

Greek language: analysis of the cardiologic anatomical etymology: past and present

Idioma grego: análise da etimologia anatomocardiológica: passado e presente

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Abstract

Introduction: The Greek language, the root of most Latin anatomical terms, is deeply present in the Anatomical Terminology. Many studies seek to analyze etymologically the terms stemming from the Greek words. In most of these studies, the terms appear defined according to the etymological understanding of the respective authors at the time of its creation. Therefore, it is possible that the terms currently used are not consistent with its origin in ancient Greek words.

Methods: We selected cardiologic anatomical terms derived from Greek words, which are included in the International Anatomical Terminology. We performed an etymological analysis using the Greek roots present in the earliest terms. We compared the cardiologic anatomical terms currently used in Greece and Brazil to the Greek roots originating from the ancient Greek language. We used morphological decomposition of Greek roots, prefixes, and suffixes. We also verified their use on the same lexicons and texts from the ancient Greek language.

Results: We provided a list comprising 30 cardiologic anatomical terms that have their origins in ancient Greek as well as their component parts in the International Anatomical Terminology. We included the terms in the way they were standardized in Portuguese, English, and Modern Greek as well as the roots of the ancient Greek words that originated them.

Conclusion: Many works deal with the true origin of words (etymology) but most of them neither returns to the

earliest roots nor relate them to their use in texts of ancient Greek language. By comparing the world's greatest studies on the etymology of Greek words, this paper tries to clarify the differences between the true origin of the Greek anatomical terms as well as the origins of the cardiologic anatomical terms more accepted today in Brazil by health professionals.

Keywords: Etymology. Terminology as topic. Cardiology.

Resumo

Introdução: O idioma grego, base para a criação do idioma latino, está muito presente na terminologia anatômica. Muitos trabalhos buscam analisar etimologicamente os termos provindos do idioma grego. Na maioria destes, os termos aparecem definidos conforme o entendimento etimológico dos respectivos autores da época de sua criação. Portanto, é possível que os termos atualmente utilizados não estejam condizentes com sua origem no idioma grego antigo.

Métodos: Foram selecionados termos anatomocardiológicos derivados do idioma grego que constam da terminologia anatômica internacional. A análise etimológica foi realizada por meio dos radicais mais primitivos que compõem os termos. Os termos anatomocardiológicos atualmente utilizados na Grécia e no Brasil foram comparados aos radicais originários do idioma grego antigo. Utilizou-se a decomposição morfológica dos radicais, prefixos e sufixos e verificou-se o emprego dos mesmos em léxicos e textos do idioma grego antigo.

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Abbreviations, acronyms & symbols	
B.C.	Before Christ
G.L.	Greek Language
A.G.L.	Ancient Greek Language
M.G.L.	Modern Greek Language
NA	Nomina Anatomica
PNA	Parisiensia Nomina Anatomica

Resultados: Foi feita uma lista com 30 termos anatomocardiológicos derivados do idioma grego e componentes da terminologia anatômica internacional. Os termos constam na forma que foram padronizados no Brasil,

INTRODUCTION

Anatomy is the area of medical science that deals with the structure, arrangement and function of human organs, as well as the dissection of the body with the aim of studying its various parts. Anatomy designates all parts of the human body for teaching purposes. It is an independent branch of medical science, and it is essential for understanding the clinical facts. Heart anatomy, or cardiac anatomy, is used to designate the terms related to the anatomy of the heart. The word *analysis* comes from the Greek. Since Ancient Greece, it means “examination and study of a situation or an object in terms of the parts composing its simplest elements. It has the purpose of addressing and clarifying the situation or object through the breaking up of a whole into smaller parts” [1]. Etymology is the study the origin of the words. It studies the sources (roots) of words going back to the words that originated them [2].

The Greek Language (GL), the basis for the creation of the Latin language [3], is much present in coining terms of anatomy. The spoken language of Greece comes from a prehistoric language, the Indo-European language, which is actually a hypothetical language supported only by poorly documented evidence [3]. This language appears in a given period of the Ancient History when people coming from India join others who were already living in parts of Europe. Historically, it is concluded that, with the experience of living in society these people have developed close ties and also an almost common language [3,4]. The differentiations and peculiarities of the Greek language, however, began to develop soon after the dissociation of the Greek people (the Hellenos) from the other Indo-European peoples. This probably occurred during the third millennium BC. At least, 2000 years B.C., the Greeks were already living in their territory, which they called Elláda [3,4], known in Brazil as the Hellenic Republic or Greece.

Other most ancient languages prior to the Greek language and spoken in the same territory represented a

no inglês, no idioma grego moderno e os radicais do idioma grego antigo que os originaram.

