

# THE ROLE OF GALEN IN THE DEVELOPMENT AND PROGRESS OF MEDICAL SCIENCES

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## ABSTRACT

Early Roman medicine was a mixture of religion and witchcraft, but as time went by, it became more influenced by the Greek medical sciences, which were more developed. The most famous Greek physician during the Roman period was Galen (129-200 AD). In the 4th century A.D. The Byzantine physicians of the Emperor Julian, made the Galenic writings available to ordinary practitioners, and so Greek medicine spread throughout Syria and was carried by the Nestorians into Persia, where it became available to the Islamic World.

Early Roman medicine was a mixture of religion and witchcraft, but as time went by, it became more influenced by the Greek medical sciences which were more developed. Numerous healing divinities bear the names of the diseases they cure such as;

1- Goddess Salus (identified by the Greek Goddess Hygeia, the Goddess of health); was worshipped with rites quoted from the Egyptian temples of Isis & Osiris.

2- Goddess Carna; which protected the intestines.

3- Goddess Febris; the deity of Malaria (Febris tertiana, Febris Quartana)

4- Goddess Mania; the Goddess of insanity.

5- Goddess Lucina; the Goddess of birth etc.

Pliny mentioned that the Roman people, for more than 1000 years, were not indeed without medicine, but without

physicians. Temples were built in Rome since 467 B.C. in honour of the healing God Apollo. Some materia medica were constituted up to 187 B.C.

Ancient Roman were indebted to the Etruscans and the Sabines for their medicines. In 399 B.C., the first Lectisternium (a festival of Greek origin) was held in Rome to combat pestilence. Metal nails were driven into the temple of Jupiter walls to ward off that dreadful epidemic.

The chief medical cult of Rome was that adopted from the Greek city Epidaurus, which included incubation sleep, exhibition of sacred snakes and dogs etc. Roman medicine of later days was obtained from Greece, specially after the destruction of Corinth in 146 B.C. which resulted in that many Greek physicians fled to Rome willingly or forcibly.

Medical education at Rome was at

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first a private matter, the earliest scientific teacher was the Greek Asclepiads of Bithynia (c. 124 B.C.), who wrote about 20 medical books.

Aurelius Cornelius Celsus (flourished c.25 A.D.), was practically the earliest scientific writer in Rome through compiling his famous volume "De Medicina" in 8 volumes.

Sanitation was from early time, a feature of Rome life, with halls or auditorial for the teaching of medicine built by emperors, while during Vespanian's reign (79 A.D.) Medical

teachers were given monthly salaries at public expense.

Roman surgical instruments (e.g. forceps, spoons, probes, trochars, canulae, speculums etc.) were successfully used (many of them were found at Pompei excavations dating to the 1st century A.D.).

The Roman army had the medical system at its best, with military hospitals built at many strategic points such as near Dusseldorf (founded round 100 A.D.). The most famous Greek physician during the Roman period was Galen.



**Galen (129 - 200 A.D.)**

Galen (Claudius Galenus): (129-200 A.D.), a Greek physician, born in Pergamum (in Asia Minor), and died in Sicily. He studied medicine in the

Pergamum Asclepieion, then went to Smyrna to study anatomy, then left for Alexandria where he studied medicine and practiced it. After 9 years, he left

Alexandria and settled down in Rome in 161 A.D., where he wrote many medical books, (his works were the first to be translated to Syriac then to Arabic). He served in the court of the Roman Emperor Marcus Aurelius.

Galen's anatomy was taught in Europe till the 17th century A.D. since he excelled in the study of bones, muscles, nervous, digestive and respiratory systems. His famous 16 books were text books that were always taught in Alexandria and all Egypt even during the times of the Memlucs.

He is considered as the founder of the experimental physiology, and was always grateful to those anatomists of medical school of Alexandria. He represents the last ring in the chain of traditional Greek medicine in relation to the different sciences that links to it, also studied philosophy and natural sciences, specially biology where he used to go deep through the hidden secrets, and revived the ancient origins of the Greek medicine which were shown clearly in his practice.

Galen's experience and ideas were derived from the long period that passed since Hippocrates announced his theories, and this six long centuries till Galen, there occurred great development and improvement in medicine and surgery due to the increased attention to experience and practice, resulting in the huge knowledge about the secrets of the human body and so gave way to better diagnosis and treatment of the diseases.

He was fascinated by the theories

and philosophy of Hippocrates, and so followed his steps, explained much of his theories which he explained in his own books. He used to prepare his drugs by himself, same as Hippocrates did, in a special room which he called *laterion*, and stored the prepared drugs in another room which he called *Apotheke* (after the famous town of Abuteeg in Upper Egypt which was a Roman store of grain).

