

Medieval Islamic Pharmacy

Development of a science and a profession

– Written by David W. Tschanz, USA

No one knows when the first medicine was made in the hopes of curing an illness, only that it was so long ago the answer is lost in the mists of prehistory. What is known is that the development of medicines pharmaceuticals has continued without interruption, though with many fits and starts, since then.

In the pre-Islamic West and Middle East early medicine was primarily a fusion of Greek, Indian, Persian and later Roman attention that had slowly progressed over the better part of a millennia. Texts on medications were common but most of these materia medica were simply lists of various plants and minerals and their

various effects; natural history more than 'pharmacy' as we understand it today.

By the start of the 7th century CE, Europe and much of the Near East was mired in a morass of intellectual stagnation. The ravages of the barbarian hordes had destroyed the libraries and irreplaceable manuscripts collected over the centuries. The achievements of a thousand years of Hellenistic civilization in the arts, sciences and humanities were erased in a paroxysm of destruction.

By mid-century the rise of Islam and its hallmark thirst for knowledge and openness to discovery began the saving and eventual expansion of what Europe had

lost, especially in the field of health. Medical practitioners were driven by a hadith of the Prophet:

"Allah never inflicts a disease unless he makes a cure for it"

This placed the responsibility for discovering these cures and restoring health on the skills and development of medical practitioners.

THE RISE OF PHARMACY STUDIES

Within a century of the death of the Prophet, a systematic approach to the study of poisons and some drugs was being undertaken at the Umayyad court. Snake and dog bites as well as the ill effects of



Above: Map showing the geographical reach of the Umayyad Caliphate. Based upon the work of Gabagool via Wikimedia Commons.

scorpions and spiders and other animals were a cause of great concern, while the poisonous properties of various minerals and plants, such as aconite, mandrake and black hellebore were exploited. Galen and Dioscorides were considered ancient authorities on the subject, and many spurious treatises on the subject were attributed to them. Numerous Islamic writers discussed poisons and particularly theriacs, the antidotes for poisons.

Sudden death was not an uncommon occurrence in royal courts and was often, usually erroneously, attributed to poison. Not surprisingly, fear of poisoning convinced Umayyad leaders of the need to study them, detect them and cure them. As a result much of early Islamic pharmacy was done by alchemists working in toxicology.

The first of these was Ibn Uthal, the Christian physician to the first Umayyad caliph, Mu'awiyah. He was a noted alchemist and had conducted a systematic study of antidotes and poisons. A number of suspicious deaths at court led to his eventual execution. Another Christian physician-pharmacist, Abu al-Hakam al-Dimashqi, served the second Umayyad caliph, Yazid.

Yazid's son, Khalid bin Yazid (d. 704), was interested in alchemy, and so he employed the services of Greek philosophers who were living in Egypt. He rewarded them lavishly, and they translated Greek and Egyptian books on chemistry, medicine and the stars. A contemporary of Khalid was the Jabir Ibn Hayan (Geber), who promoted alchemy as a profession laying early foundations for chemical and biochemical research though for reasons other than pharmacy.

SCIENTIFIC ALCHEMY AS FOUNDATION

The role of scientific alchemy cannot be over-emphasised. The trend, approach and type of information circulated in 9th century Arabic alchemical manuals represent some of the best work in this field. The careful methodology they developed would serve all fields, including pharmacy.

In the process of experimenting in the making of amalgamations and elixir, several important mineral and chemical substances were used such as sal ammoniac, vitriols, sulphur, arsenic, common salt, quicklime, malachite, manganese, marcasite, natron, impure sodium borate and vinegar.

Among simples of botanical origin they used fennel, saffron, pomegranate rinds,

celery, leek, sesame, rocket, olives, mustard and lichen. Important gums such as frankincense and acacia were used. Animal products included: hair, blood, egg white, milk and sour milk, honey and dung.

'Lab equipment' consisted of pots, pans, tubes, retorts, alembics, crucibles and various distilling apparatus, covering platters, ceramic jars, tumblers, mortars and pestles (often made of glass or metals), tripods, scales and medicinal bottles. The range and scope of alchemical operations included distillation, sublimation, evaporation, pulverisation, washing, straining, cooking, calcination and condensation (thickening of liquid compounds).

