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ANATOMISTS – PAPAL PHYSICIANS (LITERATURE REVIEW)

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Article is about anatomists, who were papal physicians: M.R. Colombo (1515–1559), G.B. Canano (1515–1579), G.C. Aranzi (1530–1589), C. Varolio (1543–1575), A. Cesalpino (1525–1603), M. Malpighi (1628–1694), G.M. Lancisi (1654–1720) and G. Flaiani (1739–1808). Their contribution into anatomy and brief biographical information are given.

Key words: history of anatomy, papacy, biography.

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Historical references speak about the complex relationship between religion and medical science. Despite bans and persecution, physicians had done much to change the look not only at the structure of the human body, but also the world at large. Acquainted with the biographies of the Popes, we found that some famous anatomists were physicians of the head of the Roman Catholic Church (Table 1).

Table 1

Roster of noted anatomists who were papal physician

Anatomist	Years of life	Pope
Mateo Realdo Colombo	1515–1559	Julius III
Giovanni Battista Canano	1515–1579	Julius III
Giulio Cesare Aranzi	1530–1589	Julius III
Constanzo Varolio	1543–1575	Gregory XIII
Andrea Cesalpino	1525–1603	Clement VIII
Marcello Malpighi	1628–1694	Innocent XII
Giovanni Maria Lancisi	1654–1720	Innocent XI, Innocent XII, Clement XI
Giuseppe Flaiani	1739–1808	Pius VI

The first and most important of the great Renaissance anatomists who were Papal physician was Mateo Realdo Colombo (1515–1559) (Fig. 1).

He studied medicine in Padua where he soon came to work as an assistant for great anatomist Andreas Vesalius. When Vesalius went to Basel at the end of 1542 to supervise the printing of his "Fabrica", Colombo filled the professor's temporary vacancy. In 1546 when Vesalius entered the service of Charles V, Holy Roman Emperor, Colombo was formally elected to the chair at Padua. For a while he taught at Pisa before he took up permanent residence in Rome in 1548. There he was professor of anatomy at the Sapienza University until his death in 1559. By 1550, he was one of the surgeons to Pope Julius III [1-4]. Colombo was an extremely accomplished and successful anatomist. Colombo is best known for his definitive description of the pulmonary circulation based on almost a thousand dissections or vivisections. He also discovered the main action of the heart was contraction, not dilation as had been previously thought. He showed that arteries expand with each heart beat, valve of the pulmonary trunk closes during diastole, preventing reflux. Colombo's observations were published in a book under the title, "De re Anatomica" in 1559 posthumously. Among other things, in this book, he gives detailed accounts on the pleura, the peritoneum, and the mediastinum [1–4].

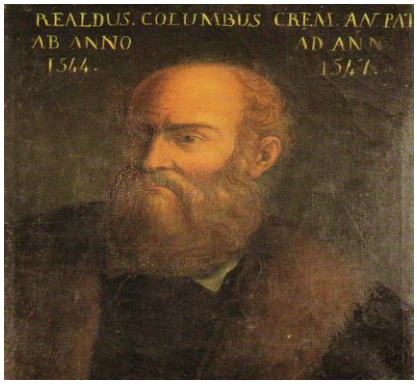

Fig. 1. Mateo Realdo Colombo

Two more anatomists took care about Julius III's health. They were Giovanni Battista Canano

(1515–1579) and Giulio Cesare Aranzi (1530–1589).

First of them came (Fig. 2) of a family of physicians. Five of his relatives taught medicine. He received his education at the University in Ferrara and succeeded his uncle as professor of anatomy there at the age of 26 (1541) [5]. In 1552, Canano became physician to Pope Julius III.

His only published work was “Musculorum humani corporis picturata dissectio” (1543), a small book but of outstanding importance for its originality. Based on his own observations, the “Picturata dissectio” contained the first anatomical drawings of the lumbricalis and interosseus muscles of the hand, and the first description and drawing of the palmaris brevis and oblique head of the adductor pollicis muscle [6, 7]. Another important contribution by Canano was the first public demonstration of venous valves performed in 1547 [5, 8].

Fig. 2. Giovanni Battista Canano

Giulio Cesare Aranzi (Fig. 3) graduated from Bologna in 1556. The same year, Aranzi became professor of surgery and anatomy at the University of Bologna. Aranzi began as a lecturer in surgery and in 1570 he was able to have 2 subjects, surgery and anatomy, separated, so that each would have its own professorship. He was the first lecturer at the University of Bologna to hold a separate professorship of anatomy. He held both positions for 33 years until his death in 1589 [9, 10].