Conclusão: Muitos trabalhos tratam da verdadeira origem das palavras (etimologia), porém, a maioria não retorna aos radicais originários ou não os relaciona com seu emprego em textos do idioma grego antigo. Ao comparar as maiores obras mundiais relativas à etimologia dos termos gregos, o presente trabalho esclarece as divergências entre a verdadeira origem dos termos anatomocardiológicos e as origens mais aceitas hoje no Brasil pelos profissionais da saúde.

Descritores: Etimologia. Terminologia como assunto. Cardiologia.

linguistic substrate of minor importance for the GL. This fact is evidenced by glossological factors existing in that language and not found in any other language [3,4]. The GL, in spite of being the ancient language that fewer changes have undergone over the centuries, it is not grammatically or phonetically identical to Modern Greek. Deviations might have occurred in etymological terms derived from the Greek language. In Brazil, the standardization of terms occurred according to with the Parisiensia Nomina Anatomica (PNA) in 1955. Later, in 1965, it was referred to as Nomina Anatomica (NA). It originated in 1998 the new corpus of anatomical terms called Anatomical Terminology. Since this new corpus was adopted, there is a constant search for consensus. It has been revised, expanded, and modified four times [5].

In several studies similar to the present one, the words are defined accordingly to the authors’ etymological understanding at the time of its creation abroad. Thus, the etymological definitions of the terms currently used are not always consistent with their origin, the ancient Greek language (AGL).

The objective of the present study is to analyze the etymology of the terms of the heart anatomy derived from the Greek language through its more ancient radical and to compare it to the etymological definition given currently in Greece and Brazil.

METHODS

As an initial criterion, in order to perform an analysis of the heart anatomy, we selected terms derived from Greek language contained in the international anatomical terminology. We excluded all the terms derived from Latin. We performed an etymological analysis of the roots used to build the most primitive terms returning to the origins of the AGL and relating them to the terms currently used in Greece and Brazil in their present anatomical terminology.

Due to the antiquity of the language, it was also

necessary to verify the use of terms in various stages of history and analyze them as the meaning contained in the respective texts and passages. Finally, we carried out a cross-information. Therefore, a criterion for selection was the diversity of sources for bibliographic analysis. We gathered all forms of use of terms of various areas of knowledge. We used etymology books and Greek dictionaries not translated into Brazil from Greek writers and teachers [3,6,7]; philosophy dictionaries and literature [1,8]; Brazilian etymological dictionaries [9-15], specific American and French etymological dictionaries [16-19]; literature and history of the Greek language [4]; translated literature related to several epochs; events and people of Ancient Greece [20-23], and specific articles about etymology [24-26].

In order to obtain the correct source of terms, their orthography in the Greek language has also been considered, once the linguistic analysis is critical to distinguish between etymological meanings. We examined the use of the studied terms by means of references related to ancient sources, from the Epics of Homer to the references of Aristotle, and we compared the most recognized international etymological lexicons and encyclopedias, including the Greek sources with other Brazilian studies. We did not consider the translation given at the time of the creation of the terms that most often occurred outside Greece. We used to accomplish that, the morphological decomposition of the roots, prefixes and suffixes. We examined the use of the roots in texts of the AGL.

RESULTS

Terms analysed:

Standard term in Brazil: ANASTOMOSE

English: Anastomosis

AGL term: αναστομώ(v.) (pronunciation – anastomô) – from αἶνα “up repeatedly” e στόμα “mouth”

MGL corresponding term: αναστόμωση (pronunciation – anastómossi)

Standard term in Brazil: ANATÔMICO

English: Anatomical

AGL term: ανα (pronunciation aná) / τέμνω(v.) (pronunciation – témno)

MGL corresponding term: ανατομικός (pronunciation – anatomicôs)

Standard term in Brazil: ANGIOLOGIA – ANGIO

English: Angiology - Angio

AGL term: άγγος (pronunciation – angôs) / λόγος (pronunciation – lógos)

MGL corresponding term: αγγειολογία (pronunciation – anguiologuía) / αγγείο (pronunciation – anguío) / λόγος (pronunciation – lógos)

Standard term in Brazil: AORTA

English: Aorta

AGL term: αείρω(v.) (pronunciation – aíro) ‘lift up, tie, fit into, hang’

MGL corresponding term: αορτή (pronunciation – aortí)

Standard term in Brazil: ARTÉRIA

English: Arteria

AGL term: αρτώ(v.) (pronunciation – artô) “hang, hold it high”

MGL corresponding term: αρτηρία (pronunciation – artiría)

