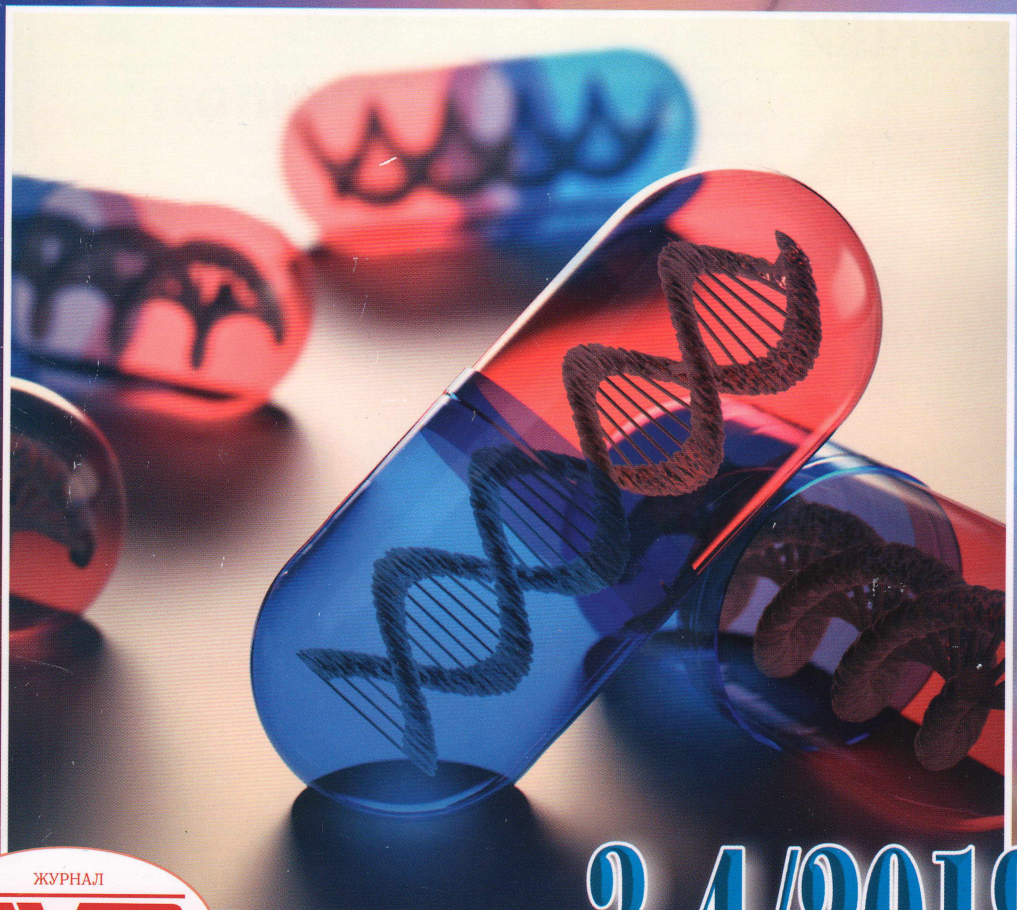


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**ANDREAS VESALIUS (1515–1564): AT THE CROSSROADS
OF ORIENTATION AND FORMATION OF NEW PRINCIPLES
OF WORLD PERCEPTION**

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The main stages of the personal and career ascent of one of the brightest representatives of the Middle Ages, the founder of the scientific direction in anatomy – Andreas Vesalius, are analyzed. His personality is viewed in the context of the formation of humanism ideas, discoveries that have changed the course of history, prominent representatives of the Renaissance, who influenced the formation of this outstanding personality. Return to the antiquity ideals, i.e. to the Renaissance humanistic principles, has been shown to open the opportunity for the establishment of a number of scientific centers and the concentration of real intellectuals of that time in them. The universalism of their thinking enabled the emergence of a new mentality and styles in art, painting, science. Andreas Vesalius, who grew up under the influence of these figures at the crossroads of the most progressive ideas of the epoch, belonged to such figures, and he himself became a great scientist.

Key words: history of anatomy, anatomical dissection, scholasticism, academic freedom, surgery, inquisition, treatment technique, Middle Ages.

Problem Statement. Andreas Vesalius's figure is inseparably linked with the historical context of the late Middle Ages, when new ideas, theories, principles of world cognition, the study of living organisms developed, and scientific directions emerged.

He symbolized a true scientist-encyclopedist, who not only absorbed the best works of his predecessors, but was able to generate completely new knowledge and develop a prism for objective world perception in medicine. The disintegration of the Byzantine Empire was accompanied by the arrival of Greek scholars and manuscripts to the West, which allowed comparing the original works of the Roman doctor and surgeon Claudius Galen, written in Greek, with their translations into Arabic and corresponding comments to them. Consequently, the main attention of medieval thinkers who studied the human body was focused on finding out the main differences in the scientific notes. The researchers of Galen's doctrine wanted to clear his works from the consequences of inaccurate translations of Arabic authors and incorrect transcription. As a result, there appeared the translations into Latin, made by the German scientist J. W. von Andernach. The popularization of Galen's works made him an indisputable authority in the field of anatomy. However, the access to these books in combination with the first anatomical dissections in the academic centers of northern Italy in the second half of the XIII century gave grounds for further scientific research confirming the views of Galen. Direct observations and individual research had only to consolidate the proposed model of the vision of the human body and the principles of its functioning. At the same time, any criticism of Galen's theory was considered to be an attack on his steadfast authority. In this regard, Vesalius's figure, his attentive investigation of the original sources, his own translation of many of them, the performance of anatomical dissections and his gradual transformation into one of the enemies of the Church, allow us to draw a parallel between him and Galen, as well as between two great encyclopedists Aristotle and Plato, a paraphrase from “Nicomachean ethics” –

“Amicus Plato, sed magis amica veritas”, also describes Vesalius’s desire to cognize the truth, even revealing serious errors in the writings of authoritative Galen.

