



# The Anatomy of Papal Tiara: A Story About Popes' Contribution and Protection of Anatomists

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## Abstract

Beginning with the thirteenth century, the papacy has exerted an important role in the development of anatomy and medical sciences through the protection and support provided to anatomists, who were in most cases the personal physicians of the popes as well. The work is intended to be *a lesson of anatomy of Papal tiara*, presenting the most important contributing popes, the anatomists–physicians whom they supported and protected and the relations between papacy and medical sciences.

**Keywords** Popes · Papality · History of anatomy · Anatomists

*Omnes viae Romam ducunt (All roads lead to Rome)*

## Introduction

Beginning with the thirteenth century, the papacy has played a significant role in the development of anatomy and medical sciences. Pursuing personal interests or desiring to support them, the Popes have always looked for the most scientific medical

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men of their time as personal doctors (Walsh 1915). They chose the most brilliant physicians and the best anatomists from the universities of the Papal States, universities that were under the ecclesiastical tutelage of the Church.

The *papal physician* was usually somebody whose professional reputation was acknowledged in the service of the Pope or an important member of the papal court or the cardinals, a member of the college and frequently associated with a university (Carlino 1999). He enjoyed respects, protection and consistent remunerations, being a member, together with the protomedicus, the college members and lecturers, of the select group of *doctores* who controlled the activity of anatomists and physicians from the Papal States (Carlino 1999).

### Pope Innocent III and the First *medicus pape*

Descendant of a noble Roman family, Pope Innocent III (c. 1160–1216) (Fig. 1a), was a pope who ruled the entire Western Europe, subjecting the kings of Europe and being at the same time the most dominant figure in the mediaeval papacy. The first *papal physician* was chosen during his pontificate, and he bore the name of *medicus pape* (physician to the pope). Some sources mention the Italian physician Giovanni Castellomata (?–1258) (Paravicini-Bagliani 2000; Williams 2003) as the first *medicus pape*, while others consider Guy of Montpellier (1160–1208) (Walsh 1915)



**Fig. 1** **a** Portrait of Pope Innocent III (thirteenth century fresco), Monastery of St. Benedict (Sacro Speco), Italy. **b** Guy of Montpellier. **c** Pope Gregory IX approving the Decretals fresco by Raffaello Sanzio (1510–1511), Stanza della Segnatura, Palazzi Pontifici, Vatican. **d** Portrait of Pope John XXI. **e** *Thesaurus pauperum* (first page) (c. 1500), Bartolomeo de'Libri, Florence. **f** Michelangelo Buonarroti by Daniele da Volterra (c. 1544), Metropolitan Museum of Art, New York (public domain)

(Fig. 1b). Founder of the Order of the Holy Spirit at Montpellier, Guy had been summoned by Innocent III to Rome in the idea of reorganizing the *Santo Spirito* of Rome (Walsh 1915). Pieces of information are scarce about the health condition of Pope Innocent and his need for the services of a personal physician, but it is certain that he died at the age of 56 after having suffered from acute fever (Retief and Cilliers 2006), probably a constitutional blood disease (Knight 1917).

The sources do not confirm whether the two physicians were anatomists or not, but since the pontificate of Pope Innocent III, a pragmatic nature (Taylor 2005) and displaying an entrepreneurial spirit, a new relationship was established between the Church and medical sciences.

## Pope Gregory IX and Richard the Englishman

Known for the wave of modern reforms of the Roman Catholic Church and the foundation of the Papal Inquisition in 1233 (Magill and Aves 1998), Pope Gregory IX (c. 1145/1170–1241) (Fig. 1c) also had a shortcoming. It concerns the first papal bull *Vox in Roma* that he issued, *the first official church document that condemns the black cat as an incarnation of Satan, and consequently it was the death warrant for the animal*, and that had continued with their sacrifice until the beginning of the nineteenth century (Engels 1999). Consequently, the decrease in the number of cats from Europe led to the aggravation of the Black Death one century after the pontificate of Gregory IX (Veterinary History Society 2003), and it is also considered that nowadays, as a consequence, a very small number of black cats survived in Western Europe (Engels 1999). Pope Gregory IX had Ricardus Anglicus (Richard the Englishman) (1180–1252) as a personal physician, also known as Ricardus Parisiensis, renowned for several medical writings, among which there were also numbered a short medical encyclopaedia, *Micrologus*, but also a treatise on alchemy, *Correctorium alchemiae* (Restorer of Alchemy) (Sarton 1927–1948). An important work of Ricardus was the treatise on anatomy *Anatomia Ricardi Anglici* or *Anatomia vivorum*, in which there is illustrated the wealth of knowledge about anatomy over the period between Salerno and Bologna and which included passages from Avicenna and Rhazes (Pioreschi 2003). Ricardus was the personal physician of Gregory IX from 1227 to the death of the pope from 1241 (Sarton 1927–1948), a period over which he was paid properly, then he returned to Paris, where he also died in 1252 (Pilcher 1918). Unfortunately, pieces of information are scarce on his life and career, being therefore often mistaken for Richard de Morins (Richard of Mores) (c. 1161–1242), an English canon lawyer, and Archdeacon of Bologna, contemporary with him.

## Pope John XXI, the Ophthalmologist

Pope John XXI (c. 1205/1220–1277) (Fig. 1d) was the only pope of Portuguese origin, although he was also nicknamed Pedro Hispano (Peter of Spain) and the only physician pope who ever reigned over the Catholic Church (McBrien 1997).

