direction in Gondeshapur to his son Bakhtishu II.²⁷ After easily solving, to the delight of the patient, the clinical situation of which he complained, he was invited by al-Mansur to accept the role of chief-physician of the court, which marked the beginning of a prolonged presence of foreign physicians in the Arab court, mainly descendants of his own family.^{40,64,66}

For six⁶⁶ or seven⁶⁷ generations and more than two and a half centuries, the Christian Bakhtishū medical family served caliphs almost continuously and was the most influential in the Abbasid court and in the city of Baghdad until the second half of the eleventh century.^{18,27,63} They were also in the position of working as translators or translation promoters. Between the positions of physicians and translators, the latter was curiously more respected and remunerated.⁶⁸

Another influential family of physicians in Baghdad was the Masawayh. Their patriarch, Yuhanna ibn Masawayh, without specific training, worked as an apothecary in Gondeshapur for about thirty years and would have studied medicine until he decided to travel to Baghdad in search of a better life.²⁷ After a difficult period, his luck changed, when resolving in a few days an ocular illness of a servant of al-Fazal ibn ul-Rabi', minister for the caliph al-Rashid, using the medication that he normally prepared for ophthalmologists in Gondeshapur. Since that illness was not solved by the physicians consulted, the result achieved by Masawayh came to the attention of the patient's employer. When, in turn, he suffered from the same illness, he called for his services, which were equally successful, and he was then hired by the minister as his family doctor. It happened that the Caliph would also

suffer from this illness, so that, knowing the good results obtained by Masawayh, he sent for him for the same purpose. The cure achieved resulted in Masawayh being appointed ophthalmologist to court.^{4,27}

Of his three children who graduated in medicine, the youngest, Yuhanna ibn Masawaih, born in 777, achieved great fame as a physician, professor and his left written work, of note, is the oldest treatise on ophthalmology, *Daghal al-'ain* ("Eye Changes").^{4,28} He was a physician to al-Ma'mun and to three of his successors and also director of the hospital in Baghdad that al-Rashid had built.²⁷ In this institution, he would have carried out anatomical research through the dissection of animals, guided by Galenical works and the translation of which he curiously commissioned from Hunayn ibn-Ishaq, a former student.¹⁸

The Importance of Translations and the "House of Wisdom"

With al-Ma'mun (seventh Abbasid caliph, who ruled from 786 to 833), the "House of Wisdom" had attained a considerable level of development and importance as a center of culture, knowledge and documental translation, to which were added original contributions in various scientific fields, mainly in mathematics, physics, astronomy and medicine.^{58,59} Part of the works in Greek was still available in the Islamic territory (especially in Alexandria, Antioch, Harran, Nisibis, and Gondeshapur) and neighboring countries, arriving to enrich an already vast library.⁶⁹ The translation of those works benefited from having prestigious academics that al-Ma'mun invited to participate in various research projects. Apart from certain occasional Muslims and Arabs, the majority of the translating academics were Syriac, Hebrew, and Persian (of Christian, Jewish, or Zoroastrian faith), part of whom came from the academy at Gondeshapur.^{66,70} The curriculum of subsequent Islamic medical training was based on translated texts from the Greek, which had already been used in Alexandria and other Christian schools in the Middle East.³⁹

Amongst the invited translators Hunayn Ibn-Ishaq distinguished himself; he is known in the West by the Latin name, Johannitus.^{27,59} The Nestorian Christian, Hunayn, studied medicine in Baghdad and stood out as an academic, scientist and one of the most famous and productive translators of the ninth century.^{59,66} In that field, Hunayn translated with astonishing accuracy, especially from Greek to Syriac, while others from his group worked from Syriac to Arabic. In collaboration with his son Ishāq and a nephew Hubaish,¹⁴ he translated more than one hundred medical and scientific Galenical works and also, works by Hippocrates, Aristotle and Dioscorides.^{32,71,72,73} Due to his merit, Hunayn would have been designated by al-Ma'mun as a chief translator and/or in charge of the "House of Wisdom".^{59,69,71}

Determined to obtain important texts existing in the

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territory of his principal enemies, Ma'mun, after obtaining an agreement with the Byzantine Emperor, decided to send three expeditions to Constantinople including his chief librarian and group of translators, from where they brought previously selected rare old Greek books and other documents to be translated into Arabic.^{17,69}

The translatory movement and the associated new learning reached its highest activity during the reign of al-Ma'mun⁶⁷ which enabled much of the knowledge about medicine, and other subjects of Greek origin and Hellenistic culture not to be definitively lost or dimmed in the following years.⁷⁴

Overall, the intensive translation movement of more than two hundred years, inherited from the "Zoroastrian Sasanian imperial ideology",¹⁸ adopted by al-Mansur, developed by al-Ma'mun and continued by his successors, would contribute to the renaissance of medicine knowledge in the territories under Islamic rule and, in particular, Medieval Europe.^{18,32,75-77}

It should be noted, finally, that along with the important role of certain Persian families as supporters of the translation and transmission of the new learning, the same strength and enthusiasm were aroused in Islamic society at the time, probably anticipating it as a progress riser.^{35,60} Together, the major Islamic sponsors or patrons included the participation of the Abbasid Caliphs and their families (even the concubines), courtiers, members of the state and military administration, academics and scientists.^{18,59}

The gradual transference from Gondeshapur to Baghdad of the majority of its most famous physicians and scientists, mainly in the ninth century, and the formalization of the "House of Wisdom", which may have occurred in 832, both apparently marked the beginning of the definitive extinction of the Persian academy of Gondeshapur.⁶⁷ More than a study center and a library, with the constant support of the Caliph and being endowed with ample economic power, the "House of Wisdom" was a legendary active participant in the development of scientific activity, which in turn, would act as the primary demand for the intense book translation into Arabic, from Greek originals and Syriac or Persian intermediaries.^{18,59}