Vesalius passed the complex stages of personal and career development as one of the brightest representatives of the Middle Ages epoch. His figure should be considered in the context of the formation of humanistic ideas, discoveries that have changed the course of history, the prominent representatives of the Renaissance, which influenced the formation of this outstanding personality.

The return to the ideals of antiquity, that is, the principles of humanism during the Renaissance, created the conditions for the establishment of a number of scientific centers and the concentration of real intellectuals of that time in them. The universalism of their thinking enabled the emergence of a new mentality and styles in art, painting, and science. Andreas Vesalius, who grew up under the influence of the authority and outlook of these figures, at the crossroads of the most progressive ideas of the epoch and becoming a great scientist, belonged to such persons. His difficult path to finding himself, a great work upon himself, broad erudition, critical thinking and incredible perseverance played a key role in the formation of a new type of scientist who relied on observation and experiment methods. Vesalius not only laid the foundations for scientific anatomy, having begun a thorough study of the human body through autopsy, but substantiated a clear distinction between religious approaches and the application of scientific principles and methods. Andreas Vesalius became an example of the struggle with contemporary medieval scholastic medicine, not only criticizing his predecessors, but also making serious discoveries in the field of anatomy, which formed the basis for the further development of various medical and biological trends in the new time.

Historiography and research base. A large number of works, which analyze the views, scientific heritage, the proposed method of studying the structure of the human body is dedicated to Andreas Vesalius. Among the leading researchers one can find such western scholars as V. Nutton, J. Hazard, L. O’Malley, H. Cook, M. Biesbrouck, A. Cunningham, D. Lanska, H. Glaser, Russian historians D. Balalykin, O. Berger, D. Izutkin, M. Engelhardt, A. Paievskiy and others.

Among the most prominent historians of medicine in the Middle Ages there is the name of American professor, former president of the International Academy of Medical History Charles Donald O’Malley, the author of the book “Andreas Vesalius of Brussels, 1514–1564” (1964) [25]. Based on the study of foreign sources, the author managed to investigate the genealogy of A. Vesalius family, kinship relations, the intellectual environment in which this unrivaled figure developed. However, the most interesting is the detailed analysis of the stages of his career, as well as those mentioned in the book well-known personalities of the Middle Ages – thinkers, inventors, artists, painters, publishers, doctors who had the greatest influence on the Vesalius’s scientific worldview. It is not only about knowledge, scientific centers, borrowing the experience of Vesalius’s predecessors and contemporaries, but first of all about the formation during the last centuries of medieval period of a special academic space, the worldview, the emergence of new methods of cognition, which contributed to the emergence of such outstanding figures as Andreas Vesalius.

The fundamental study of the historian of medicine at the Faculty of History and Philosophy at Cambridge University, director of the world-famous center “Cambridge Wellcome Unit for the History of Medicine” Andrew Cunningham “The Anatomical Renaissance: the Resurrection of Anatomical Projects of the Ancient” (1997) is devoted to the study of Vesalius’s role in establishing the scientific anatomy and changing the paradigm of traditional perception of the human body. In addition, A. Cunningham is the author of the summary publication “The Four Horsemen of the Apocalypse: Religion, War, Famine and Death in Reformation Europe” [19, 20].

Professor of History of Medicine at the University of London, V. Nutton, the author of a number of fundamental works devoted to the period of the Middle Ages, tends to believe that the main differences between Galen’s teachings and the results of the autopsies received by Vesalius, lie in the possible misunderstanding of the methodology of the Roman doctor [23, 24, p. 377]. The British scholar believes that between

Aristotle, Galen and Vesalius succession and borrowings can be traced, but Vesalius criticized his Roman predecessor precisely because he had no systematic practice of anatomical dissections.

Maurits Biesbrouck is a well-known Belgian medical scientist, one of the leading contemporary European researchers of the Middle Ages medicine, in particular the life and work of Andreas Vesalius, and the first translator of his fundamental "De Humani Corporis Fabrica Libri Septem" into Danish. He is the author of a number of fundamental works devoted to Vesalius, his surroundings. In particular, Maurits Biesbrouck, Theodor Goddeeris and Omer Steeno have to be rendered due to their collective work, which analyzes the studies of the Andreas Vesalius's contemporary – Reiner Solenander (1524-1601), a famous physiologist, graduate student from leading universities in France and Italy, who published an article in 1566, which reveals previously unknown biographical pages related to the last years of life and the circumstances of death of the great anatomist [17, p. 265–286]. The series of M. Biesbrouck works, printed on the pages of "Medical Terminology Daily", which concerned Vesalius's fatal voyage to Jerusalem, are also very important [16].