Standard term in Brazil: AUTÔNOMO

English: Autonomous

AGL term: αυτόνομος (pronunciation – aftónomos) “regulated by its own laws”

MGL corresponding term: αυτόνομος (pronunciation – aftónomos)

Standard term in Brazil: BRONCO- (MEMBRANA BRONCOPERICÁRDICA)

English: Broncho

AGL term: βρόχω (approximated pronunciation – bróco) “swallow, devour”

MGL corresponding term: βρόγχος (approximated pronunciation – vrôncos)

Standard term in Brazil: CARDÍA - CARDIO-

English: Cardio-

AGL term: καρδία (pronunciation - cardía) “heart”

MGL corresponding term: καρδιά (pronunciation – cardiá)

Standard term in Brazil: CIRÚRGICO

English: Surgical

AGL term: χείρ- (pronunciation aproximada – quir) “hand” / εργον (pronunciation – érgon) “trabalho” / -ικος (pronunciation – ikos) “relative to”

MGL corresponding term: χειρουργικός (pronunciation – quirurguikôs)

Standard term in Brazil: CLÍNICO

English: Clinical

AGL term: κλίνη (pronunciation – clíni) “hospital bed” / -ικος (pronunciation – ikos) “relative to”

MGL corresponding term: κλινικός (pronunciation – klinikôs)

Standard term in Brazil: CORONARIA

English: Coronary

AGL term: κορώνη (pronunciation – korôni) “recurvate”

MGL corresponding term: stefaniaia (pronunciation: stefaniéa)

Standard term in Brazil: DIAFRAGMA
(DIAFRAGMÁTICO)

English: Diaphragma

AGL term: διαφράσω (pronunciation ‘diafrásso’) “blockade, I make a barrier”

MGL corresponding term: διάφραγμα (pronunciation ‘diáfragma’)

Standard term in Brazil: EMBOLIA (EMBOLIFORME)

English: Embolism

AGL term: εμβάλλω (pronunciation – embálo) “something thrust in” / forme (Latim term)

MGL corresponding term: έμβολο (pronunciation – ênvolo)

Standard term in Brazil: ENDOCÁRDIO

English: Endocardium

AGL term: ένδον (pronunciation – endós) “inside” / καρδιά (pronunciation – kardía) “heart”

MGL corresponding term: ενδοκάρδιο (pronunciation – endokárdio)

Standard term in Brazil: ENDOTELIO

English: Endothelium

AGL term: ένδον (pronunciation – endós) “inside” / (επι)θηλή (pronunciation – thilí) “nipple”

MGL corresponding term: ενδοθήλιο (pronunciation – endothílio)

Standard term in Brazil: ENDOTORÁCICA

English: Endothoracic

AGL term: ένδον (pronunciation – endós) / θώραξ (pronunciation – thórax) “armour”

MGL corresponding term: ενδο^Lωραχικο (pronunciation: endothorachikô)

Standard term in Brazil: EPITÉLIO

English: Epithelium

AGL term: επί (pronunciation – epí) / θήλιο (pronunciation – thílio) “nipple”

MGL corresponding term: επιθήλιο (pronunciation – êpithílio)

Standard term in Brazil: ESPLÂNCNICO

English: Splanchno

AGL term: σπλάγγνο (pronunciation – splâncno) “viscus”

MGL corresponding term: σπλαγγνικός (pronunciation – splancnikôs)

Standard term in Brazil: FRÊNICO

English: Phrenico

AGL term: φρην (pronunciation: frin) “mind”

MGL corresponding term: φρένες (pronunciation: frénes)

Standard term in Brazil: GÂNGLIO

English: Ganglion

AGL term: γαγγλίον (pronunciation – ganglîon) “uncertain etymology”

MGL corresponding term: γάγγλιο (pronunciation – gânglio)

Standard term in Brazil: HISTOLÓGICO

English: Histological

AGL term: ιστός (pronunciation – istós) “tissue” / λόγος (pronunciation – logos) “treatise, discourse”

MGL corresponding term: ιστολογικός (pronunciation – istologuikôs)

Standard term in Brazil: ISTMO (ISTMO DAAORTA)

English: Isthmus

AGL term: ιθμός (pronunciation – ithmós) “slight constriction”

MGL corresponding term: ισθμός (pronunciation – isthmós)

Standard term in Brazil: LINFA (LINFÁTICO - LINFONODOS)

English: Lymph

AGL term: νύμφη (pronunciation: nínfi) “mythological being”

MGL corresponding term: νύμφη (pronunciation: nínfi)

Standard term in Brazil: LOBO (ARTÉRIAS LOBARES - ARTÉRIA LOBAR MÉDIA)