Galen followed the new scientific systems in therapy through observation and experimentation, and was against old useless medical theories which were concerned with the structure of the human body or of the universe, which favoured by Hippocrates, and rejected them as basis for medical practice, also rejected the doctrine which prevents the teaching of the personal experience of the practitioner in treatment.

Galen spent the last 30 years of his life in medical researches and compilation of texts, numbered more than 400 volumes, mostly in anatomy and physiology. He was the first to describe the cerebral nerves, sympathetic system, dissected the spinal cord in order to produce experimental hemiplegia so as to prove the relation between the destruction of the spinal cord and occurrence of hemiplegia.

He was the first to explain in an accurate way, the system and mechanism of respiration. He also showed that the arteries carry blood, explained the motor power of the heart, in that, the blood flows back and forth between the heart and the artery

connected to it. (Although he dissected monkeys and could not understand its blood circulation perfectly).

He followed the Alexandrian medical school, showed that the arteries and veins were connected to each other through invisible minute vessels, and also if the heart was removed from the chest, it will continue to beat for a certain time, indicating that it does not depend on the venous system. Thus paved the way to performing more experiments in physiology. (he used cautery as haemostatic).

Galen also tried to combine both theories of Hippocrates and Aristotles, thus he quoted from the first those beneficial opinions on the vital unity of the human-being concerning the power of life, nutrition and the continual efforts to regain the normal health of the body in case of sickness or wounds. He also considered the human body as composed of one united unit that can not be divided. He also quoted the theory of the four elements; fire water, earth and air. And the four temperament of the body; cold, heat, dryness and humidity. and the four humours, blood, yellow bile, black bile and phlegm.

From Aristotles biological philosophy Galen quoted much from it and adopted them in all ways concerning organic construction of the creatures in that natyre does not create something without a cause or reason.

He showed also in his compilations that the human body in general is created as the set for the spirit or life, and the

carrier of life or its causative or the vital forces that energizes that body to perform its functions perfectly which is the Pneuma (i.e. the compact air) which enters into the body with respiration, thus gets divided into three portions:

1 - Psychic pneuma or animal spirit; concerned with the brain and nervous system.

2 - Life pneuma or vital spirit; concerned with the heart and arteries.

3 - Physical pneuma or natural spirit; concerned with the liver and goes deep into the veins that manufacture the blood, nourishes the body and keep it growing continuously.

He also showed that the liver takes its needs from the stomach and intestines.

The basics of his treatments shows that every disturbance formed in the body's functions has to be due to an affection to the sick organ, and the physician has to know at the beginning if the natural body powers is capable of curing the damaged organ by itself, thus returning it back to normal or not, and has not to interfere unless these powers are not functioning.

Galen is considered one of those great physicians who had the ability to analyses the result taken from the patients, he examined personally, and from the results obtained from surgical dissection of the different animals bodies and also from his physiological experiments which he had performed using pigs and monkeys instead of the human bodies which he never-dissected.

Although he was over confident in himself and of the medical theories he invented, yet many of them lost their importance owing to the numerous errors it contained, but still could survive for the next 15 centuries. Of his most important volumes were "On Therapeutics and Hygiene," "the Places Affected," "On the Natural Faculties." etc.

Galen was a pioneer in the muscular system composition and function, when he dissected the Rhesus monkey, but his account of the nervous system was in an intermediate position.

He mentioned that.. food is transmitted as Chyle by the portal vein to the liver, where they are converted into blood, and endowed with the natural spirit which bestows power of growth and nutrition. This blood enters the Vena Cava, part of which enters the right ventricle and goes to the lungs via the pulmonary artery (Vena Arterials). (Galen described the net of vessels under the brain as the wonderful net work, since he had no perfect knowledge of the blood-circulation). He stated that new blood was made in the liver.

His experiments on the spinal cord were spectacular, where he mentioned the effect of injury between the 1st and 2nd cervical vertebrae and that between the 3rd and the 4th cervical vertebrae." Concerning the lower injuries, he said that.. "one obtains paralysis of intestines, bladder and lower limb."

Galen established no medical schools but in 161 A.D., he went to Rome where he became celebrated as a teacher of medicine, practitioner and

writer. He was called to Aquileia in Venice, by the Emperors Lucius Verus and Marcus Aurelius. By 170 A.D. Galen prepared his famous theriac for Marcus Aurelius, and in 175 A.D., he was summoned to treat Marcus of an abdominal disease and successfully cured him.