According to the French scientist Jean Hazard, Andreas Vesalius can be considered the founder of the "Medical Renaissance", because in his opinion, scientific anatomy begins with the dissections carried out by Vesalius, as well as his works, where the descriptions of the parts of the human body and the most detailed comments to illustrations were given for the first time. The researcher agrees with the thesis about his moral, intellectual and professional development among prominent sculptors, architects and painters of the Renaissance. J. Hazard devoted his study to the history of illustrations to the famous "De Humani Corporis Fabrica Libri Septem", which, according to the assumption of numerous Vesalius's biographers, were the result of close cooperation between Vesalius and Titian [22, p. 471–480]. The scientist notes that there is no documentary evidence of this assumption, but it is certainly known that the impeccable illustrations were performed by Titian's disciple, Jan Stephan Calcar – the famous representative of the Flemish school of painting.

One of the leading historians of medicine, in particular the period of Middle Ages epoch, the author of numerous works D. O. Balalykin analyzed the works of scientists who studied and criticized Galen's heritage. He tried to appreciate Vesalius's figure precisely through the prism of Vesalius's attitude to Galen [2, p. 256]. D.O. Balalykin confirmed the opinion found in most of the researchers of Vesalius's heritage, that Vesalius's views on the teachings of the great physician of Rome during his whole career have undergone a serious correction. However, the reasons for the discrepancies and mistakes in Galen's works, on which Vesalius focused his attention, according to the historian, should be sought not in the absence of anatomical material on autopsies, but in the "Aristotelian" approach to comparative anatomy, used by Galen, and, incidentally, by Vesalius himself [3, p. 113–122]. The comparison of the human body with other living organisms made it possible to trace the differences, which allowed to better understanding the motivation of such Vesalius's attitude to his great predecessor.

The collective work of D. Balalykin, O. Berger and V. Borodulin, devoted to the main erroneous stereotypes, which were predominant in the estimates of Vesalius's heritage for a long time, drew attention to a special intellectual environment, which contributed to the emergence of many scientific branches in the era of the late Renaissance [4, p. 46-51]. It dwells upon the intensive intellectual life of Europe at that time, the conception of powerful academic centers, which also influenced the formation of such extraordinary personality like Vesalius.

Vesalius became the first anatomist who spoke about the existence of contradictions between Galen's works and the contemporary medical practice. D. Balalykin highlighted that Vesalius's contemporaries believed that his research was based on Galen's groundwork, but he did that only to formulate his own conclusions, to show the main differences. D. Balalykin also speaks of the unequivocal charges of Vesalius in the plagiarism of the ideas of Roman doctors, but it seems that the great anatomist did not want to make reference to their teachings.

D. A. Izutkin analyzed Andreas Vesalius's contribution to the formation of a scientific approach to the study of human anatomy, the role of his works in the further development of this field of medical knowledge. Studying the problem of succession between Galen's doctrine and Vesalius's anatomical investigations, D. Izutkin states that there are many outdated stereotypical statements concerning the latter, especially regarding the main advantages of the groundwork of the great anatomist. In particular, it says that Vesalius's works are written according to the results of the dissections, but the most important is that he adhered to the same approaches to understanding the structure of the human body, as those formulated by Galen. It enabled Vesalius to substantiate the main issue of scientific anatomy – the organism is an integral, balanced system, all organs of which function in interaction and interconnection [10, p. 40–41].

D. Lanska, the American researcher, considers Vesalius to be an orthodox galenist who, during his life has changed his attitude to Galen due to the practice of anatomical dissections and his academic career. If at the beginning of his formation as a leading anatomist he was fond of Galen, even used some of his false allegations, then, before the appearance of his famous "De humani corporis fabrica" in 1543, Vesalius already clearly understood that the causes of Galen's mistakes lay in the fact that he anatomized animals [11, p. 17]. "Vesalius's withdrawal from the traditional Galen's theory developed gradually during his medical training and academic career" [12, p. 19]. According to the researcher, this evolution is best traced by Vesalius's and his followers' works.

Among the generalizing works which reflect the medieval epoch, the struggle between scholasticism and the birth of a new generation of scientists, the personalities of the most prominent scholars, one should mention the collective publication, which was prepared by leading scholars from Cambridge, Oxford, Indiana University. In particular, attention is paid to a separate chapter entitled "The Death of a Naturalist: Knowledge and Community in Late Renaissance Italy" [26]. Much interesting information about the epoch of the Middle Ages, its influence on the development of medicine, the formation of medical and biological branches, the struggle of the papal inquisition against rationalism can be picked up from the work of Harold G. Cook "Medicine at the Courts of Europe, 1500–1837" (1990) [21, p. 3]. The work of the famous Austrian publicist Professor Hugo Glaser, "The Investigators of the Human Body from Hippocrates to Pavlov" (1956), in which Andreas Vesalius's figure occupies one of the leading places among a number of great medieval scholars – Leonardo da Vinci, Paracelsus, Mondino de Luzzi [7, p. 4]. The author calls Vesalius "the great", since it was him who introduced the real science based on the results of anatomical dissections [7, p. 44].

