

REVIEW ARTICLE

The Anatomy in Greek Iatrosophia during the Ottoman domination era

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Summary

The knowledge of Anatomy during the Ottoman domination in Greece has not been widely studied. Medical knowledge of the time can be retrieved from folk and erudite books called Iatrosophia. The majority of these books focused on empirical diagnostics and therapeutics. However, a small quota of these Iatrosophia includes important information about anatomy. The interest in anatomy appears only after the Neohellenic Enlightenment (1750-1821) and has been associated to the scholarly background of the 1821 revolution against the Ot-

tomans. At the same time, anatomy has been discussed by various authors in diverse contexts. All in all, it appears that a consensus on the importance of anatomy has been established among Greek scholars in the late 18th century, leading to the translation of current anatomical knowledge to the contemporary language and literature.

Key words: anatomy, history of medicine, Iatrosophia, Neohellenic Enlightenment

Introduction

Medicine in Greece during the Ottoman domination has not been widely studied. It appears that during this period, whose duration differs from territory to territory, medicine has been practiced either by physicians and pharmacists trained in European Universities, or by empirical healers. Medical knowledge of the time has been collected in a series of manuscripts authored by representatives of both sides. Although the names of these authors are not fully known, their manuscripts collectively adapted the name “*Ιατροσόφια*” or Iatrosophia. The exact definition of the term Iatrosophia is vague. This compound word derives from “*ιατρό-*” (iatró-[according to the International Phonetic Alphabet]), which means “medical”, and “*-σοφία*” (-sophía), which means “wisdom”. It has been first encountered as a name of the books that Byzantine physicians used [1].

During Ottoman domination, Iatrosophia pertained to medical manuscripts which were divided in those who had a known author and those whose author(s) remained unknown. Iatrosophia have also been divided with regard to the identity and social background of the author in erudite and folk ones. Iatrosophia were expected to be a source of medical knowledge for a wide range of practitioners many of whom did not have formal medical education. Hence, the majority of them elaborate on several aspects of diagnostics and therapeutics such as botany and folk medicine [1,2].

Basic medical science disciplines such as anatomy, morphology and pathophysiology appear underrepresented in these texts according to our sources. Formally trained physicians of the time were able to retrieve information from Latin or an-

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cient Greek textbooks whenever necessary, while such information was not easily communicated to folk practitioners and healers. However, several authors of Iatrosophia have dedicated parts of their work on summarizing or even analyzing information related to human anatomy [1].

The purpose of our study is twofold. We first spot passages dedicated to Anatomy in a wealth of medical manuscripts dated back to the era of Ottoman domination of Greece. Then we discuss their significance, the grounds on whom the author presented anatomical knowledge and we attempt to draw conclusions concerning the basic medical science literacy of Greek physicians at the specified time.

Methods

We searched all the medical manuscripts of the period that were included in the archive of J. Karas (an account of the scientific manuscripts written in Greek during the Ottoman domination era). We found that manuscripts containing information about anatomy were written in the last decades before the Greek War of Independence of 1821. On these grounds, we searched further the F. Heliou – Benaki Museum 19th century manuscripts database. We also searched Iatrosophia retrieved from the archive of the Medical Museum of the University of Crete, and from the Public Library of Dimitsana.

As far as these accounts are concerned, we went through the passages and summaries that they listed in order to spot books and books chapters dedicated to anatomy. We listed twelve manuscripts that seemed to include such information. After carefully going through their contents (where available) and passages we narrowed down to six manuscripts. Moreover, we retrieved secondary information from previous works citing anatomy references in the “*Ερμής ο Λόγιος*” (*Hermes the Scholar*) journal. Such information was retrieved from the work of the Greek historian of medicine Dr. D. Karaberopoulos concerning medical science in the Neohellenic Enlightenment.

Results

We narrowed our search down to the following Iatrosophia:

- I. *Εγχειρίδιον της των Ζώων Οικονομίας (Manual of animal economy)* authored by Kirikos Chairētis [3].
- II. «*Ομιλία Φυσιολογική περί του εαυτόν γνώναι, ορθώς διαλέγεσθαι δηλαδή κατά γένος αρετήν και κακίαν, είτε η Ηθικολογική*» (*Physiological Speech regarding self-knowledge, choosing correctly between virtuousness and viciousness or Ethicology*) authored by Georgios Chrysovelonis [4]
- III. *Εγχειρίδιον Συμβουλευτικόν Περί Φυλακής του Νόος και των Πέντε Αισθήσεων (A Handbook of*