Galen wrote 15 books on anatomy (six of which were preserved in Arabic), and so was named the Master of anatomy, owing to that he was reported to have dissected two human bodies (though doubtful) in Egypt, and advised his students to go to Alexandria to study human skeletons. His anatomy continued to be studied up to the time of Vesalius in the 16th century A.D. (who proved Galen to be wrong in many of his anatomical descriptions).

Galen introduced many new terms in medicine such as cervical vertebrae, symphysis, styloid...etc. He rejected the thought that the arteries contained air. His work on neurology is the cream of his researches, and did not say that blood ebbed and flowed in the arteries and veins, but said that it kept up a steady outward flow. He was however misled by the combined cross-section of the aorta and vena cavae on the one hand and the pulmonary veins and artery on the other, but he said that most of the blood flowed from the right side of the heart through the pulmonary artery via anastomosis in the lung. The pulse arose from an active dilating force "a pulse - force," and is communicated to the arteries from the heart.

In physiology, Galen recognised that every part of the body performs a definite function, and he wrote on blood, respiration, nervous system, pneuma, the eye and the senses.

Galen's pathology is founded upon the four elements and the doctrine of the pneuma. He distinguished catarrh, colic, dysentery, cholera, intestinal parasites, dropsy, ascites, pneumonia, pleurisy, stomach, hemorrhage, phthisis, renal calculi, paralysis of bladder, diabetes, gastric disturbance, vertigo, apoplexy, paralysis, epilepsy, melancholia, skin diseases. He used catheters whenever indicated.

In materia medica and therapeutics, Galen was not as proficient as Dioscorides, but he wrote on hygiene and drugs whenever possible.

In the 4th century A.D., the Byzantine physicians of the Emperor, Julian, made the Galenic writings available to ordinary practitioners, and so Greek medicine spread throughout Syria and was carried by the Nestorians into Persia where it became available to the Islamic world. In the 9th century A.D., Galen's books were translated into Arabic, and due to the efforts of the Caliph Harun Al-Rashid of Baghdad and Abdul Rahman III of Spain who were great patrons of Greek learning, with the result that great scholars like Rhazes, Avicenna and Averroes were known. The Galenic standpoint appealed to the theological bias of Islam, and so the medical knowledge of the Muslim compilers was based entirely on Galen.

The observational period of Greek medicine was ended by the death of Galen and the beginning of the decay of the Roman Empire. In 476 A.D., the eastern part of the empire was split with its capital at Constantinople. Thus the medical care ran down gradually and insidiously into the hands of monasteries and many saints were engaged in spiritual healing such as Cosmos, Damian and others.

During the period of rapid decadence, few medical personalities like Oribasius, Alexander Trallianus Aetius and Paulus Aeginata carried the torch of medicine successively one to the other.

Oribasius of Pergamum wrote several medical books specially on diet and diseases of children. Alexander of Tralles was superstitious more than medical, while Paul of Aegina who practiced medicine in Alexandria was renowned in surgery.

Several causes were attributed to the scientific decadence after Galen, of them, were Paganism which was blamed for a while, then Christianity was thought responsible for the drawback, a third opinion was the motive of the deterioration was due to the difficulty in understanding of the philosophy that dominated science. The result was that for nearly 800 years (400 - 1200 A.D.), scientific knowledge was imprisoned between the walls of the monasteries, which in turn helped in dwindling science gradually, resulting in that some of the religious personalities such as the Bishop of Seville in Spain (570 - 636 A.D.) became very famous in medicine.

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## चिकित्सा-विज्ञान के विकास एवं प्रगति में गेलन की भूमिका

- समीर याह्य अल-गम्माल

रोमी चिकित्सा पद्धति प्रारंभ में धर्म एवं जादू-टोने का एक मिश्रण थी। समय के साथ साथ इस चिकित्सा पद्धति पर यूनानी चिकित्सा पद्धति का बहुत प्रभाव पड़ा क्योंकि उस समय यूनानों चिकित्सा पद्धति बहुत विकसित थी। रोमी काल में गेलन (129-200 ए.डी.) एक बहुत ही प्रसिद्ध यूनानी चिकित्सक था। चौथी सदी ईसवी में चक्रवर्ती जूलियन के समय में उसके बैजन्टैन चिकित्सकों ने गेलन की कृतियों को साधारण वैद्यों को उपलब्ध कराया। इस प्रकार यूनानी चिकित्सा पद्धति सारे शाम देश (सीरिया) में फैल गई और वहां से ईरान पहुँची, फिर वहां से सारे इस्लामी जगत को प्राप्त हुई।