Andreas Vesalius (1515–1564) was born in a known Vitting family, who lived in Nijmegen, the oldest city in the Netherlands, known since the first years of the Christian epoch. The Dutch researcher was born on December 31, 1514 in Brussels. Vesalius was the representative of the true medical dynasty. Several generations of the dynasty were scientists and experts in medicine. His great-grandfather Peter was a court physician at the Emperor of the Holy Roman Empire – Maximilian I and his wife, a professor and rector of the University of Leuven. He loved books above all, created a collection of the most famous medical treatises, spent a large part of his wealth on collecting manuscripts on medical works. Andreas's great-grandfather was a well-known mathematician and doctor, who also taught at the University of Leuven. Everard, Andreas's grandfather, was also a practicing physician, famous for his commentary to the work of one of the most famous medieval Arabian thinkers-encyclopedists Al-Razi "Ad Al Mosarema", wrote his own supplements to the first four paragraphs of "Corpus Hippocraticum" ("The Hippocrates Code"). In addition, he gave a detailed description of smallpox and measles. Vesalius's father was the court pharmacist of princess of Netherlands – Margarita Francisca.

Even since his childhood, Vesalius aspired to learn as much as possible about the human body structure, to understand the principles of the internal organs functioning, that is why he was obsessed with, at first sight, rather strange idea – to bring home the human body and study it in detail with no witnesses. This very insuperable desire of a young anatomist would lead in the future to the creation of the world's first anatomi-

cal atlas. Andreas's father was a court pharmacist and often accompanied the royal family of Charles V, often leaving for sick calls. So when he returned home, he often talked about his patients. As a consequence little Andreas showed an interest in books from early childhood, especially in anatomical treatises. He often watched the woman cooking in their house, dividing poultry or rabbit meat into parts for a dinner dish.

Andreas's greatest desire was to know the peculiarities of the human body structure, so he began a more detailed study of anatomy. This unstoppable interest in knowledge was formed under the influence of several well-known at that time personalities who were Vesalius's teachers.

It all began with his friend's father, court physician Nicholas Florent, who insisted on the boy's serious studying of medicine in Paris, which was a powerful research center at that time. In 1532 Vesalius enters the University of Montpellier, and next year moves to Paris. It is in the French capital that the fate brought Vesalius together to the luminaries, who would leave a noticeable mark in the formation of his worldview and research interests. As a sign of gratitude to his "godfather" N. Florent, who noticed the outstanding abilities of the young man, Vesalius, being a professor, would write a dedication "The Epistle on Bloodletting" (1539).

In 1537 he received his bachelor degree in medicine in Leuven, then at the University of Padua, and two years later became a professor at the same university. During the same period of time he was a professor of three Italian universities – in Padua, Bologna and Pisa. Vesalius persistently studied Latin, Greek and Arabic in order to get the original knowledge of Avicenna, Galen and Hippocrates teachings, without the layers imposed on these figures by different translators.

For a detailed understanding of the reasons why Vesalius was so enthusiastic about anatomical studies, one should focus on the activities of his direct teacher Guido Guidi [15, p. 402–403]. Guidi is mentioned in the famous work "The Life of Michelangelo" by Romain Rolland "as an outstanding physician, scientist", a "noble Florentine citizen". Guido Guidi (Latin: Vidus Vidius) (1509–1569) is an Italian surgeon, anatomist, his father was also a doctor and anatomist, and his mother was the daughter of the famous Florentine artist Domenico Ghirlandaio. After medical practice in Florence and Rome, he was invited to Paris by King Francis I, where he became his personal physician and taught at the "College de France", created by the king himself [15, p. 402–403]. In Paris Guido Guidi made friends with a very unordinary person and artist of the Renaissance – a famous Italian sculptor, jeweler and painter Benvenuto Cellini. His work "Surgery" (1544) was published in France, and was recognized as one of the best illustrated books based on the works of the Hippocrates, Galen and Oribasius. In 1547 Guidi returns to Italy, where he becomes a personal physician of the Duke Cosimo de Medici and simultaneously teaches at the University of Pisa. While being still alive, Guidi began to work upon another fundamental study entitled "Ars Medicinalis", however, it was his nephew who had to finish and publish his work between about 1596 and 1611 years [27, p. 201–203]. Vidian nerve and Vidian artery are called in honor of the great Italian.

In Paris, the fate brought Vesalius to another famous anatomist Francois Dubois (1478–1555), who was also known under several other names – Silvius Jacobus, Jacques Dubois, Francois Dubois [14]. The researcher A. Pajewski dwells upon the existence of two great physicians with the identical name and surname: the first one commented on the works of Paracelsus and Galen, and was also called "Silvius", translated from Latin as "the one who came from the forest". It was he who became Vesalius's master teacher, although he was most criticized by Vesalius. The other one was Franciscus de le Boë (1614–1672), born in Hanau, who lived in Amsterdam some part of his life. It is exactly known that since 1658 he worked as a professor of medicine in Leiden. He became the founder of the iatrochemical direction. He devoted his life to the study of the human brain. His main works were "Disputationum medicarum decas" (1663) and "Praxeos medicae idea nova" (1667) [18, p. 134].