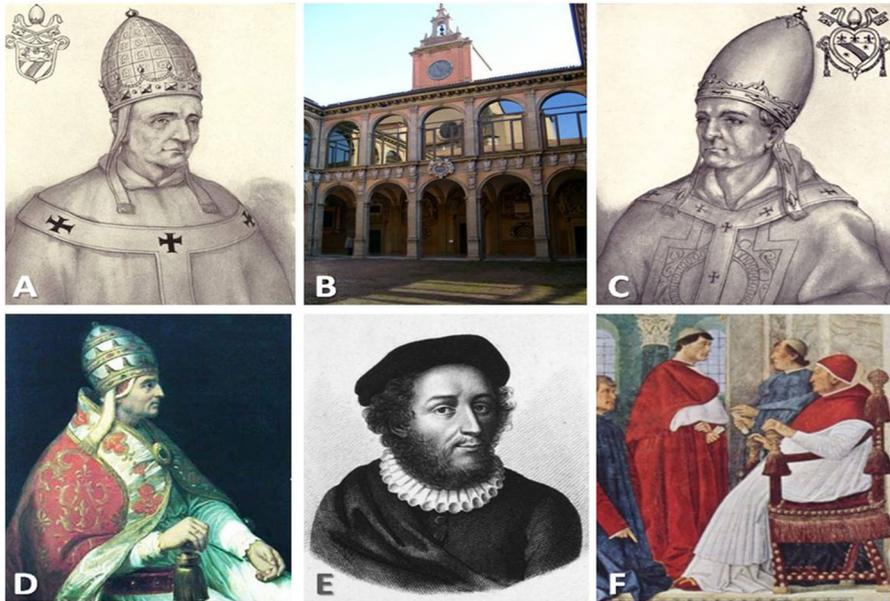
A philosopher, logician and anatomist, the personal physician of Pope Gregory X before becoming pope, John XXI reigned over the Catholic Church for a short time, only 8 months (Ilardi 2007). He is worth being remembered for the contributions that he made to anatomy and medical sciences as in period he was Archdeacon of Vermoim within the Archdiocese of Braga. Among his scientific works, it is worthwhile remembering *Liber de Oculo* (Book on the Eye), a treatise on ophthalmology, considered as a compilation based on standard Greek and Arabic practices (Blanchard 1995; Ilardi 2007), but which saw a wide spreading in the universities of Europe, *Thesaurus Pauperum* (Treasury of the Poor) (Fig. 1e), *Summa medicinae*, a treatise on medicine and *Liber de conservanda sanitate* (Compendium of the Preservation of Health) (Pioreschi 2003; Blanchard 1995). In the first part of *Liber de Oculo*, Pope John XXI provided a review of the anatomy and physiology of the eye, in which he identified seven coats of the eye that correspond with the seven planets. He also mentioned the three natural humours of the eye, among which the crystalline humour represents the seat of vision (Blanchard 1995; Petrus Hispanus and Berger 1899).

Three centuries later, when Michelangelo died, a copy of *Liber de Oculo* by Pope John XXI was found among his papers, which *Il Maestro* had copied by himself. The period over which the Sistine Chapel was painted, when Michelangelo injured himself many times, he used a prescription made by Pedro Hispano as a treatment: *when something falls into the eye, make a wash with honey water and rose water and milk* (Blanchard 1995). Taking into consideration that the genius polymath spent 4 years (1508–1512) by keeping his head and eyes tilted up to the fresco, while the paint and plaster splattered down covering his face, we can consider that the remedies of Pope John XXI contributed to the completion of the wonderful Sistine Chapel (Bloch 2012) (Fig. 1f).

The physician pope died accidentally while he was studying at the Papal Palace of Viterbo that was under construction, when a piece of the ceiling of the room where he was sleeping collapsed on top of him (Pioreschi 2003; Kelly 1990; De Rijk 1970). Because of his scientific preoccupations related to medicine and ophthalmology, the people suspected him of practicing witchcraft, both during his lifetime and after his death (Blanchard 1995), and the accident that caused his death was considered an act of divine justice. As regards Pope John XXI, Dr. J. B. Petella said *one of the most renowned personages of Europe during the thirteenth century, from the point of view of the triple evolution of his extraordinary mind, which caused him to make his mark in the physical sciences, in the metaphysical sciences, and in the religious world. In him there was an incarnation of the savant of the time, and he must be considered the most perfect encyclopedist of the Middle Ages in their first renaissance* (Petella 1897–1898).