The key names in scientific alchemy during the early Abbasid period were Abu al-Fa'id Ohun-Nun (d. 861) of Egypt and Ibn Wahshiyah (fl. ca. 900) who wrote on a variety of topics including alchemy, toxicology, magic and astrology. Rational alchemical activities, however, reached a climax in the works of ar-Razi, a contemporary of Ibn Wahshiyah, and a far more original writer. Ar-Razi's works are of much higher calibre both in their relevance to alchemy, as well as to pharmacy and medicine.

Islamic Caliphates:



Above: Timeline of the Islamic Caliphates.

All of these techniques and methodologies as well as the attention to methodology and experimentation were essential to the development of pharmacy as a science and not a hit and miss exercise.

THE ABBASIDS

The 9th century marked the beginning of the Golden Age of Islamic learning and just as Muslim scholars began to make progress in the physical sciences, so too did they learn, master and expand the arts of medicine and the science of pharmacy.

This early rise and development of professional pharmacy in Islam – more than 4 centuries before such development took place in Europe – was the result of three major occurrences:

1. the great increase in the demand for drugs and their availability on the market,
2. professional maturity and
3. an unprecedented intellectual curiosity.

Translation of scientific books into Arabic had already begun under the short-lived Umayyad Caliphate. It exploded under the Abbasids whose caliphs searched the world for books and manuscripts above all else.

Hunayn ibn Ishaq, was probably the greatest translator in Arab history. He had a superlative knowledge of Syriac, Greek and Arabic, and carried out a large number of translations from Greek scientific and philosophical manuscripts into Arabic, for which he was paid their weight in gold. These included most of the works of Hippocrates and Galen. After his death, work was continued by his pupils and by his nephew Hubaish. Thabit ibn Qurrah, who wrote on a variety of medical topics as well as on philosophy and astronomy;

Qusta ibn Luqa and Mankah the Indian, who translated from Sanskrit into Arabic, and translated a treatise on poisons written by the Indian physician Shanaq, were also leading figures in this crucial period.

PHARMACY AS A PROFESSION

While Islamic scholars did not invent the idea of medications, they did develop pharmacy as a separate, co-equal profession requiring skilled practitioners with their own training, licensing and standards.

The prolific intellectual ferment that fired the Baghdad schools, support at the highest levels of government and a craving for intellectual pursuits paved the way for greater achievement in the next 400 years. Manuals on materia medica and books of instructions circulated in large numbers throughout the Islamic World and using the methods of alchemy to formulate medicines and experiments.

Methods of extracting and preparing medicines were brought to a high art and their techniques of distillation, crystallisation, solution, sublimation, reduction and calcination became the essential processes of pharmacy and chemistry.

With the help of these techniques, the saydalanis (pharmacists) introduced new drugs such as camphor, senna, sandalwood, rhubarb, musk, myrrh, cassia, tamarind, nutmeg, alum, aloes, cloves, coconut, nuxvomica, cubebs, aconite, ambergris and mercury.

They further introduced hemp and henbane as anaesthetics, and established the monopoly on the dispensation of ointments, pills, elixirs, confections, tinctures, suppositories and inhalants.

As was the case in Europe and America up to modern times, many prominent physicians in Islam, prepared the necessary medications for their patients. Al-Majusi, az-Zahrawi and Ibn Sina (d. 1037) are good examples, but exceptions. For the typical medical professional, the role of educated pharmacists in the medical field and in society could not be ignored and was, in fact, welcomed. Arabic pharmacy (saydanah) was recognised as a profession and school of thought separate from medicine, just as grammar is separate from the art of composition, prose from poetry, and so forth. Its practitioners were recognised as possessing essential skills in a profession meeting high standards.

By the beginning of the 9th century Baghdad, the centre of learning at the time, saw a rapid expansion of the number of privately owned pharmacy shops, a trend that quickly spread to the suburbs and then to other Muslim cities. Initially these were unregulated and managed by personnel of inconsistent quality, but all that changed.

One of the finest definitions of the pharmacist, his role and his profession, was given by Abu ar-Rayhan al-Biruni (d.1048). In his work as-Saydanah fit-Tibb, al-Biruni defined the pharmacist “as the professional who is specialised in the collection of all drugs, choosing the very best of each simple or compound, and in the preparation of good remedies from them following the most accurate methods and techniques as recommended by experts in the healing arts.” This description varies only slightly from the modern one.

Pharmacy students were trained in a combination of classroom exercise coupled with day-to-day practical experiences with

drugs. Trainees became familiar with the shapes, physical properties, and kinds of drugs.