Jacques (Jacobus) Dubois or "Silvius" was a doctor and anatomist, a doctor of medicine at the University of Montpellier, a professor at the Faculty of Medicine at

the University of Paris. It should be added that at the same time the researcher received the position of professor of surgery at the Royal College (College royal). It should be noted that this educational institution was founded in Paris in 1530 by King Francis I, where, unlike the scholastic Sorbonne, the spirit of humanism, freedom of teaching and research was dominant. Professors received their fees from the royal treasury, that is why they wore the honorary title of "professeurs royaux" (royal). Considering a very high status of college teachers which still remains one of the most prestigious scientific institutions in the field of medicine, Silvius's invitation to work in the college indicated his substantial credibility.

Paradoxically, Dubois became famous as a wonderful lecturer, but his scientific achievements were rather dubious. Despite the fact that he successfully defended his thesis, one of the first began to dissect the human body, he did not want to admit that the results of autopsies greatly differed from Galen's conclusions. Although Silvius did not become the author of scientific discoveries, he became famous for his comments. However, it was due to them that Vesalius did not apprehend his teacher positively enough. Dubois did not seek to correct the mistakes of his predecessors, did not pay attention to the practical skills of students who would have been able to dissect the living being, to analyze individual cases of diseases, dissections were performed only on animals. Consequently, it minimized the future physicians' knowledge in anatomy. Demonstrators were former barbers, they never used real parts of the body at classes, and therefore they did not satisfy Vesalius's cognitive interest either.

Silvius, being very conservative, initially fascinated by talented Vesalius, will soon show hatred to his most beloved student because of his relentless desire to know the true structure of the human body. Silvius painfully perceived any attempt of the inquisitive young man to suspect and question Galen's views, which he admired himself.

Vesalius managed to overcome the prohibitions that the anatomists of that time were afraid to transcend, which allowed him to surpass his teachers' knowledge in anatomy and become the founder of scientific anatomy. While studying in Paris, he tried to perform an autopsy in any way. At night Andreas wandered around the famous Parisian cemetery "Cimetière des Innocents", to receive the body of the executed person from the watchman for a bribe. In Montpellier, one of the oldest universities where doctors were trained and where Vesalius studied first, the anatomy developed a bit better thanks to the special order of the brother of King Charles V which permitted to dissect the body of the executed criminal once a year. Later Vesalius will consider the Parisian period of his life and scientific research to be the most fruitful.

Andreas seized every opportunity to get material for his research: he stole the bodies of the dead vagabonds, exhumed the dead from the graves. The Spanish Inquisition sentenced him to death for the dissection of corpses, but thanks to the intercession of the Spanish King Philip II, the verdict was replaced by a pilgrimage to Jerusalem.

Personal physician of King Henry II, mathematician, astronomer, doctor of sciences, and professor of medicine at the University of Paris Jacques François Fornell was one of the Vesalius's mentors. He became the author of the famous "General Medicine" (1554). It was thanks to Fornell that the terms "physiology" and "pathology" were introduced into the scientific use, and medicine also received descriptions of numerous mental and sexually transmitted diseases.

At the University of Paris Andreas Vesalius had the opportunity to attend lectures on anatomy and surgery of the famous French anatomist Andernach Günther (1487–1574), the author of the work "Four books of anatomical settings, intended for candidates of medicine, according to Galen".

In 1536 Vesalius returns to Leuven, where, along with his friend Frisius Rennie Gemma, who later became a well-known physician, mathematician, cartographer and philosopher, they untiringly continue their scientific research in the field of anatomy. They kidnapped the bodies of the executed people from the gallows, rigorously reconstructed the human skeleton to the smallest detail with their own hands. All this was done in a complete secret. As Vesalius wrote afterwards, in Leuven doctors had not even tried to study the structure of the human body in practice before he did [1, p.

14]. For this educational institution Vesalius and his techniques became a real breath of air, which made it possible to apply anatomical knowledge in the treatment of diseases. However, shortly after that, he had to leave Leuven due to a conflict with one of the instructors concerning the problem which method of bloodletting was more effective – proposed by Hippocrates or Avicenna. Everything ended in an urgent search for a new place of residence and work.

Vesalius had to look for a more secure place to continue anatomical research. That is why he moved to the University of Padua, which was under the control of the Venetian republic. After the legendary “Hippocraticus Civitas” in Salerno, where they began to train doctors for the first time in Europe and the University of Montpellier, the University of Padua with its medical faculty became a leading educational institution that was famous for its indisputable authority. Vesalius called the University of Padua “the most important educational institution around the world” [1, p. 14]. However, even a few decades ago, the situation in the University of Padua looked rather conservative. As it is described in the biography of the famous astronomer Nikolaus Copernicus, who studied there at the Faculty of Medicine in 1503-1506, the university was one of the best in the training of doctors. If Bologna was considered the best law school, Padua was an indisputable champion in medicine [9, p. 37]. However, significant changes in Padua occurred when Andreas Vesalius arrived there. The author of the book “Nikolaus Copernicus. His life and scientific activity”, written at the beginning of the XX century, very precisely describes the situation in the European medicine and in Padua, in particular. Medicine was conditionally divided into a theoretical one, limited to interpreting the views of Avicenna, Galen and Hippocrates, and the practical one, which included the study of treatment methods and surgery. However, the theoretical medicine still remains the most popular one. As it is noted in the N. Copernicus’s biography, university professors interpreted the ancient medical treatises, sometimes complemented them by their own reflections, but did not dare to investigate the real human body. The book “Anathomia” by Mundinus Liucius, which saw the world in 1316, was considered to be the most authoritative textbook on human anatomy during almost two centuries [9, p. 38]. The practical lessons consisted in the dissection of two bodies of the executed criminals – a female and a male one – once a year, on which professors demonstrated Mondini’s and Galen’s knowledge.