English: Lobus

AGL term: λοβός (pronunciation – lovôs) “A rounded projecting part bounded by fissures, sulci, connective tissue septa, or other structural demarcations”

MGL corresponding term: λοβός (pronunciation – lovôs)

Standard term in Brazil: MIOCÁRDIO

English: Myocardium

AGL term: μυς (pronunciation – mi) “little mouse” / καρδιά (pronunciation - cardiá) “heart”

MGL corresponding term: μυοκάρδιο (pronunciation – miocárdio)

Standard term in Brazil: MIOLOGIA

English: Myology

AGL term: μυς (pronunciation – mis) “little mouse” / λογία (pronunciation – loguía) “treatise, discourse”

MGL corresponding term: μυολογία (pronunciation – miologuía)

Standard term in Brazil: PARASSIMPÁTICO

English: Parasympathetic

AGL term: παρα (pronunciation – para) “parallel to” / συμπαθώ(ν.) (pronunciation - simpathô) “I am touched by

the emotions of another person”

MGL corresponding term: παρασυμπαθητικός (pronunciation - parassimbathitikós)

Standard term in Brazil: PERICÁRDIO

English: Pericardium

AGL term: περικαρδίου (pronunciation – perikardíu) “around the heart”

MGL corresponding term: περικάρδιο (pronunciation – perikárdio)

Standard term in Brazil: SIMPÁTICO

English: Sympathetic

AGL term: συμπαθῶ(v.) (pronunciation - simpathô) “I am touched by the emotions of another person”

MGL corresponding term: συμπαθητικός (pronunciation – simbathitikós)

Standard term in Brazil: TRÍGONO (TRÍGONO FIBROSO - DIREITO E ESQUERDO DO CORAÇÃO)

English: Trigonum

AGL term: τρι- “três” / γωνία (pronunciation – gonía) “knee/genu, angle”

MGL corresponding term: τρίγωνο (pronunciation: trígono)

DISCUSSION

The evolution of a language is extremely dynamic, which causes some difficulty in understanding the term real meaning. The words mentioned should be related to feelings, aggregate cultural values and customs of each civilization [4,9]. When we deal with such an old language as the Greek language, the words are born for a purpose and over the centuries, these words can acquire a totally different meaning [9]. Ruth Benedict, the anthropologist, in her book “The Chrysanthemum and the Sword,” written in 1946, says that the culture is like a lens through which we view the world. “The lens through which a nation sees life is not the same as other nation uses. It is difficult to be conscious with eyes through which we look” (Benedict, 2002). For example, the term *soma* that in the modern Greece has always meant the body, in the Ancient Greek of Homer did not have that meaning. As a matter of fact, it had no meaning in living man. The term “soma” came to exist only after death, i.e., the closest meaning transferred to the present day would be “corpse” [9]. Giovanni Reale says in his study: “the language is much more than an instrument by which thought expresses the thing, as it is the language itself that brings to light the thing and allows the mind to think of it. The language is never susceptible to a perfect translation to another language, because to reach an understanding and a complete expression of the messages

communicated in this language, we would have to be a direct participant in the world in which that language is expressed” [9].

The term *cardio-* has been used since Ancient Greece with the same meaning of “heart.” The true origin of the term lies in the root of the Indo-European word ‘kerd’, which already had the meaning of heart [4]. The same term is also found in the Epics of Homer as a synonym for *cardio-* [9]. In Ancient Greece, besides being considered a physical organ, the heart - so often reported in archaic writing - was also considered as an organ of feeling. Until a certain period of the antiquity, the Greeks believed that the heart was the seat of the center of the intellect. Once the organ responds promptly to any strong emotion, many emotions were attributed to it such as joy, pain, fear, anger, tenderness, etc. [4,9]. Remnants of that thought linger today as the heart is reported as an organ of feeling, however, always metaphorically. In fact, for the Homeric man these feelings were the proper functions of the heart.

Generally, in Brazil, simple anatomical terms derive from Latin, while the compound terms derived from the Greek. Therefore, *cardio-* is only found as a form of combination [16]. This is what happens in cardiogenic [Of cardiac origin], cardiology [cardio- + G. *logos*, study], cardiogram [cardio- + G. *gramma*, a diagram], etc. In the international anatomical terminology, we can find the term *cardia*, which derives from the same Greek root [G. *kardia*, heart]. However, it is used to designate the area of the stomach close to the esophageal opening (cardiac orifice or *cardia*) that contains the cardiac glands [2,3,14]. According to Jean Riolan, the term *cardia* was used by the ancients as a synonym for the mouth of the stomach [14].

