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Islam's forgotten contributions to medical science

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Past progressive

Islam's forgotten contributions to medical science

The transmission of medical knowledge can be traced to some of the earliest writings in human history. Yet a particularly fruitful period for advancement in medical science emerged with the rise of Islam. For the most part, Western scholarship belittles the contribution of the physicians of the Islamic world. They are usually perceived as simple purveyors of Greek science to the scholars of the Renaissance. However, the facts show otherwise.

For example, the 11th-century Iraqi scientist Ibn al-Haytham, known as Alhazen in Latin, developed a radically new concept of human vision. Ancient Greek notions of a visual spirit emanating from the eyes and allowing an object to be perceived were replaced by a straightforward account on the eye as an optical instrument. Ibn al-Haytham's detailed description of ocular anatomy forms the basis for his theory of image formation, which is explained through the refraction of light rays passing between 2 media of different densities. Ibn al-Haytham derived this fundamentally new theory from experimental investigations.[1] His *Book of Optics* was translated into Latin in the 12th century and continued to be studied both in the Islamic world and in Europe until the 17th century.[2]

Ibn al-Nafis, a 13th-century Syrian physician, re-addressed the question of blood movement in the human body. The authoritative explanation had been given by the Greek physicians more than 1000 years earlier. But what had caused them a major problem was how the blood flowed from the right ventricle of the heart to the left, prior to being pumped out into the body. According to Galen (2nd century), blood reached the left ventricle through invisible passages in the septum. Referring to evidence derived from dissection, Ibn al-Nafis described the firm, impenetrable nature of the ventricular septum and made it clear that there were no passages in it. Instead, he concluded, the blood in the right ventricle must be carried to the left by way of the lungs.[3,4] The description of the pulmonary circulation by Ibn al-Nafis was a breakthrough in the understanding of human anatomy and physiology. His approach to the study of medicine was exemplary for a scientist of his time as he demonstrated the need to evaluate the existing knowledge and reject those concepts that were inaccurate as shown by his own observations. Thus he was able to further the medical learning that was inherited from the Greeks.

Bodleian Library, University of Oxford, 2007, MS Marsh 54, fol. 68v

Fig. 1: Vaginal speculum (left), 2 types of forceps and double-edged scalpel (suspended). From a 1271 Arabic copy of al-Zahrawi's *Surgery*, written in the 10th century.

The 10th-century physician Abu 'l-Qasim al-Zahrawi, from Muslim Spain, was clearly frustrated by the state of the art in surgery during his time. In order to advance surgical knowledge, he wrote a book that described surgical procedures and gave detailed illustrations of the necessary surgical instruments — several of which were devised by the author himself — together with his observations and comments based on experience. We owe it to al-Zahrawi that surgery became integrated into scientific medicine instead of being a practice left to cuppers and barbers.[5,6]

Al-Zahrawi's work had a profound influence on the emerging medical science in medieval and early modern Europe, where the author was known as Abulcasis or Albucasis. However, for centuries the quality of the translations from Arabic into Latin and the accompanying illustrations were less than satisfactory. For example, al-Zahrawi's treatise contained an illustration of a vaginal speculum and 2 types of forceps for extracting a dead fetus (Fig. 1). The speculum was operated by a screw mechanism (at the top; see illustration) and had functional blades. The Arabic caption informs us that the spear-like feature suspended behind the right side of the speculum is a separate instrument, namely a double-edged scalpel (and therefore not connected with the speculum). A 14th-century Latin copy of al-Zahrawi's work, however, shows that the Western illustrator was entirely unfamiliar with the speculum and its mechanical principles (Fig. 2). He drew it

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Fig. 2: Vaginal speculum. From a 14th-century Latin copy of al-Zahrawi's *Surgery*.

upside down, with the blades being mistakenly depicted as a decorative bar. The 6-lobed shape at the foot of the illustration, which ought to be the screw, clearly had no mechanical function. The lantern-shaped device suspended at the right misrepresents the scalpel, which has now been integrated into the speculum.[7,8] Such distortions show that, in the 14th century, the Western world had much to learn from the physicians of the Islamic world.

In the introduction to his book, al-Zahrawi pointed out that good practice in surgery requires a sound knowledge of anatomy.[9] He also emphasized his religious convictions as a Muslim believer. Al-Zahrawi, as well as many of his colleagues, would have considered the study of anatomy not only as indispensable to their professional advancement, but also as a means to understand the wisdom of God's design and, in particular, the perfection of the human being, God's supreme creation.[10] This mode of thinking was best expressed by the 12th-century physician and philosopher from Muslim Spain Ibn Rushd, known in Latin as Averroes, who stated: "He who is engaged in the science of anatomy, increases his belief in God."[11] However, the anatomical study of the human body was problematic because it required dissection. A number of scholars — religious scholars in particular — seem to have been opposed to the practice since it implied mutilation of God's most noble creation. The medical texts on the other hand — particularly those of the 12th and 13th centuries — make frequent references to dissection, both animal and human, and include detailed descriptions of the practices involved. For a discussion of the complex issue of human dissection in the medieval Islamic world, see Savage-Smith.[12]

The important point here is that dissection of the human body seems to have been a controversial issue, but that those involved in the debate did not feel a need to hide their opinions. This is just one example of the intellectual open mindedness in early Islamic times. The receptiveness to new ideas included the heritage of the pre-Islamic world, such as the writings of Galen, which entered the realm of Islam from the 9th century on through systematic translations into Arabic. In the same way as the heritage of the ancients was studied with great respect, non-Muslim scientists, Jews and Christians in particular, played important roles in the scientific community. It was the open, non-dogmatic atmosphere that encouraged people to engage in debate, share ideas and seek new knowledge by asking questions and examining evidence.

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