The status of a separate medical institution, awarded to the Faculty of Medicine of the University of Padua, and a significant degree of autonomy, the tendency to provide students with practical skills in treatment, turned it into a powerful research center.

In early December, 1537 Vesalius was awarded the PhD degree of the University of Padua. The following year, after a mandatory public dissection, a 23-year-old young man was appointed to the position of professor of surgery with the right to teach anatomy. During the next five years he headed the Department of Medicine and Surgery. His lectures were especially interesting, and draw the attention of students from other faculties who came to listen to their favorite teacher. He also became the court physician of Bishop of Padua. In addition, Vesalius received not only high status, but, finally, a decent standard of living, since in Padua the professor received a high salary.

However, according to Professor Vesalius, there weren’t enough interesting lectures to train real physicians. Therefore, he introduced the innovation – not only demonstrated dissections in public, commented on them, but depicted a fragment of a particular organ, part of the human body in all the smallest details, and then used these pictures during his lectures. It was during these public lectures that the listeners, and Vesalius himself, often found striking differences between what Galen had stated and what was found during the autopsies.

The overwhelming majority of Andreas Vesalius’s works are devoted to human anatomy. His irresistible desire to depict the structure of the human body in tables and drawings Vesalius could realize in 1538, when he published anatomical tables – six sheets of engravings of Jan Steven van Calcar’s authorship, a student of the great painter Titian Vecelli. Jan Steven van Calcar was 15 years older than Vesalius. They accidentally met in the Titian’s studio, where Calcar studied. Vesalius and Calcar

turned out to be fellow countrymen. When Vesalius told the craftsman about his idea and the need for drawings of very high-quality, the artist agreed to cooperate. Three drawings were made by Vesalius himself, and the other three were created by Calcar. The images were engraved in wooden plates. That is how the anatomical tables called "Tabulae anatomicae sex" emerged. The name of Jan Steven van Calcar was printed on the title page of the atlas.

A. Vesalius's work "On the structure of the human body" ("De Humani Corpori Fabrica libri septem") was published in Basel in 1543. The author was only 28 years old at that time. At the period when scholasticism was dominant, one needed to have honored patrons to publish a scientific paper and gain recognition. That is why Vesalius devoted his study to the Spanish King Charles V, hoping for his favor.

A scientific description of the structure of the human body was first presented in this fundamental research. Vesalius artistic abilities gave reason to assume that he was the author of some drawings in this book. Nikolai Stopii, a well-known sculptor of that time, worked on engravings together with Vesalius. They created more than two hundred original drawings, which were transposed in the form of engravings onto a wooden surface. Every element of the human body was thoroughly described. A prominent anatomist placed a text sample, cut into pieces, with sheets, on which human bodies were depicted, between the rows of tables. He also made text inserts and marked to which pictures they should be submitted. The notes were made on the inside margin, "so that they served for the reader as the author's commentary and were an indication to which particular figure that part of the body is possible to refer" [11, p. 26].

Vesalius decided to publish his work in Basel at the printing house of his friend Johannes Oporinus. This interesting person is worth saying a few words. The name of Johannes Oporinus, the real name of Johann Herbst (1507–1568), is found in the work of the famous German theosophist, occultist, Doctor of Medicine Franz Hartmann entitled "The Life and the Doctrines of Paracelsus" (1887). The author mentions Oporinus as one of Paracelsus's most famous students, who served as his personal secretary and assistant for three years, and later became a professor of Greek language at the University of Basel, a good connoisseur of medicine, who had a good command of ancient languages, and loved to collect books, along with an entrepreneur Robert Winter in 1539 they started the publishing business [6, p. 19]. Born in the poor family of the artist, thanks to incredible efforts, Oporinus became a recognized professional in his work, one of the best publishers of that time. Books from his printing house were very beautiful, and the fonts were of very high quality.

The manuscript of the book with engravings was conveyed to Oporinus through the Milan merchants. In his letter from Venice, addressed to J. Oporinus, Vesalius described his work in detail, the complexity of engravings, and the importance of their most accurate reproduction in the publishing process [11, p. 23]. "The details must be reproduced in the most precise manner and could thus become a global commons" [11, p. 25]. He drew the attention of the publisher even to the thickness and density of the lines.

Vesalius was interested not only in the high quality of the print and the shortest reasonable time during which the book had to be published, but most of all he was concerned about ethical issues, in the modern language, how to adhere to copyright. In the Middle Ages, the phenomenon of plagiarism was quite widespread, when whole abstracts or drawings were taken out of works, and author's own comments were submitted to them, without mentioning the real author. The shameful instances of reprinting his tables from the famous "Atlas" made Vesalius protect himself from such situations. The decrees that the author had to provide to the publisher served as guarantees. So, Vesalius received the decree of the Venice Senate, so that no one, without his consent, could reprint his tables under one's name. The same decree was to be given to him by the French king. In addition, these decrees had to protect the author from the persecution of the papal inquisition [11, p. 26].