For example, many of the heart anatomy terms we use today such as cardiology, anatomy, and anastomosis have a French origin. These are loanwords borrowed from the roots of the Ancient Greek Language [3,4]. The term *anastomosis* has a French origin borrowed from Greek words. It means the communication between two tubular organs, which can occur naturally due to illness or surgery. Galvão [11] translates it as to the action of discharge. Fernandes [14] puts it another way: “through the mouths.” Etymologically, the term comes from two roots of the Ancient Greek Language, *ανα* “up, repeatedly, consecutively, continually” and *στόμα* “mouth” with this same meaning from the Indo-European language as in ‘-Stom’: “mouth” [3].

The term *angiology* comes from the roots ‘άγγος’ and λέγω (v.). The term *αγγείο*, from the Modern Greek Language, has meanings as the following: container for storage or transport of fluids (jar); conductive tubes in the body conveying blood or other organic fluids (arteries, veins, lymph vessels) [3,6,16]. In the Ancient Greek Language, the root ‘άγγος’ had the meaning of “compartment, pot, vase, amphora. The term “Λόγος” comes from λέγω (v.)

meaning “speech, discourse” [3,4,6]. Although derived from the Ancient Greek Language, the term *angiology* has its origin in France as ‘angiologie’. There was a modification of the spelling over the years. This facilitated the pronunciation, and the term *angiology* entered common usage in Brazil. Semantics was maintained. The term “anatomical” is used both in Brazil and Modern Greece (ανατομικό). It has the following meaning: relating to anatomy. The term *anatomy* had its origin in France. It was borrowed from the roots of the Ancient Greek Language *ana* (ανα) “from the bottom up, repeatedly” and *témno* (τέμνω) “to cut, to open” [3,14]. As a science that studies the various body structures, anatomy has been used in Greece since 1738 [3]. It was translated by Edgar A. M. Morales as: “cut on all sides of an animal body in order to see its forms and to study its various parts” [26].

The term *artery* is used both in the Modern Greek Language (αρτηρία) and in Brazil (artéria). Considered by the ancients as “air conduits [aeir + thirón], once blood was not found in the arteries after death [14]. A primitive meaning was “trachea”. At the time of Aristotle, it was called trachea-artery [11]. However, the most primitive root, that is, the true origin in the Ancient Greek Language is ‘αρθώ’ (pronunciation - artô), which means “hang, hold high” [2,3,6]. There is a relation of this term under the root ‘αείρω’, which means “float, lift, connect, fit.” Therefore, it is related to the term *aorta*. The term *αέρα* (pronunciation - aéra) also comes from the root ‘αείρω’, which means “air” [3]. The term *aorta* is used both in Modern Greek Language (“Αορτή”) and in Brazil (“aorta”). The term of the Ancient Greek Language “αείρω” (v), to suspend, to lift, to connect, to fit, etc., gave birth to the noun *αορτήρ*, which means “suspensor” (pronunciation - aortír) [3]. Thus, the *aorta* might be defined as the artery connecting (binds) the heart to the whole arterial tree, and also as being the site of “setting” of the entire system to the heart. Aristotle defined as *flebos* the term ‘aorté’, which is translated as a carried or suspended vein [11].

The term *broncho-* in Human Anatomy carries the same meaning in both the Modern Greek Language and Brazil. Its etymology is uncertain. However, by linguistic analogy, it is possible to relate the standardized term in Brazil and Greece with the verb of the Ancient Greek Language ‘βρόχω’, which means “swallow, devour.” The origins of the term *coronary* are found in the Ancient Greek Language κορώνη (pronunciation Koróni). It means “crow” or “hooked/recurved” [3,18,19]. The term used today in Brazil comes from ‘the Latin ‘Corona’, which is a loanword from the term *crown*. However, it was borrowed from the Ancient Greek Language whose meaning was hooked/recurved or crow [3,18,19]. In the Modern Greek Language, the term corresponding to coronary is ‘stefaniaia’, which comes from *stephane* (pronunciation stefané) that means crown.

Although the term is used even in Greece with the meaning of crown (stefaniaia), its etymology relies on the Ancient Greek κορώνη, which meant ‘hooked/recurved’ [3,18,19]. Etymologically, the term could be translated as ‘curved or bent near its tips like the beak of a crow’.