## Pope Honorius IV and Ten Thousand Ducats

Pope Honorius IV (c. 1210–1287) (Fig. 2a) reigned over the Catholic Church for only 2 years, and on his election, he was very old and ill, suffering for several years from gout, a disease that had seriously affected his joints. It is said



**Fig. 2** **a** Portrait of Pope Honorius IV, *The lives and times of the popes* (1911) by Artaud de Montor, New York. Reproduced from *Effigies Pontificum Romanorum* Dominici Basae, sixteenth century. **b** Palazzo dell'Archiginnasio (the wing with the Anatomical theatre), Bologna. **c** Portrait of Pope Nicholas IV, *The lives and times of the popes* (1911) by Artaud de Montor, New York. Reproduced from *Effigies Pontificum Romanorum* Dominici Basae, sixteenth century. **d** Portrait of Pope Urban V by Calixte Serrur (nineteenth century), Palace of Popes, Avignon. **e** Portrait of Guy de Chauliac (1914). **f** Pope Sixtus IV appoints Bartolomeo Platina prefect of the Vatican Library (detail), fresco by Melozzo da Forlì (1477), Vatican Library (public domain)

that when he was saying Mass, he was compelled to sit on a special chair with a mechanical system that lifted his hands. His long suffering determined him to reach out to the medical assistance of the famous medicine professor from Bologna, Taddeo Alderotti (Thaddeus of Florence) (c. 1210–1295), considered in the Italian Peninsula as another Hippocrates, being even named *Taddeo Ippocratista* (Napier 1846). Due to his abilities, Taddeo was requested often to treat Italian princes that were contemporary with him, each of them being asked to pay 100 golden ducats per day. When Honorius IV asked to attend him, Taddeo refused him until he promised him 100 golden ducats for each day of service. After the pope was cured of the acute episode of his illness, he paid Taddeo 100,000 ducats, which Taddeo used for equipping hospitals and churches (Schedel and Schmauch 1947/2010; Napier 1846). He remained the physician of the pope until the death of the latter; then, he returned to Bologna, Modena, Ferrara, Rome and Milan to practice medicine, being followed at the papal court by Simon Januensis (Simon of Genoa).

Through his work, Taddeo Alderotti represents the best practice in the thirteenth century in the field of medical education: he was the true founder of the

Medical School of Bologna (Fig. 2b) (Schedel and Schmauch 1947/2010), a pioneer in the development of the Bologna medical curriculum (Wallis 2010), founded the Faculty of Medicine that replaced the Faculty of Law (Kaye 2014) and led to the establishment of the characteristics of Italian learned medicine during the Middle Ages (Wallis 2010). Not only Honorius IV was the patron of Taddeo, but also other aristocratic clients, as well as members of royal and noble households and King Enzo, the natural son of Emperor Frederick II (Kleinhenz 2004; Prioreshi 2003). He was considered the first citizen of Bologna and a public benefactor who was exempted from taxes (White 2009), being also offered a generous financial reward by the commune of Bologna for his services as a physician (Kaye 2014). He died in 1295, rich and famous, earning more money from medical practice than from the practice of teaching at university (Prioreshi 2003).

### Pope Nicholas IV and University of Montpellier

Pope Nicholas IV (1227–1292) (Fig. 2c) was interested in the academic activity of European universities, including the study of anatomy and medicine. *Because wisdom enlightens the human heart and leads it to virtue* were the words inserted at the beginning of the papal bull issued by Pope Nicholas IV on 26th October 1289 (Summerfield and Devine 1998) through which he founded officially and recognized the University of Montpellier with the papal bull *Quia sapientia*, and which incorporated Schools of Medicine, Law, Letters and Theology (Vergani et al. 2012). Through this action taken by Pope Nicholas IV, Montpellier was promoted to the rank of *stadium generale* (university), conferred his physicians *ius ubique docendi*, namely the right to teach in any university, without a prior evaluation (Janin 2008). Thus, the pope facilitated the dissemination of knowledge in other parts of the world as well.

It was also Nicholas IV who tried to ensure a higher education policy in Western Europe, officially recognizing in 1289 *licentia ubique docendi* not only in Montpellier, but also in Bologna in 1291 and Paris in 1292, although Oxford failed to obtain it, despite the efforts made by Kings Edward I and Edward II (Nardi 1992).

One of the researchers of that time whom Pope Nicholas IV supported was also his personal physician and chaplain Simon Januensis (Simon of Genoa) (1288–1303). A botanist, lexicographer, subdeacon and physician at the same time, Simon Januensis is known for being the author of the first important dictionary of medicine entitled *Synonyma Medicinae or Clavis Sanationis* (Key of Health), a comprehensive glossary of Greek, Latin and Arabic anatomical and medical terms (Gutiérrez Rodilla 2004). In his work, Simon was supported not only by Pope Nicholas IV, but also by Pope Boniface VIII, who were actually close friends of him (Walsh 1915). The value of this dictionary is incommensurable, because in the preface to the book, Simon confessed that he had worked for 30 years to compile it, looking up all the books from European libraries (Bagliani 1991). Unfortunately, Simon of Genoa did not live to see his work in print, because *Synonyma Medicinae* was printed only in 1473 by Antonius Zarotus in Milan (Henry 1905; Cordo 1473).

## Pope Urban V and the Father of Modern Surgery

A member of the Order of Saint Benedict, Pope Urban V (1310–1370) (Fig. 2d) lived in simplicity and modesty, being also the only Avignon Pope who was beatified. A patron of arts and learning, he founded the universities of Cracow and Vienna (Kleinhenz 2004, 2016) and supported the great surgeon Guy de Chauliac (c. 1300–1368) (Fig. 2e) together with other Avignon Popes such as Clement VI and Innocent VI (Wallis 2010).