Under decrees by the caliphs al-Mamun and al-Mutasim pharmacists had to pass examinations to become licensed professionals and were pledged to follow the physician's prescriptions, though most medical scholars, including Biruni, believed a pharmacist should be able to substitute or to discard one drug for another if it made pharmacological sense.

To avoid conflict of interest and assure that no cover-ups occurred, doctors were prevented from owning or holding stock in a pharmacy or apothecary shop.

Pharmacists and their shops were periodically inspected by a government appointed official al-Muhtasib and his aides.

The Muhtasib checked to see that the medicines were mixed properly (to prevent dilution of the medicines) and that the jars containing the medicines were kept clean. When the inspector caught a druggist not abiding by the rules, the druggist was fined heavily or suffered more severe punishment, such as a beating of the soles of his feet.

Hospitals had their own dispensaries, attached to manufacturing laboratories, where syrups, electuaries, ointments and other pharmaceutical preparations were prepared on a relatively large scale. The hospital was run by a non-medical administrator. He was assisted by a Chief Medical Officer (Mutwalli or Dean) who was a physician. The other member of the hospitals troika was the Shaikh Saydalani who served as Chief Pharmacist and overseer of the dispensary.

The government post of Inspector-General of Hospitals was created during



Image: De Materia Medica of Dioscorides, an image from an Arabic-translated manuscript from De Materia Medica, a Greek text written by Dioscorides (Public Domain).

the Abbasid regime, which was usually occupied by the most outstanding physician of the Islamic world. Another post, that of Chief Pharmacist, was also created to head the department which supervised the preparation of drugs. One of the most famous holders of the position was Zia Ibn Baytar, the great botanist and herbalist who occupied this post in 1266.

DEVELOPMENT OF PHARMACEUTICAL LITERATURE

The preparation and use of medicinal drugs had its own specialised literature, a

trend that accelerated from the 9th century onwards. Not surprisingly, early knowledge of medicinal substances was based initially on the approximately 500 substances described by the Greek Dioscorides in his treatise on materia medica.

The Nestorian physician, Yuhanna bin Masawayh (ca777-857), a second generation pharmacist, penned an early treatise on therapeutic plants, listing about 30 aromatics including their physical properties, methods of detecting adulteration and their pharmacological effects. He recommended using medicinal

THE RULES OF CLINICAL TRIALS

In any field of human endeavour he turned his attention to, Ibn Sina (Avicenna) was like a force of nature. In the area of pharmacy he made many contributions, including describing 760 drugs and their uses. His most lasting in the field of pharmacy was his development of rules for testing the effectiveness of a new drug or medication. These principles still form the basis of modern clinical drug trials.

1. The drug must be free from any extraneous accidental quality.
2. It must be used on a simple, not a composite, disease.
3. The drug must be tested with two contrary types of diseases, because sometimes a drug cures one disease by its essential qualities and another by its accidental ones.
4. The quality of the drug must correspond to the strength of the disease. For example, there are some drugs whose heat is less than the coldness of certain diseases, so that they would have no effect on them.
5. The time of action must be observed, so that essence and action are not confused.
6. The effect of the drug must be seen to occur constantly or in many cases, for if this did not happen, it was an accidental effect.
7. The experimentation must be done with the human body, for testing a drug on a lion or a horse might not prove anything about its effect on man.

SUMMARY

A series of Islamic scholars, physicians, scientist, authors and an army of unsung plain folk played a critical role in the development of pharmacy as a science and as a separate profession.

Islamic scholars laid down a legacy that reflects itself in every prescription that is filled, every license that is granted, every elixir, syrup and medicament that is created, used or tested. It is memorialised in the significant number of current pharmaceutical and chemical terms derived from Arabic: drug, alkali, alcohol, aldehydes, alembic and elixir among others, not to mention syrups and juleps. They invented flavourings extracts made of rose water, orange blossom water, orange and lemon peel, tragacanth and other attractive ingredients.

The Muslims' introduction of regulation ensured that all doctors and pharmacists were qualified and that they did not cheat their patients when it came to drug composition actions which doubtlessly saved countless lives that would have been lost due to incompetence and assured professional standards unmatched for centuries.

If what these men did seems to be a simple and obvious thing to us now, it is only because the obvious is yesterday's discovery.

Parts of this paper are based on a peer-reviewed published manuscript:

Tschanz DW. A short history of Islamic pharmacy. Journal of ISHIM 2003. <http://www.ishim.net/ishimj/3/03.pdf>

Further Reading

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