Fig. 3. Giulio Cesare Aranzi

Aranzi was a meticulous and unprejudiced observer to whom anatomy owes several discoveries. First of all, he established anatomy as a distinguished branch of medicine for the first time in medical history [9]. Aranzi discovered levator palpebrae superioris muscle in the year 1548 while he was a student. He was the first who described the coraco-brachialis as a separate muscle. He coined the term "hippocampus" [10]. Aranzi described two fetal shunts – ductus venosus and ductus arteriosus, which discovery was erroneously attributed to Leonardo Botallo (1530–1600). He also mentioned the postnatal closure of the ductus arteriosus and foramen ovale. Another discovery in connection with the heart is the nodules of the aortic valve [11].

Next was famous anatomist Constanzo Varolio (1543-1575) (Fig. 4). He was born in Bologna and studied medicine in that city. He was appointed professor of anatomy and surgery there, and after winning a great reputation he went to Rome in 1573 as physician to Pope Gregory XIII – remembered for his revision of the calendar [12, 13].

Varolio was renowned as a lithotomist but he was also an outstanding anatomist, and is remembered especially for his work on the brain and cranial nerves. He developed a new method whereby the brain was removed from the skull and dissected from below. By applying this method he was able to observe several structures, including the hippocampus, the cerebral peduncles, and the pons [7, 12, 13]. Varolio rediscovered “Musculi erectores penis” (i.e. mm. bulbospongiosi and ischiocavernosi) and gave a correct description of the mechanisms of erection [14].

Fig. 4. Constanzo Varolio

One of the founders of botany Andrea Cesalpino (1525–1603) (Fig. 5), also known as Caesalpinus, studied under Realdo Colombo and Luca Ghini in Pisa, where he received his degree in 1551. Later in 1555 he succeeded Ghini as director of the

Botanical Garden of Pisa and as lecturer of medicine. Cesalpino was Chair of Medicine from 1569 to 1592, when he moved to Rome where he served as physician to Pope Clement VIII and taught medicine at the Sapienza University [15].

Andrea Cesalpino was an important predecessor of William Harvey. Cesalpino rediscovered the pulmonary circulation without knowing that both Servetus and Columbus had each previously and independently discovered the same. In 1593 Cesalpino published his book "Quaestionum medicarum" with experimental proof of the total circulation of blood and proposed term "circulation" in reference to blood and its travels throughout the body. He demonstrated that blood flows from the heart through the arteries and back in veins. He suggested that arteries and veins were connected by tiny vessels he called "capillaries" [15, 16].

His botanical experiments laid the foundations of plant physiology. In his "De Plantis" (1583), he was the first to attempt the scientific classification of plants based on fruit and seed characteristics [15].

Fig. 5. Andrea Cesalpino

Marcello Malpighi (1628–1694) (Fig. 6) attended the University of Bologna, where he graduated in philosophy and in medicine in 1653. Malpighi became a lecturer in logic at Bologna in 1655 but left in 1656 to be professor of theoretical medicine at Pisa. Malpighi returned to Bologna in 1659, where he was made extraordinary lecturer in theoretical medicine.

Through Giovanni Borelli's influence, Malpighi was elected to the first chair in medicine at Messina in 1662. He remained there for 4 years and then returned to Bologna for the last time. He remained there for the next 25 years until, in failing health, he was appointed as the personal physician to Pope Innocent XII in 1691 [17–20].

He is regarded as the founder of microscopic anatomy and may be regarded as the first histologist [17–20]. In 1661 he identified the pulmonary capillary network, proving William Harvey's theory on blood circulation. He discovered the taste buds and was the first to see red blood cells and realize that they gave blood its color. Malpighi first demonstrated the lymphatic follicles in the spleen and described the renal glomerular capillaries, both of which bear his name. He demonstrated that bile is secreted by the liver, not the gall bladder. The great Swedish botanist, Linnaeus named a genus of plants after Malpighi, the Malpighiaceae.

Fig. 6. Marcello Malpighi

Well-known scientist and physician Giovanni Maria Lancisi (1654–1720) (Fig. 7) graduated from Sapienza University (Rome). In 1684 he was appointed Chair of anatomy at this university, a position he held for 13 years [11]. At the age of 34, Lancisi was selected by Pope Innocent XI to be his personal physician. When the Pope died in 1689, Lancisi returned to private practice and teaching. A decade later, Lancisi was again called to serve the Vatican. This time he was consulted in the case of Innocent XII for whom he cared until the Pope's death. His successor, Clement XI, also appointed Lancisi to the prestigious position of Physician to the Pontiff [21–23].