Professor at the University of Montpellier, not far from the residence of popes from Avignon, Guy de Chauliac was frequently requested by the papacy for his medical services (Walsh 1915), and in return they protected him and supported his studies, because Guy came from a poor family (Walsh 1915; JAMA 1965). Besides his position as personal physician of the papacy, Guy de Chauliac was successively canon of the cathedral of Saint Just in Lyon in 1344, canon of Riems from 1353 to 1358 when he was reappointed to Saint Just where he was appointed and remained provost of the chapter until his death (Pilcher 1895). Archives referred to him as *venerabilis et circumspectus vir, dominus Guigo de Cauliaco, canonicus...medicusque domini nostri pape* (Pilcher 1895).

The beneficial influence of Guy on the papacy can be noticed by the permanent interest of the popes whom he served in the medical department of the University from Montpellier (Walsh 1915) and the permission granted to him to dissect and examine the bodies of plague victims. The last one was the desperate attempt of Pope Clement VI to find a way of stopping the pestilence that had ravaged Avignon since January 1348 when it appeared, killing more than 2000 people only within the first days (Para 2016). This pontifical permission represented the first authorization of autopsy outside of medical study in universities that was ever guaranteed (Burnham 1978; Para 2016).

Although known rather for his magisterial work *Chirurgia Magna*, which influenced surgical thinking and was recognized as surgical authority in Europe for the following two centuries (Pilcher 1895; Watters 2013), Guy was the one who also stressed the importance of knowing anatomy to which he dedicated one of the seven sections in *Chirurgia Magna* (Watters 2013). As the Father of Modern Surgery, he understood the importance of anatomy: *a surgeon who does not know his anatomy is like a blind man carving a log* (Hyde 2017).

## Pope Sixtus IV and the Long-Awaited Papal Bull

An enthusiastic patron of arts and sciences, Pope Sixtus IV (1471–1484) (Fig. 2f), is known especially for his two great achievements: *Bibliotheca Apostolica Vaticana* (Vatican Library) and *Sistine Chapel* that bear his name (Pacifci 1921). As concerns his contribution to the development of anatomists and the improvement of anatomy knowledge, it was represented by a permissive Papal Bull issued on 4 April 1482 for the University of Tübingen, which allowed the performance of

autopsies, with the consent of the local bishops (Weisz 1997; Nuland 1989), but on condition that the bodies to be properly buried according to Christian tradition (Webb 2012). This document was followed by similar Bulls issued for the universities of Padua and Bologna (Weisz 1997).

The Papal Bull mentioned that: *permission to take the bodies of legally executed criminals from the place of execution, and to dissect them according to medical rules and practice without any special licence from the Holy See* (Thiene 1997). As long as the dissections did not *destroy the contours of the body*, they were considered technically acceptable by the ecclesiastical authorities (Park 1994, 1995). However, Pope Sixtus IV considered the public dissection as a kind of humiliation and there, in his letter addressed to the University of Tübingen, he stressed that public dissections should have been performed by convicted murderers and only once every 2 or 3 years (Webb 2012). Pope Sixtus IV had studied theology and philosophy at the universities of Bologna and Padua and was aware of the importance of the dissections performed in these universities that traditionally studied anatomy (De Santo et al. 2002). Through his action, Pope Sixtus IV disapproved the hostility of the Church towards the anatomical dissection and the progress of science (De Santo et al. 2002).

## Pope Leo X and da Carpi's Treatment of French Disease

Pope Leo X (1475–1521) (Fig. 3a) is best remembered for granting indulgences for those who donated for the reconstruction of the Basilica of Saint Peter (Fig. 3b, c). A member of the Medici family, he was also a true patron of arts and sciences: he rebuilt the Basilica of Saint Peter, reorganized the Roman University and decorated the Vatican, but he emptied the treasuries (Bautch and Racine 2013; Doak 2006; Eire 2016; Grendler 2002). He was also the one who stated: *Since God has given us the papacy, let us enjoy it!* (Doak 2006).

Over the same period, in the Papal States, the physician Jacopo Berengario da Carpi (c.1460–c.1530) gained the reputation of being one of the most famous physicians of the sixteenth century (Costea 2017a). Professor at the University of Bologna from 1502 to 1527, Berengario da Carpi was a great anatomist and surgeon, being frequently summoned to consult noble people or cardinals such as Lorenzo II dei Medici, Giovanni dalle Bande Nere, Galeazzo Pallavicini, Alessandro Soderini or Cardinal Pompeo Colonna (De Santo et al. 1999). Among those who requested him was also Pope Leo X, who summoned him to Rome and appointed him as his personal physician.

Leo X knew that his nephew Lorenzo di Piero de' Medici (1492–1519) (Fig. 3d) whom he had appointed Duke of Urbino in 1516 would die of syphilis 3 years later and, moreover, his predecessor Pope Julius II (1443–1513) (Fig. 3e), had also contracted the disease from some male prostitutes in Rome (Hale 1977; Martin 2015). A quite controversial pope (Rumsey 1981), Julius II was known as the first pope who contracted 'the French disease' (Hale 1977; Martin 2015), and in Rome rumour had it that, on the day of Good Friday in 1508, he was not able to leave his leg to be kissed by believers because it was completely covered