The term *autonomus* has been used since the Ancient Greece as ‘αυτόνομος’ (pronunciation aftónomos) with the meaning of “something or someone that is governed by its own laws; it does not depend on another person; independent; having independence or freedom from control by external forces” [1,3,6,7]. In the Modern Greek Language, the corresponding term is the same: αυτόνομος (pronunciation - aftónomos). It comes from the terms of the Ancient Greek Language αυτό, meaning “own, for my own account” and νόμος, meaning “law.” Autonomous was also used in the field of philosophy to designate the independence of the will toward an object of desire and as the ability to establish itself as a proper law [1]. The surgical term, “χειρουργικός” (pronunciation: quirurguikôs), has been used in medicine since Ancient Greece. It comes from the roots of the Ancient Greek Language χείρ (approximate pronunciation: Kir), which means “hand”, εργον meaning “work”, and the suffix –ικός, meaning “relating to” [3,16].

The term, “κλινικός” (clinical), is used in medicine both in Greece and Brazil with the same meaning: “what is relative to the medical practice for the patient’s therapy.” The meaning of this term is relatively new, and it appeared in France deriving from the term “clinique.” Centuries before, Galen had already referred to the term ‘κλίνη’ as “hospital bed.” All related terms (clinic, clinical, clinoid, etc.) derived from the same root of the Ancient Greek Language, “κλίνη”, which in turn comes from the term ‘κλίνω’ (v.), which also comes from the AGL meaning “to bow, to tilt.” In ancient writings, it specifically refers to the inclination of the body in any direction from the standing position: to incline, to lie down.

The term *diaphragm* is used in the area of Human Anatomy to designate the main respiratory muscle separating the thoracic and abdominal partitions. It comes from the Greek term ‘διαφράσω’ (v.) meaning “a partition wall, a barrier” [1,3]. The term derives from the following roots: ‘Ana’ = ‘through’ and frásson = ‘encircle, surround, enclose’ [1,3,16]. Emboliform is a hybrid term (of a confusing nature), which comes from the Greek root έμβολο (pronunciation Ênvolo). It is also used in Brazil with a medical meaning of “mass of clotted blood or any substance not dissolved in the bloodstream able to occlude blood flow.” Although it has been translated as ‘wedge’, the true origin of the term “εμβάλλω”, from the Ancient Greek Language, is “to put into” [3]. The term was used by Hippocrates to describe the replacement of a bone in place [12]. It also comes from two roots of the Ancient Greek Language, ‘ev’ (pronunciation - en), which had the meaning

of “inside,” “part of” + ‘βάλλω’ (v.), which meant “to put” [3,6]. In Homeric texts, the term was already used in the meaning of “to put.” Currently, in Greece, the term ‘εμβολία’ means a vaccine (plural, εμβολια).

The prefix ‘endo-’, from the ancient Greek ἐνδον (pronunciation - éndon), is a compound term, and it is present in endocardial endothelium, endothoracic, etc. Its origin arises from two roots of the ancient Greek ‘ev’ (pronunciation - en), which means “inner, absorbing, or containing,” and ‘e-don’ meaning “home,” “inside the house” [3,6]. However, this word root used to express the word *house* contained in itself a “metaphoric” sense, referring to our most intimate environment, the body’s internal environment [1,3]. Transcribing it according to its use in ancient texts, we reach the meaning of “inside our own body.”

The prefix peri-, which composes the word pericardium, is a common prefix in terms derived from the Greek language, as well as the prefix endo-. The prefix peri- has its origin arising from the AGL word “πέριξ” (pronunciation - périks). It had the meaning of “around, about, near, on all sides” [3,16]. In the Modern Greek Language, the term ‘περί’ (pronunciation - peri) carries the following meanings: regarding, more or less, around, or near [16]. Endothelium comes from the ancient Greek Language term ‘ἐνδον’, which means “inside the body” and the term ‘θηλή’ meaning “nipple,” that in turn arises from the term θηλώ, which indicates “to suck, to breastfeed.” The term ‘Θηλώ’ is related to female gender. The same word root forms the word “feminine,” which in the Greek language means ‘θηλυκός’ (pronunciation - thilikós). The term thorax (θώραξ) had the meaning of “armor” in ancient Greece. It comes from the word endothoracic. It referred to a type of leather or metal armor that protected the warriors’ chest and back.

Term *sympathetic* has its origin in the ancient Greek Language ‘συμπαθώ’ (v.) (pronunciation simbathô). It first meant: “I am touched with the emotions of another person; I feel the pain of another person.” It is formed by the ancient Greek roots ‘συμ’ and ‘πάσχω’ (pronunciation páthsco) meaning “with, together” and “I suffer”, respectively. It is a term related to suffering caused by a disease [2,3,6]. The prefix *para-* (παρά - pronunciation para), like in the word *parasympathetic*, is quite common in the Greek language. It conveyed the meaning of “adjacent, alongside, near, parallel to.” In the Modern Greek Language, the term παρά (pronunciation - pará) has several meanings, such as “on the contrary, reduction, lack of, less, imposition or exception (παρά) [I do not want anything besides your help], alternation [(day = παρά) (every other day)], near, far from, and at the side of [16].