Lancisi is remembered for his neuroanatomical studies. He provided an excellent description of the corpus callosum and striae longitudinales mediales corporis callosi – anatomic structures that bear his name (Lancisi's nerves) [22]. Lancisi collaborated with Marcello Malpighi in heart embryology studies.

One of the most important Lancisi's contributions to anatomy is rediscovery of Bartholomeo Eustachio. This great anatomist in 1552 completed a series of forty-seven anatomical plates. They were published in a book entitled "De dissensionibus ac controversis anatomici". Eight

small plates were published together with explanatory texts in Venice in 1564 under the title “Opuscula anatomica”. They included the work on the kidneys and the azygos vein. The remaining thirty-nine plates were missing for about 150 years after Eustachio's death. The plates were finally located through the diligence of Giovanni Maria Lancisi. He found them in the possession of a canon of the Cathedral of Urbino, Paolo Andrea da Rossi. The Pope Clement XI presented them to Lancisi. Lancisi published the plates alone with his own comments in Rome (1714) under the title “Tabulae anatomicae”. These were the first known anatomical plates engraved on cooper and they are considered to be more accurate than the revolutionary work of Vesalius “De humani corporis fabrica” (1543) [24].

Fig. 7. Giovanni Maria Lancisi

Last archiater among anatomists was famous surgeon and anatomist Giuseppe Flaiani (1739–1808) (Fig. 8). He studied at the La Sapienza University (Rome) and received his degrees on philosophy and medicine in 1761. He practiced as surgeon in Sassia. In 1775 he was appointed as surgeon of Pope Pius VI [25].

Flaiani is a founder of the anatomical museum of the Hospital of the Holy Spirit in Sassia. There he taught anatomy. Flaiani was first to publish a description of exophtalmic goiter (1802), which therefore is sometimes known as “Flaiani’s disease” (more common name “Flaiani-Basedow-Graves’ disease”) [25].

Fig. 8. Giuseppe Flaiani

Summarizing, we want to remind the wise idea of William Shakespeare: "Health – more precious than gold." It is surprising that nobody said this before him. First of all, those who knew it, had unlimited power and gold which it gave. These people, in the first place, were vicars of the Apostle Peter, from Sylvester, who became Pope on time the papacy received trusteeship of the Roman Empire up to Shakespeare’s contemporaries: Sixtus VI, Clement VIII, Paul V.

They knew how much power needs to have intelligence, energy, and faith, and, finally, the talent to achieve and serve on the throne of St. Peter. And for these achievements they need to pay own health and even their lives. That's why valued such people who had unfathomable talent to treat and save the divine gift - health. To do this, did not spare the gold and medicine also move to the achievements that we have today.

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АНАТОМИ – ОСОБИСТІ ЛІКАРІ ПАПСТВА (ОГЛЯД ЛІТЕРАТУРИ)

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Стаття присвячена анатомам, які були особистими лікарями Пап Римських у різний час: М. Р. Коломбо (1515–1559), Г. Б. Канано (1515–1579), Г. С. Аранзі (1530–1589), К. Варолій (1543–1575), А. Чезальпіно (1525–1603), М. Мальпігі (1628–1694), Дж. М. Ланцізі (1654–1720) та Дж. Флайяні (1739–1808). Подається інформація про їх внесок у розвиток медицини та короткі біографічні данні.

Ключові слова: історія анатомії, анатомія, папство, біографія.

АНАТОМЫ – ЛЕЧАЩИЕ ВРАЧИ ПАПСТВА (ОБЗОР ЛИТЕРАТУРЫ)

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Статья посвящена анатомам, которые были лечащими врачами Пап Римских в разные годы: М. Р. Коломбо (1515–1559), Г. Б. Канано (1515–1579), Г. С. Аранзи (1530–1589), К. Варолий (1543–1575), А. Чезальпино (1525–1603), М. Мальпиги (1628–1694), Дж. М. Ланцизи (1654–1720) и Дж. Флайяни (1739–1808). Рассказывается об их вклад в развитие медицины и короткие биографические данные.

Ключевые слова: история анатомии, анатомия, папство, биография.