**Fig. 3** **a** Portrait of Pope Leo X with Cardinals Giulio de' Medici and Luigi de' Rossi (detail), painting by Rafael (c. 1518), Uffizi Gallery, Florence. **b** Papal Basilica of St. Peter in the Vatican (main façade seen from the roof of Castel Sant'Angelo). **c** "Indulgentia plenaria quotidiana perpetua pro vivis et defunctis" (Perpetual everyday plenary indulgence for living and the dead). Indulgence notice on the façade of Roman church Santo Gregorio della Divina Pietà, Rome. **d** Portrait of Lorenzo de' Medici, Duke of Urbino, painting by Rafael (c. 1516–1519), private collection. **e** Portrait of Pope Julius II, painting by Rafael (1511–1512), National Gallery, London. **f** Saint John the Baptist in the Desert, painting by Rafael (c. 1518–1520), Uffizi Gallery, Florence (public domain)

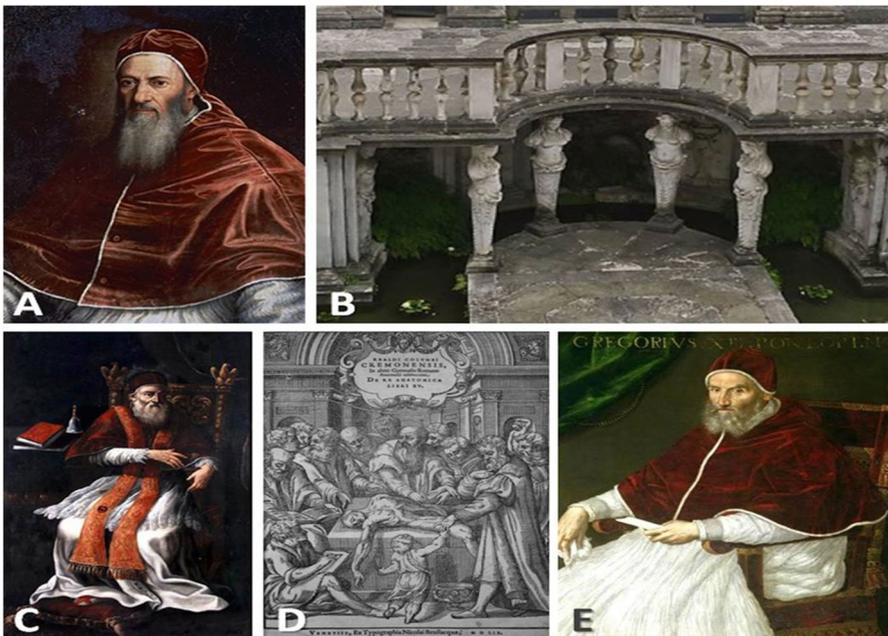
by syphilitic gummas (Buret 1895; Martin 2015). This frightening story was also known by Leo X, who was also a controversial pope in terms of morality (Cesareo 1938; Falconi 1987), who had also got syphilis (Bollet 2004) in the meantime. On the other hand, da Carpi was renowned and known for the introduction of quick-silver in the treatment of the *French disease* (syphilis) (French 1985), on which he also wrote a short treatise *De guaiaci medicina et morbo gallico*, published in 1489 (Di Cicco 2015). It attracted the attention of Pope Leo X, who summoned him and became a very close friend of him, so that this influential friendship helped da Carpi escape the punishment for violence and suspicion of vivisection on two Spaniards (Lind and Da Carpi 1990), the last one being, however, never proven (Di Ieva et al. 2011; Falloppio 1564).

Da Carpi was respected not only by Pope Leo X, but also by other popes such as Clement VII and Julius II (De Santo et al. 1999), who rewarded him and supported him not only with their patronage and protection (Dowling and Goodrich 2016), but also with financial benefits, giving him many valuable gifts for his service provided to the high clergy, including the famous painting of Raffaello, *Saint John the Baptist in the Desert* (Fig. 3f) (Putti 1937). In a letter dated 4 December 1506, Pope Julius II granted Berengario Bolognese citizenship and 2 years later,

after the outbreak of plague, he was appointed by the city government as chief healthcare officer (Lind and Da Carpi 1990).

### Pope Julius III, A Pope with Many Physicians

Pope Julius III (1487–1555) (Fig. 4a) remains known as a patron of arts and a great admirer of classical culture (De Grummond 2011). He supported and reorganized the University of Rome, allowing only the Medical College to award degrees in Medicine (Gaudio and Memoli). He sponsored a number of famous artists such as Michelangelo Buonarroti (1475–1564), Giorgio Vasari (1511–1574), Prospero Fontana (1512–1597), Bartolomeo Ammannati (1511–1592) and Giacomo Barozzi da Vignola (1507–1573) (De Grummond 2011). He also established close relations with Bologna and the surrounding region of Emilia and Romagna, and many of those physicians and artists were summoned and employed in Rome. One of them was Bartolomeo Maggi (1477–1552), a professor of anatomy and surgery at Bologna, the uncle and mentor of Julius Caesar Aranzi (1529/1530–1589) (Major 1954), who became archiater immediately as the Pope ascended the pontifical throne. Maggi was also the physician of the Papal Army, being preoccupied by gunshot wounds, a topic on which he wrote a book entitled *De vulnerum sclopetorum, et*



**Fig. 4** a Portrait of Pope Julius III. b Nymphaeum loggia (detail) of the Villa Giulia, by Bartolomeo Ammannati, Rome. c Portrait of Pope Paul IV. d *De re anatomica libri XV* (title page), 1572. e Portrait of Pope Gregory XIII (1502–1585), three-quarter-length, seated, painting by Lavinia Fontana (c. 1600–1625) (public domain)

*bombardarum curatione tractatus* (Maggi 1552) that he dedicated to *Prince Giovanni Battista de Monte*, the nephew of Pope Julius III and general-in-chief of the Papal Army (Walsh 1915).