The term *splanchnic* (σπλαγγχνικός) refers to “the viscera.” It has its origin arising from the ancient Greek Language σπλάγγχο, which means “viscus.” The term is also related to the word σπλήν (pronunciation - splín). It conveys a similar

meaning in the ancient Greek Language. In the Modern Greek Language, the term ‘σπλάγγχο’ refers to the viscera and the term ‘σπλήν’ to the spleen. The term *lobe* (λοβός) both in Greece and Brazil is used in Human Anatomy to describe each part of the same organ bounded by fissures, sulci, connective tissue septa, or other structural demarcations. In the ancient Greek Language, it came from the word ‘λοβός’, which had the meaning of “rounded projecting protrusions bounded by a fissure or a section” [3].

The term *lymph* comes from the ancient Greek word *nínfi*. It arrived in Brazil through the Latin word *lymph*. It was translated by many authors as clear spring water [3,12]. However, the term *nínfes* (nymphs) refers to minor youth female nature deities, which always wear white dresses. They are believed to dwell in mountains and groves, by springs and rivers, and also in trees and in valleys and cool grottoes. Arising from the same term, the Greek nífi (νύμφη) (nymph) has “bride” and “veiled” among its meanings. The correlation of similar terms of the Greek language is done through the words “freshness, youth, clarity, pureness, serenity” [3,6]. The Greek root *thelium* (from the Greek θήλιο) as found in **endothelium** and **epithelium**, in most studies of Greek etymology is reported as a “nipplelike structure/mamma” [1,15,16] due to the similarity of this tissue with the nipples [15]. According to Greek works, the root has its origin in the Indo-European language with the meaning of “to suck, to breastfeed” [3].

Since the Epics of Homer up to the time of the great Greek philosophers, the Greek term *phren-* has been cited several times. It has very different meanings. In part, the term is related to a physical body, but most often it appears linked to the emotions and in general to the mind [1,8]. The term also appears as *phren*, indicating diaphragm [8]. However, this does not seem to be the first definition or translation given by Homer. In most of the passages, the term relates to various feelings and emotions. So one can understand why it is often found translated as “heart.” The term *phren* is found with two meanings: mind and heart [3,8]. Although in most of the passages from the Epics of Homer, the word *phren* is found with the meaning of mind, in the Iliad it also appears with the meaning of heart [8]. A convincing explanation for this translation of the term *phren* as diaphragm or heart existed in a given period of the antiquity; the Greeks regarded the diaphragm, near the heart, as the center of the intellect! [4,8].

CONCLUSION

Most of the terms from the Greek language were created outside of Greece. They were loanwords - a word borrowed from a donor language and incorporated into a recipient language. The terms were borrowed from the roots of the Ancient Greek Language. Through a survey of the origins

of the Greek language, we could verify that there is a wide divergence between the etymological meaning perceived by the authors and the etymology of the roots used to build the international standardized terms of the heart anatomy. There are many studies that address the real origin of words (etymology), but most of them will not go far beyond the birth of the term, which is usually composed of two or more radicals from the Ancient Greek Language. We analyzed many terms according to the meaning given to them at the time of their creation, leaving aside the analysis of the primitive radicals. Obviously, one cannot reach absolute conclusions on this specific area, but in order to carry out this search it is necessary to consider the precepts of analogy and language, especially for a language as complex as the ancient Greek. The present study compared the world's greatest works on the etymology of Greek words published in several languages, including citations on the earliest sources of the AGL: the Epics of Homer. Thus, it was possible to clarify some discrepancies between the true origin of the heart anatomy terms and the most accepted terms today in Brazil by health professionals.

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APPENDIX 1: COMMON PREFIXES AND SUFFIXES

A - AN

AGL prefix: $\alpha - \alpha\nu$ [pronunciation - an (when before a vowel)]

MGL: $\alpha - \alpha\nu$ [pronunciation - an (when before a vowel)]

The prefix indicates “no, not, without, lack of, apart”

ANA

AGL prefix: $\alpha\nu\alpha$ (pronunciation – aná) – “up”, “upward, upward movement” or “something that occurs for the first time or subsequently”. Uncertain etymology

MGL: $\alpha\nu\alpha$ (pronunciation – aná) – It indicates something that (1) goes up, moves upward, (2) continuously happens, (3) split up, (4) - distribution through a space, (5) - distribution for a period of time.