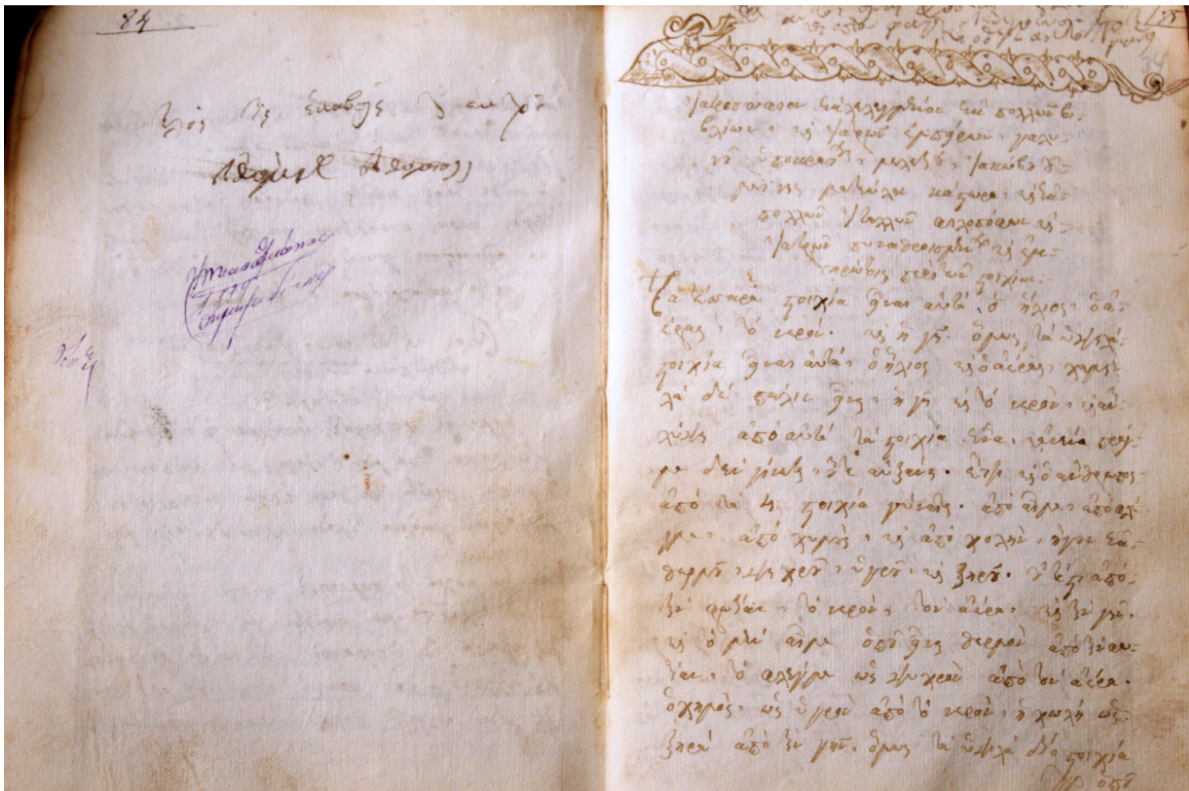


Figure 1. A photograph demonstrating two pages from the Iatrosophion of Dimitsana authored by Iakovos. Reproduced by kind permission of Public Library of Dimitsana, Peloponnese, from [7].

Spiritual Counsel) authored by Nicodemus the Hagiorite [5].

- IV. Selected passages from texts of Dionisios Gazis and other authors [6].
- V. An Iatrosophion authored by Iakovos from Dimitsana, Peloponnese [7] (Figure 1).
- VI. An Iatrosophion authored by Ioannis Athanasiou from Papingo [8] (Figure 2).

The I is a medical textbook dedicated to respiratory, digestive and blood physiology [3]. Kirikos Chairetis (1756-1830) was a renowned physician from Crete who has extensively studied these topics abroad and served as a personal physician of the Ottoman Sultan Mahmud II. He wrote this book in order to educate contemporary practitioners on basic medical science. In this notion, he elaborates in depth on the anatomy of the respiratory and digestive system, providing an extensive account of the circulatory system anatomy. Chairetis' work depicts a deep understanding of the interaction of anatomical structures and an effort to connect gross and microscopic anatomy. The anatomy of the respiratory system includes basic concepts such as the division between upper and lower airways or the pulmonary lobes, while microscopic features such as trachea's cartilage and musculoskeletal anatomy (thoracic wall, pectoral muscles etc.) are examined in a functional context. The digestive system is also presented from the tongue to the large intestine, and a wealth of features from the anatomy of the teeth and the tongue to the "four layers of the colonic wall" or the large intestine's "lymphatic circulation" are discussed. These layers consist of a membrane, which forms the intestinal lumen, and of three muscular bands, whose role is to support the sphincter and peristaltic mechanisms. Although there is not a clear distinction of mucosa and submucosa the triple muscular band resembles to the taeniae coli.