Also in Bologna, but also in northern Italy, the professor Giulio Cesare Aranzi (Julius Caesar Arantius) (1530–1589) had become one of the most prominent experimental anatomists of that time, known for his public dissections (Gurunluoglu et al. 2011). He was also a remarkable surgeon, also known for the fact that he was the one who take the initiative in separating surgery and anatomy into two individual professorships (Gurunluoglu and Gurunluoglu 2008). Pope Julius III heard of him and summoned him to Rome to serve him, appointing him *archiater pontificalis*.

Another anatomist who became the physician of Julius III was Andrés Laguna (1499–1559). A botanist, pharmacologist, physician and pioneer of anatomy and urology, Laguna lived in 1545 in Rome, where he was also appointed as the personal physician of Julius III, being at the same time the physician of his predecessor Pope Paul III. Pope Julius III rewarded his work, offering him the title of *Palatine Count* and *Knight of the Pontifical Order of St. Peter*, which had been created in 1520 by Pope Leo X (Kousoulis et al. 2011).

Giovanni Battista Canano (1515–1579), also known as Giambattista, the holder of the Chair of Anatomy at the University of Ferrara, also enjoyed the honours of being papal physician. Due to his reputation and medical abilities, Battista was invited in 1552 by Pope Julius III to Rome, where he appointed him as principal physician, offering him at the same time multiple ecclesiastical benefits. Immediately after the death of the pope, in 1555, Battista returned to Ferrara, where he continued his studies of anatomy (Rees 1819). Although he only published one work entitled *Musculorum humani corporis picturata dissection* (c. 1543), a small book, Canano remained in the history of anatomy through the originality of his contribution, based on the dissections and vivisections performed on animals together with his cousin Anton Maria Canano in their house. Pope Julius III was aware of the good reputation of Canano not only as lecturer in anatomy, practical medicine and surgery at the University of Ferrara, but also as medical attendant on the Este family and protomedico of the state (Westfall 1995a). Pieces of information are scarce on the health condition of Pope Julius III, but it is believed that he might have suffered, at least towards the end of his life, from severe attacks of gout (Ceccarelli 2003; Hosler 2014) that might have affected both his hands and his legs. Therefore, towards the end of his life, between 1551 and 1553, he built a luxury residence, Villa Giulia, in Rome, equipped with baths for the treatment of his ailment (Coffin 1979) (Fig. 4b).

## **Pope Paul IV and *De re anatomica libri XV***

Pope Paul IV (1476–1559) (Fig. 4c) was Pope of Rome between 1555 and 1559, being known as one of the most energetic and reforming popes of the sixteenth century. At the same time, Paul IV also remained in history for his measures of censorship. In fact, one of the first measures that he made after being elected pope lay in his order that all the nudes from the Sistine Chapel should have been covered, a request ignored by Michelangelo.

One of his physicians was the anatomist Mateo Realdo Colombo (c. 1516–1559), the first important professor of anatomy, who, together with Vesalius and Eustachius, represented *the trinity of great original investigators in anatomy about the middle of the sixteenth century* (Walsh 1915). Pope Paul IV had heard about the anatomy courses of Colombo from the University of Padua, which were so interesting, that the public dissections were attended by hundreds of people, not only students, but also important figures of the church hierarchy. He summoned him to Rome, where he appointed him *archiater pontificalis*, becoming at the same time the physician of the cardinals from the Vatican, and gave him the opportunity of developing anatomical research (Walsh 1915).

In 1548, Colombo was appointed as professor at the Sapienza University of Rome, where he would teach until his death in 1559 (Eknoyan and De Santo 1997). His status at the Vatican allowed him to perform autopsies on several important people such as Cardinal Campeggio, Cardinal Cibo and even Ignatius of Loyola, about whom Colombo said: *with these my hands have extracted numerous calculi of various colours found in the kidneys, in the lungs, in the liver, in the portal vein....in the Venerable Ignatius, founder of the Congregation of Jesus, in whom I saw stones in the ureters, in the bladder* (Colombo 1559; Dillon 2016). He dedicated his book *De re anatomica libri XV* (Colombo 1559; Costea et al. 2017b) (Fig. 4d) to Pope Paul IV, but because Realdo Colombo died just when the work was printed, his sons changed the title page and dedicated it to the following elected pope, Pius IV (Dillon 2016).

## Pope Gregory XIII and Costanzo Varolio

Known for the fact that he updated the Julian calendar in 1582, which nowadays bears his name Gregorian, Pope Gregory XIII (1502–1585) (Fig. 4e) was also a lover of arts, so that he commissioned many artists in order to complete the decoration works at the Vatican and *Galleria delle carte geografiche* (Gallery of Maps) (Donovan 1844). He also gets the credit for having supported *Collegio Romano*, founded in 1551 by Ignatius of Loyola and which got a new headquarters in 1584 through his care. To his memory, the university nowadays bears the name *Pontificia Universitas Gregoriana* (Pontifical Gregorian University).