Vesalius admired the doctors of antiquity, who were well-versed in anatomy and were able to perform dissections. The measure of the qualification of such doctors was the number of cured fractures, wounds and bleedings. Among the greatest authorita-

tive doctors that Vesalius admired were Galen, Theophilus, and Arab doctors. One of the greatest authorities in medicine, as Vesalius believed, was Oribasius from Pergamum (326–403), the court physician of Emperor Julian, who was considered the best compiler of the works of the great Greek doctors, especially the representatives of Alexandria medical school [13].

Andreas Vesalius was not a supporter of a particular treatment technique, because, in his opinion, the method itself could not be effective, because only the combination of medications, the necessary regimen and surgical intervention could be effective [1, p. 10]. It was precisely because of avoiding the practice, according to Vesalius, a significant part of the priceless experience of ancient Egyptians, the Persians had been lost, especially concerning the knowledge about the healing properties of various components that were used in ancient times. He was categorically opposed to the fact that doctors treated only internal diseases of the body. Vesalius convinced that medieval medicine should develop in such a way that it would not be ashamed to compare itself with the ancient methods of dissections. The main guarantee of his success was the fact that in Paris, risking his career, and often life, he performed a lot of anatomical dissections.

Vesalius deservedly believed Galen to be the first anatomist, although he subjected his conclusions to tough criticism. He reviewed the medical terminology, Latinized it as much as possible, renouncing the Greek names and archaisms. The definitions introduced by the famous scientist-encyclopedist, philosopher Aulus Cornelius Celsus, the author of the fundamental work "De medicina" ("On Medicine") in eight books including the sixth, seventh and eighth parts of his encyclopedia "Artes" were taken as the basis of those terms. In total there were up to two hundred medical terms. Vesalius criticized Galen's view of the circuits of blood circulation, in particular about the heart septum and the opening in it, through which, reportedly, the blood moves from the right ventricle to the left. In his first book Andreas Vesalius described the properties of all bones and cartilage tissue, the ligaments by means of which bones and cartilages attach to each other, the types and functions of each of them [5, p. 31–481]. In the second book the anatomist represented the types of ligaments that connect the cartilages, as well as a list of muscles [5, p. 503–1012]. The third part is devoted to the circulatory system, the fourth one describes the nervous system, the fifth book deals with the digestive organs, the sixth highlights the structure and work of the heart, and the seventh dwells upon the brain and organs of sensation.

Turning the pages of "De humani corporis fabrica" one can see that Vesalius recognized the authority of Galen. On each page of this fundamental study Professor Vesalius refers to Galen, either agrees, or refines his thoughts. He understood well that Galen had not made any dissection of the human body, and all his conclusions had been based only on the results of the dissections of monkeys, which led to erroneous statements. Galen's successors blindly compiled his thoughts, without taking into account that Galen himself made a lot of refinements and corrected himself. All the shortcomings, exposed by Vesalius, were presented in his work, and reliable comments were added to the images so that other doctors could study in a qualitative way. Let's add that the total criticism of the generally recognized authority caused the ambiguous perception of Vesalius by other doctors of that time.

Previously mentioned Vesalius's teacher "Silvius" or Jacques Dubois from the University of Montpellier was among those who reacted to criticism of Galen's views too sensitive, because he perceived his doctrine as a dogma. His biased attitude to everything that Vesalius did, turned into an open conflict and baiting. Silvius considered abnormal and heretical everything that did not coincide with Galen's teachings. He expressed his negative attitude in the form of an insulting pamphlet "Defamation of the slander of some madman for the anatomical work of Hippocrates and Galen, compiled by Jacques Silvius, the king's counselor on medical issues in Paris" (1555). This work consisted of 28 chapters. The author recanted his student Andreas Vesalius as the one who spoke out against the generally accepted doctrines of medicine.

Due to a powerful wave of persecution and harassment, he had to leave his position at the University of Padua in 1544, to destroy the vast majority of his personal

archives, in fact, to abandon his life. Vesalius's virtue was especially affected by inuendos from his students with whom he shared his invaluable experience. His best student Realdo Colombo (1516–1559) suddenly became one of them; in the future he would be a great anatomist, Vesalius's follower. He studied at the University of Padua. He was his aides and assistant. However, after Vesalius was so much criticized, he began to discredit his teacher. As soon as Vesalius left Padua in 1544 Colombo headed his department at the university. But later he moved to Pisa, and from 1551 he taught at the University of Rome. His most famous work was fundamental "De La Anatomica libri XVI" which consisted of 15 books, overlapping many of Vesalius's ideas [8, p. 70–73]. Even if you compare the covers of the works of both outstanding anatomists, you will see the image of the public dissection. As N. Goncharov notes, Colombo boldly began to criticize Galen, denying his doctrine of blood circulation and heart work. However, if Vesalius had always been faithful to his moral principles, Colombo's behavior "manifested craftiness and timeserving", since he initially admired and praised Galen, but as soon as he received Vesalius's position, he began discrediting not only Galen but his predecessors and teachers [8, p. 71].

Another famous disciple, who headed the department after Vesalius and Colombo, was Gabriel Fallopius (1523–1562). Due to determination and diligence in the study of the human body, researcher G. Glaser, called Fallopius the second largest anatomist of the XVI century [7, p. 67]. Like his teacher, he sharply criticized Galen's views. He performed dissections by himself and published the results in his work "Observations", continuing the study of the anatomy of female reproductive system, started by Vesalius [7, p. 66].