Anatomy is also prioritized in the blood physiology chapters where the anatomy of the heart, as well as, morphological features of arteries, veins, and lymphatic vessels, are discussed in detail [3]. The lymphatic vessels are called "γαλακτοφόρα" (galaktophóra) and are associated with the intestines, where they absorb the "χυλός" (khylos), a product of food digestion. Small lymphatic vessels merge forming a common trunk between the diaphragm and the thoracic vertebrae. The common trunk ascends behind the right lung, crosses between the aorta and the azygos vein and forms an anastomosis with the left subclavian vein or with the left jugular vein at the C6 level. Although there seems to be a misconception of the lymph as far as physiology is concerned, the account of the common lymphatic ducts and tract anatomy is



Figure 2. A photograph demonstrating the first page from the Iatrosophion authored by Ioannis Athanasiou from Papingo. Reproduced by kind permission of the Medical Museum, University of Crete, from [8].

quite interesting. In fact, Chairetis was not aware of the division between the right lymphatic duct and the thoracic lymphatic duct. Hence, he also ignored that the lymph is drained in both subclavian veins. He was also unaware of the role of lymph nodes. As far as the drainage is concerned, Chairetis mentions that it occurs continually in small quantities suggesting his perception of the lymphatic peristalsis.

The II is an erudite manuscript which addresses a broader audience [4]. Georgios Chrysovelonis (1756-1822) was also a formally trained physician who practiced in his native island of Chios and in Nafplion. Besides his medical practice, he was actively involved in the preparation for the 1821 revolution. His treatise deals with neuroanatomy. He dedicated 23 chapters of his book to the brain. Initially, he presented a tripartite division of the Central Nervous System (CNS) in "principal brain", "spinal cord" and "cerebellum", as well as the surface anatomy of the brain, describing its color and the morphology of gyri and sulci. He also presents the ventricular system, the circulation of the cerebrospinal fluid (CSF) and the division of the spinal cord in four parts, which he misinterprets arguing

that half of them derive from the “principal brain” being superior to the rest which derive from the cerebellum. Chrysovelonis also appears to be familiar to the meninges as he describes features of their morphology and their role in CSF circulation. In particular, he describes the dura mater as the thickest layer of connective tissue surrounding the brain which is attached to the skull and to the falx cerebri. He also points out that the pia mater firmly adheres to the surface of the brain and is loosely connected to the arachnoid mater. Furthermore, Chrysovelonis presented the origin, the course, and the macroscopic morphology of the cranial nerves, which according to him are only nine. He describes each nerve function without giving a specific name to most of them. On this account, he attributes olfactory function, vision, ocular motility and visceral innervation to the cranial nerves. The “non-cranial” CNS nerves arise from a structure that seems to include both the medulla oblongata and the cervical spine and in this notion, it seems that these “non-cranial” CNS nerves could be the accessory, the hypoglossal and the vagus nerve although their functions have already been attributed to the cranial nerves. Further details are not provided. He also highlights that the twofold outgrowth of cranial nerves is identical to the outgrowth of similar structures in the plants indicating a background of comparative anatomy.

This knowledge derives from dissections or autopsies, given that Chrysovelonis often uses examples from this context in order to describe the topographical features of CNS structures. All in all, the anatomy account of Chrysovelonis provides a detailed description of CNS according to the knowledge of that period in Greek language.

The III is a theological and philosophical treatise authored by Nicodemus the Hagiorite (1749-1809) [5], a monk who was later proclaimed a Saint and was actively involved in “Kollyvades”, a movement among monks of Mount Athos that attempted to counteract the influence of western scholars of the time. He also presents features of CNS anatomy with a special interest on the neuro-anatomy of perception. His account is particularly detailed regarding visual and acoustic perception. Nicodemus appears to be aware of the gross anatomy of the eye and the ear mentioning the function of the retina and the tympanic membrane respectively. Although he does not elaborate in detail about these because of the nature of his treatise, in the end of his book he has included a short chapter presenting anatomic structures according to the “dissections of modern scholars” indicating his familiarity with scientific oeuvres of the time. He emphasized on the connection of the sensory

organs to the brain through neural structures. He also argues in favor of the sensory role of the heart on the grounds of its connection to the brain through “tubal nerves”.

The IV consists of a collection of passages and texts that focus on the anatomy of the heart [6]. The authors pay special attention to the surface anatomy of the heart making significant clinical correlations. Moreover, the shape of the heart is discussed in geometrical terms (cone) and several hypotheses are made concerning the structure and junctions of myocardial fibers.

The V, an Iatrosophion from Dimitsana, Peloponnese authored by Iakovos [7] offers some additional insights in the knowledge of anatomy during that period. The whole manuscript is a compilation of theology, philosophy, scientific and folk medicine. Most of the content consists of a condition-focused discussion folk remedies. Although the remedies themselves are of empiric character and do not resonate with a clinical interpretation of the existing anatomical knowledge, formal anatomical terms such as “έντερον” (énteron = bowel), “κοιλία” (koilía = abdomen and ventricle depending on the context) and “οφθαλμός” (op^htalmós = eye) can be found among the titles of the subsections.