The personal physician of Gregory XIII was the anatomist Costanzo Varolio (1543–1575) (Dobson 1962), although some debated the matter (Westfall 1995b). Varolio was from Bologna, where he taught anatomy and surgery at the university and had *great skill in removing stones* (Westfall 1995b). Gregory XIII appreciated him and called to Rome in 1572 to teach at the Sapienza University (Westfall 1995b), in his attempt to correct the decline into which the teaching of anatomy had fallen (Carlino 1999). Although he was never listed in the *rotuli* of this institution (O'Malley 1980; Tubbs et al. 2008), the epitaph on his tombstone specifies clearly: *Medicinam et Chirurgiam percallens-Extrahendi calculi peritissimus-Cum in Gymnasio Romano-Anatomicam lectiones-Sectionemque profiteretur* (Carlino 1999). Varolio was under the patronage of the pope, who in fact appreciated him very much (O'Malley 1980).

## Pope Clement VIII and the Autopsy of a Saint

Coming from a prominent Florentine family, Pope Clement VIII (1536–1605) (Fig. 5a, b) held an important pontificate from the viewpoint of the Catholic reform, but also as concerns reconciliation with the Church of Henry IV of France (1589–1610) (Sutherland 2002). Clement VIII also gets the credit for the spreading of coffee popularity among Catholics. Considered for a long time *the bitter invention of Satan* because of its popularity among Muslims, when the pope tasted it, he said: *this Satan's drink is so delicious that it would be a pity to let the infidels have exclusive use of it. We shall cheat Satan by baptizing it!* (Davidson 1983).

His personal physician was the botanist and philosopher Andrea Cesalpino or Caesalpinus (1519–1603) (Fig. 5c), who might have elaborated the theory of blood circulation within the body before William Harvey (Humphry 1882). Cesalpino was Professor of Medicine at Pisa from 1567 to 1592, when Clement VIII called him to Rome and appointed him as his personal physician, but also *professore straordinario* at the Sapienza University (Clericuzio 2017), earning 1000 *scudi* (Bellorini 2016). Over that period, with the help of Pope Clement VIII, Cesalpino completed his work entitled *De metallicis*, which he published in 1596, dedicating it to his patron



**Fig. 5** **a** Portrait of clement VIII, by anonymous Italian (seventeenth century), Duesselderfer Auktionshaus. **b** Election of Pope Clemens VIII in 1592. Vue de la place Saint-Pierre de Rome lorsque le pape Clément VIII apparaît à la loggia après son élection en 1592, by Louis de Caullery (1600), Petit Palais, Paris. **c** Portrait of Andrea Cesalpino, painting by Battista Ricci (sixteenth century), Rettorato Università di Pisa. **d** St. Filippo Neri in Ecstasy, painting by Guido Reni (1614), church Santa Maria in Vallicella, Rome. **e** Portrait of Pope Innocent XI (1787) (public domain)

(Clericuzio 2017). The pope respected him, being known the fact that he was *very well disposed towards physicians* (Bartalini 1995), entrusting him at the same time with the task of performing the autopsy of San Filippo Neri (Bayon 1939) (Fig. 5d).

## Pope Innocent XI and Giovanni Maria Lancisi

Although for a long period of his pontificate he was concerned about his tensions with Louis XIV of France (Wolf 1972), Pope Innocent XI (1611–1689) (Fig. 5e) was a modest man who promoted genuine Christian values, reduced taxes and rejected the nepotism that existed within the Church (Maras 1984), being beatified in 1956 by Pope Pius XII.

When his personal physician died in 1688, Innocent XI summoned Giovanni Maria Lancisi (1654–1720) to hold the position, becoming at the same time *intimus cubicularius* (secret waiter) of the Pope (Mantovani and Zanetti 1993; Klaassen et al. 2011). Considered one of the founders of modern clinical medicine (Walsh 1915), Lancisi was also physician, epidemiologist and professor of anatomy at the Senior College of the University of Sapienza in Rome, where he collaborated with Marcello Malpighi (1628–1694) in his studies of embryology on the heart. Moreover, due to the success and popularity that Lancisi enjoyed, the Rector renovated and extended the anatomical theatre where Lancisi taught (Fye 1990). At the same time, he was also appointed as representative of Cardinal Altieri to lead the county that conferred the diplomas in the Medical College of Sapienza (Acierno 1994; Klaassen et al. 2011).

Lancisi was not only the personal physician of Pope Innocent XI, but also the one of his successors, Innocent XII (1615–1700) and Clement XI (1649–1721). After the death of Innocent XI in 1689, Lancisi returned to his activity of teaching, not before performing his autopsy (Di Ieva et al. 2007). One decade later, Lancisi was called again to serve the Vatican, taking care of the health of Innocent XII until the death of the pope (Fye 1990).