Concluding Remarks

Gondeshapur's fame was not restricted to the warrior feats of its founder, to the beauty and amenities of the region or to its agricultural and structural development, in a project that tradition has located in the third century and attributed to Shapur I. To these references from the beginning of the Sassanid period, the almost legendary reputation of Gondeshapur arose associated with the later creation of a first hospital school and an academy, largely under a Nestorian influence with Greek cultural background.⁶⁷ From this perspective, apart from the sciences, arts, and humanities, Gondeshapur was, in the sixth and seventh centuries, perhaps the most important model center

in antiquity for medical learning and qualification,^{4,26} also participating in the foundation of Islamic medicine initiated in Baghdad.^{4,26,77} Although undergoing several attacks and destruction during the tenth century, the city had still kept much of its prior magnitude four centuries later.

The biggest part of the knowledge and traditions of Persian Antiquity were orally transmitted, so books and other historical documentation were a rarity and, what was left, would have been subject to other types of losses and destruction. In this context can be included the zeal with which the Islamic authorities and passionate converted Persians committed themselves, in particular during the ninth century, also to the elimination of all documentation which seemed to them to have a focus of paganism, especially that of Zoroastrianism.^{1,78} It is possible that much of the original documentation of Persian science was amongst that which was destroyed, limiting clarity about the existence and characteristics of the teaching and practice of medicine in Gondeshapur. However, as the orders for documental destruction were not carried out throughout the whole of the territory, some manuscripts with enlightening information about teaching and medical practice survived in Ancient Persia.⁴

The lack of knowledge of Pahlavi or the Persian languages constituted an additional obstacle for investigators who have sought to clarify the content of the remaining documentation of the pre-Islamic period, given that Persian became a scientific language only from the twelfth century. In this way, the earliest and widely known descriptions were presented in the twelfth and thirteenth centuries by noted medical biographers Ibn al-Qifti and Ibn Abi Usaybi'a, Muslims, and Bar-Hebrews, Christian. Temporal distance from past events is not a decisive argument for doubting its historical credibility.

It is worth mentioning the recent emergence of some skepticism about the descriptions that have come to light about the teaching of medicine in Gondeshapur. Thus, instead of a Sassanid hospital and medical school, it was proposed that there were only seminars in which medical texts were read and an infirmary where the medicine of Greek origin was practised.⁷⁹ The existence of Syriac or Sassanid sources that demonstrated the existence of the academy and the hospital in Gondeshapur, before the Islamic period, were unknown.³⁹ An alternative in line with previous statements added that the potentialities of Gondeshapur would have been excessively overstated and enlarged by the Bakhtishū medical dynasty and/or by Nestorians, and subsequently perpetuated by the Islamic authors of the time.^{40,80} However, in any of the cases, the intellectual seriousness of the training and the medical activity developed in Gondeshapur was not doubted and would have had the merit of underlining the ideals of the medical profession and its motivations, goals and clinical practices.

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A favorable supposition was the existence of a theological school with an attached infirmary, where medical priests would teach medicine.⁸¹ The letters that were sent by the Nestorian Patriarch Timothy I, patriarch of the East Syrian church between 780 and 823, to Sergius, the physician and metropolitan abbot of Khuzestan, also constitute a valuable testimony about the suitability and intellectual level of Gondeshapur. In this correspondence, Timothy asked Sergius if one of his students could learn medicine with him in Gondeshapur.⁸² Coming from who it was and, at the time this happened, it is not credible that the quality of these studies was of dubious quality. On the contrary, given that, at that time, the Nisibis medical school was still a point of reference,⁸³ it is plausible that Gondeshapur's was superior to it, regarding the sustained preference demonstrated by both Caliph al-Mansur and his other successors and senior Arab dignitaries regarding physicians coming from that academy.⁴ On the other hand, the history of Islamic hospitals, beginning with those built during the Abbasid dynasty and, according to its own sources, has been associated with the quality of Gondeshapur's medicine and its physicians.^{35,40}

The medical traditions of Gondeshapur lasted and Islamic medicine flourished, through two plausible pillars. Firstly, through the transposition of the training system and imported practices of Gondeshapur to Baghdad and which, from there, were spread to the West.^{35,80} Secondly, through having relied on the same texts which, centuries earlier, had been translated from ancient Greek into Pahlavi and Syriac, then reconverted into the dominant language of Arabic.^{35, 62,81} which became the *lingua franca* for almost half of the world at that time,³³ and then into Latin in the Middle Ages, as an essential step in the European Renaissance.²¹ The main link between Greek and Islamic medicine will have occurred especially at the end of the Sassanid period, at the apogee of the Academy of Gondeshapur, rather than that of Alexandria.³⁵ The institutions and practices of Gondeshapur would influence Islamic medicine as happened a few centuries later in Baghdad and, finally, in the regions where it also spread, until the thirteenth century.⁶² The model of the Islamic hospital system reproduced in Baghdad, Shiraz, Damascus and Cairo and many other places, seems to have been based, to a large extent, on the traditions and practices of the Sassanid hospital in Gondeshapur,^{4,35,57} in turn inspired by the Byzantine *xenodocheia*.^{20,84,85}

As with many other historical questions that time has blurred, in this case, the differentiation between myth and reality still allows for additional conclusive studies.

Conflict of Interest Disclosures

None.

Ethical Statement

Not applicable.

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