The introduction of the book is richer in terms of anatomy. The initial part of the introduction presents a more theological and philosophical consideration of the human body and health. Right after this introduction, the author provides a brief overview of human embryology focusing on the heart. Reciting Aristotle (384-322 BC), the author suggests that the heart is the first organ to be developed during embryonic life because of its primordial role in circulation and in the production of the four humors.

Although Aristotle considered the heart as a three-chambers organ [9], the author mentions that the heart consists of four ventricles. The author does not elaborate further on the structure of the heart or the associated vessels but emphasizes on the position of the heart in the thoracic cavity. He mentions that most of the heart is located “ζερβά” (zervá = at the left) but a smaller part can be found at the right part of the thorax. He hypothesizes that this part does not put weight on the “οισοφάγος” (esophagus), understanding, seemingly, that the base and the apex of the heart are into the left hemithorax. The rest of his account of the heart presents an obscure theory correlating the 30 days of the month with the production of blood and other humors by the cardiac ventricles.

The VI from the collection of the Medical Museum of the University of Crete [8], included a versatile account of folk medicine with a strong

focus on botany and the use of natural remedies for common and uncommon ailments. Distinct anatomical terms of specific organs such as “οφθαλμός” (eye) or “κοιλία” (abdomen) would be found dispersed in the text; however, the author does not provide any detailed description of their anatomical structure.

Discussion

All in all, going through these texts has led to interesting conclusions and revealed obscure points for discussion. It appears that a diverse group of authors rediscovered anatomy in the last decades before the 1821 Revolution. The interest in science and in educating the occupied populations included a deepening of the contemporary medical knowledge or a switch of practical and empirical treatment to etiologic comprehension of the human body and its pathogenesis [10].

Moreover, it seems that this interest is related to the so called Neohellenic Enlightenment. Drs Chairetis and Chrysovelonis, were influenced by the advance of science in Italy and Europe and attempted to introduce this knowledge in Greece [3,10]. The journal “Ερμής ο Λόγιος” (*Hermes the Scholar*) served also the same purpose [11]. On the other hand, Nicodemus belonged to a spiritual movement known as “Kollyvades” which attempted to counteract the influence of western civilization in Greek science of the time. Despite this conflict, it seems that spreading the word about basic medical science was widely acceptable even among the most conservative minds of the time [12,13].

The diversity of the texts that referred to anatomy is also remarkable. Apart from the physiology textbook of Chairetis – which fits more to the definition of Iatrosophia – anatomy is discussed in ethical and philosophical/theological treatises. Chrysovelonis used the anatomy of the brain in order to formulate a new conscience encompassing liberty and revolution, while Nicodemus merged theological concepts with contemporary medical knowledge [6,14]. At the same time, Iakovos appears as an interesting mix of an erudite scholar and folk practitioner [7]. His knowledge ranges from ancient Greek philosophy of medicine to rituals capable of dissolving marriage. His work reveals the popularity of the medical theories of Aristotle, Hippocrates (460-377 BC) and Galen (c.130-201) among the folk medicine practitioners of the time, despite the discoveries of Andrea Vesalius (1514-1564) and William Harvey (1578-1657).

In both cases, it seems that anatomy serves as a common rational ground that should be implemented before discussing national or personal

conscience. Furthermore, anatomy is also featured in a periodical edition, a new form of knowledge communication that challenges the authenticity of a book and illustrates the continuous renovation of knowledge [6,15]. The diversity of genres and contexts that host anatomy at this period indicates the existence of a consensus about its significance.

Finally yet importantly, the anatomy of Iatrosophia could be correlated to the linguistic issue of Modern Greek language. Although no conflict appears between erudite and folk language at that time, the fact that medical science escaped the “sacred” language of ancient Greek and Latin textbooks and was translated in contemporary Greek language and introduced in a variety of contexts is very important and should be further studied [16].

Our study faces a number of restrictions such as the lack of access to manuscripts that have not been archived yet. Moreover, we focused on Iatrosophia or significant passages the referred to anatomy and not on remote use of anatomical terms. Hence, our findings focused on erudite Iatrosophia rather than folk or anonymous ones. In the future it would be interesting to assess the perception of anatomy by empirical healers such as the Pantazides. It would also be important to correlate these findings with similar manuscripts of the Ottomans or other people who endured Ottoman domination.

Conclusions

All in all, here we collectively demonstrate the anatomical knowledge regarding folk and erudite Iatrosophia. Although rare, this information provides an insight of the medical awareness of that time, which have never been presented before in such a unique way, providing a valuable resource for Greek medical history during the Ottoman domination era.

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Conflict of interests

The authors declare no conflict of interests.

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