## Pope Innocent XII: A Lifetime Friendship with Marcello Malpighi

Innocent XII (1615–1700) (Fig. 6a) was a pope of the Enlightenment, a man of knowledge and reason (Stensvold 2015). When he was taken ill, he summoned Lancisi to serve him as his personal physician, offering him all the benefits of this position, but also conferring him the title of *Noble*, in addition to the Pope's family coat of arms (Di Ieva et al. 2007). However, his closest physician was his dear friend Marcello Malpighi (1628–1694) (Fig. 6b). Considered the founder of microscopic anatomy, Malpighi was a professor of medical practice at the University of Bologna, appointed in 1656, a year in which the University of Pisa also created a chair of theoretical Medicine especially for him (Karamanou and Androutsos 2010; Meli 1997), being invited by Ferdinand II de' Medici, the Grand Duke of Tuscany (Pouyan 2014). Malpighi resumed his activity of research with the help of the microscope that had been just invented by Sacharias Jansen (1580–1638) and Galileo Galilei



**Fig. 6** **a** Portrait of Innocent XII (seventeenth century). **b** Portrait of Marcello Malpighi, painting by Carlo Cignani (1683), Accademia di belle arti di Bologna. **c** Church Saints Vincent and Anastasius near Fontana di Trevi. **d** Festival before the Quirinale Palace, painting by Antonio Cioci (1767), The State Hermitage Museum, Sankt Petersburg. **e** Portrait of Pope Clement XI (public domain)

(1564–1642) and wrote some articles in *Philosophical Transactions* of the Royal Society of London (Karamanou and Androutsos 2010).

In 1668, the Royal Society awarded Malpighi the title of honorary member, being the first such recognition offered to an Italian citizen (Hall 2002). The pioneering studies in the field of microscopic anatomy conducted by Malpighi attracted the criticism and envy of his colleagues, who burned his house, where the manuscripts and the laboratory equipment were kept (Acierno 1994; Karamanou and Androutsos 2010). Moreover, it is said that he was aggressed by two masked colleagues of his from the University of Pisa (Pouyan 2014).

Several years later, in 1691, his good friend Pietro Antonio Pignatelli, the Catholic cardinal, attached to the University of Bologna became prince of the Church as Pope Innocent XII. He invited Malpighi to become his personal physician and, after repeated refusal, he agreed. He was appointed *cameriere segreto partecipante*, a title equivalent to the status *Monsignor* and was received in Rome with the highest honours (Reverón 2011), also appointing him as count (Pouyan 2014). The invitation of Malpighi to Rome came as a blessing for him, who ameliorated the insults that he had suffered for so many years and served the Pope until the end of his life. He spent the last years of his life with the consent of Innocent XII in the Quirinale Palace in Rome (Fig. 6d), the summer residence of popes, where he also died after a massive cerebral haemorrhage (Dupont 1999).

Pope Innocent XII agreed that the necropsy of his good friend should be performed in the Church of Saints Vincent and Anastasius (Fig. 6c) situated close to the famous Fontana di Trevi, by renowned anatomists of that time: Giovanni Maria Lancisi, Giorgio Baglivi and Antonio Maria Valsalva (Cunningham 2016). Later, Malpighi was buried at the Santi Gregorio e Siro Church from Bologna, and the inscription borne by his tombstone bears witness to the honest life that he led: *SUMMUM INGENIUM/INTEGERRIMAN VITAM/FORTEM STRENUAMQUE MENTEM/AUDACEM SALUTARIS ARTIS AMOREM* (great genius, honest life, strong and tough mind, daring love for the medical art) (Pouyan 2014).

## Pope Clement XI and Forgotten Sketches in the Vatican Library

Pope Clement XI (1649–1721) (Fig. 6e) was also a patron of sciences and arts, known for his interest in archaeology, being at the same time a great benefactor at the Vatican Library. Understanding the importance of the anatomical sketches of Eustachius, he ordered Lancisi to print the anatomical plates of Eustachius, which had lain in the Papal Library for almost 162 years (Foote 1917), the expenses being supported by him.

The first physician and secret *camériere* of Pope Clement XI was also Giovanni Maria Lancisi (Black and Goldoni 1828), whose help he asked for improving the health of the environment and the inhabitants of Rome (Fye 1990). Being confronted with an epidemic of unexpected deaths in 1705, with the consent of Pope Clement XI, Lancisi performed the autopsies on many of the victims (Fye 1990). He published the conclusions of his observations in the work *De subitaneis mortibus*, where he tried to find several explanations (Fye 1990; Lancisi 1707, 1971).

Another physician of Clement XI was Bellini Lorenzo (1643–1704), an Italian anatomist and physician, known for his studies on the structure of the kidneys that he published in his book *Exercitatio Anatomica de Structura Usu Renum* (1662). He was a professor of medicine at the University of Pisa, and he was later invited to Florence in order to hold the position of personal physician to the Grand Duke Cosimo II and then becoming senior consulting physician of Pope Clement XI (Kelly 1905).

## Conclusion

Despite that the split between science and faith continued for centuries, through the decision that they made as princes of the Church, some popes brought the two fields closer. In 1992, the 400th anniversary of Galileo's appointment at the University of Padua, Pope John Paul II admitted the error and in a letter to the University of Padua closed the controversy by saying: *The common vocation of both scientists and theologians is to contribute to the best knowledge of the Truth* (John Paul II 1992). Nevertheless, we can consider that the papacy played an important role in the development of anatomy and medical sciences through the protection and support that it provided to anatomists, who were in most cases the personal physicians of the popes as well.

## Compliance with Ethical Standard

**Conflict of interest** The author declares that the article content was composed in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The authors declare that they have no conflict or interest.

**Human and Animal Rights** This article is a novel work and does not include research involving human participants and/or animals. This manuscript is our original work and is free from plagiarism; each author has participated sufficiently in the work. The order of authorship is as stated on the title page of the manuscript. Each of us has seen the final version of the manuscript submitted for publication and has approved of it. The manuscript has been read and approved by all authors. This manuscript or a substantial part of it has not been submitted to any other journal for publication. It has also not been published previously.

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