According to life circumstances Vesalius had to return to medical practice and became a court surgeon at the Emperor of the Holy Roman Empire, Charles V. So he returned to Brussels in 1545. After the emperor renounced the throne and went to the monastery, the great anatomist in 1556 continued his service at his son's – Philip II, who became king of Spain. Because of this, Vesalius had to move to Madrid, where he faced another, even greater, wave of anger from the Spanish Inquisition. He was accused of performing an autopsy on a living person. The heart of a woman, who was believed to have died, suddenly beat during an autopsy [7, p. 64]. It is clear that this was only one of the reasons, as Vesalius had encroached upon many provisions of the Holy Scripture. In addition, public accusations of a lie by Silvius, whose opinion was important for other scholars, was construed as sufficiently substantiated. His criticism of Galen was automatically considered a blow to the credibility of Silvius. Only the intercession of Philip II saved the great anatomist from execution.

He was sent to a pilgrimage to the Holy Sepulcher as a form of punishment for the spread of "heretical" teaching. He left Madrid and moved to Venice, where he had to start his journey. During this difficult journey, Vesalius was about to lose his life, but miraculously got rescued from the sunken ship. His very emaciated body was found on the coast of Zakynthos island. However, all the events left an imprint on his health, and on October 15, 1564 Vesalius died.

Conclusions. Thus, Andreas Vesalius's extraordinary personality was formed under the influence of a new style of world perception – the Renaissance epoch – of ideas, theories, figures that irreversibly changed the course of history. The great medieval thinkers, who at different times left a mark in Vesalius's life, changed his mentality, motivated him for further research. It resulted in the emergence of absolutely new approaches to understanding the anatomical structure of the human body and the principles of its functioning. His figure clearly demonstrates not only the history of the conception of one of the leading branches of medicine – anatomy, but shows a number of factors of a personal and historical nature. They formed a new type of scientist-encyclopedist Andreas Vesalius who could not be a conformist, at the cost of losing a career, and even life. He changed the paradigm of understanding the structure of the human body. Thus, his teachings and techniques created the necessary basis for separating science from religious layers and prohibitions, which allowed the next generations of scientists to seek new ways of diagnosing and treating diseases and fighting epidemics.

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АНДРЕАС ВЕЗАЛІЙ (1515-1564): НА ПЕРЕХРЕСТІ ЗАРОДЖЕННЯ ТА ОКРЕСЛЕННЯ НОВИХ ПРИНЦИПІВ СВІТОСПРИЙНЯТТЯ

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Проаналізовано основні етапи особистісного та кар'єрного сходження одного з найяскравіших представників епохи середньовіччя, засновника наукового напрямку анатомії Андреаса Везалія. Його постать розглянуто у контексті формування ідей гуманізму, відкриттів, які змінили хід історії, визначних представників епохи Відродження, що вплинули на формування цієї непересічної особистості. Показано, що повернення до ідеалів античності, тобто принципів гуманізму в період ренесансу, відкрило можливість для заснування ряду наукових центрів та зосередження в них справжніх інтелектуалів того часу. Універсалізм їхнього мислення сприяв зародженню нової ментальності і стилів у мистецтві, живопису, відкриттів у різних галузях наук, зокрема в медицині, біології та хімії. До таких постатей належав і Андреас Везалій, який зростав під впливом цих постатей, на перехресті найпрогресивніших ідей епохи і сам став одним з тих, хто створив фундамент для формування наукової анатомії і сучасної медицини взагалі.

Ключові слова: історія анатомії, анатомічний розтин, схоластика, академічна свобода, хірургія, інквізиція, методика лікування, середньовіччя.

АНДРЕАС ВЕЗАЛІЙ (1515-1564): НА ПЕРЕСЕЧЕННІ ПРОЦЕСОВ ЗАРОДЖЕННЯ И ФОРМИРОВАНИЯ НОВЫХ ПРИНЦИПОВ МИРОВОЗЗРЕНИЯ

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Проанализированы основные этапы личностного и карьерного становления одного из самых ярких представителей эпохи средневековья, основателя научного направления анатомии Андреаса Везалия. Его личность рассмотрена в контексте формирования идей гуманизма, открытий, изменивших ход истории, великих представителей эпохи Возрождения, которые повлияли на формирование этого незаурядного учёного-энциклопедиста. Показано, что возвращение к идеалам античности, т. е. к принципам гуманизма в период ренессанса, открыло возможность для возникновения ряда научных центров, сосредоточения в них настоящих интеллектуалов того времени. Универсализм их мышления способствовал зарождению новой ментальности и стилей в искусстве, живописи, открытий в различных отраслях наук, особенно в медицине, биологии и химии. К мыслителям такого уровня принадлежал и Андреас Везалий, мировоззрение которого не только сформировалось под влиянием великих представителей возрождения, самых прогрессивных идей эпохи, но и стало определяющим для дальнейшего становления и развития научной анатомии, физиологии и современной медицины вообще.

Ключевые слова: история анатомии, анатомическое вскрытие, схоластика, академическая свобода, хирургия, инквизиция, методика лечения, средневековье.