APO

AGL prefix: $\alpha\pi\acute{o}$ (pronunciation – apô) “away from, separate from, separation”

MGL: $\alpha\pi\acute{o}$ (pronunciation – apô). It indicates: 1- starting place; 2- starting time; 3- comparative; 4- cause.

EN

IGA prefix: $\epsilon\nu$ (pronunciation – en) Meaning: (1) within 2- during, while, whereas, as long as.

MGL: $\epsilon\nu$ (pronunciation – em) It indicates: 1- inside, within, entrance; 2- sum, conquest, possession; 3- increase of

ENDOS

AGL prefix: $\epsilon\nu\delta\omicron\nu$ (pronunciation – endós). Etymologically the term comes from $\epsilon\nu$ (pronunciation – en) that meant “within” “inner” and $-\delta\omicron\nu$ that meant “house”, “inside the house”. However, archaeological finds from the Greek language, refer to its meaning as “within the body.”

MGL: $\epsilon\nu\delta\omicron$ (pronunciation – endo) Meaning “inner”, “within”.

EPI

AGL prefix: $\epsilon\pi\acute{\iota}$ (pronunciation – epí). It indicates 1- over, upon, above; 2- sum; 3- immediately after, subsequently, after.

MGL: $\epsilon\pi\acute{\iota}$ (pronunciation – epí). It indicates: 1- over, upon, above; 2- sum; 3- something else, the best of a group; 4 - immediately after, subsequently, after

HIPO

AGL prefix: $\upsilon\pi\omicron$ (pronunciation – ipo) Meaning: “below, under”

MGL: $\upsilon\pi\acute{o} - \upsilon\pi$ (pronunciation – ipô) Meaning: 1- below, under; 2- under the effect of; 3- Someone who has a hierarchically lower position; 4- something that happens hiddenly, under the table, something that occurs at lower levels 5- backward movement, back; 6- something that exists in small amounts or for a short

time; 7- something characterized by failure, failure, lack of, something that is below the limit; 8- it indicates something more intense than normal.

ÍDE (OIDE)

AGL prefix: $\epsilon\iota\delta\omicron\varsigma$ (pronunciation – ídos) Meaning: “shape”. I.E. origin ‘weid’ (Probable Ancient Greek pronunciation – oid) “I know, I see”

MGL: $\epsilon\iota\delta\omicron\varsigma$ (pronunciation – ídos) Meaning “shaped, as”. it is also used in human biology as “species.”

LOGOS

AGL root: $\lambda\acute{o}\gamma\omicron\varsigma$ (logos) that comes from $\lambda\acute{\epsilon}\gamma\omega$ (lêgo) Meaning “I form a group, I gather information” and afterwards I “speak” MGL: $\lambda\acute{\epsilon}\gamma\omega$ (pronunciation – lêgo) Meaning “to express something through speech”.

MI(O)- / MY(O)-

Combining root meaning relating or pertaining to a muscle.

OIDE

AGL: $\epsilon\iota\delta\omicron\varsigma$ (pronunciation – idôs) – The first meaning of ‘eidôs’ in AGLI was ‘like the shape of’, a probable link with the term ‘weid’ from the IEL, which meant ‘I know, I see’.

MGL: 1- in the shape of; 2- species or kind.

PARA

AGL prefix: $\pi\alpha\rho\alpha$ (pronunciation – para) – Meaning “parallel to, by the side”

MGL: $\pi\alpha\rho\acute{\alpha}$ (pronunciation – pará) – It indicates 1- contrary to; 2- decline, miss, lack, less (he lost the game by 5 points - $\pi\alpha\rho\acute{\alpha}$ (by)); 3- exception or imposition (I do not want anything from you (beyond) ($\pi\alpha\rho\acute{\alpha}$) your help); 4- alternation (every two days); 5- place, locality: position in relation to something (close by, far away, by the side of).

PERI

AGL prefix: $\pi\acute{\epsilon}\rho\iota\zeta$ (pronunciation – périks) Meaning “around; on all sides”

MGL: $\pi\acute{\epsilon}\rho\iota$ (pronunciation – perí) Meaning 1- in respect to; 2- more or less; around; 3- close by, around.

SIN-

AGL root: $\xi\acute{\nu}\nu$ (pronunciation – ksín) Meaning “with, together with, along with”

MGL: $\sigma\upsilon\nu$ - (pronunciation – sín) it is also used as $\sigma\upsilon$ -, $\sigma\upsilon\mu$ -, $\sigma\upsilon\gamma$ -, $\sigma\upsilon\lambda$ -, $\sigma\upsilon\sigma$ e $\sigma\upsilon\rho$. It indicates: 1- something that happens together or with the help of another; 2- a common feature in more than one object or person; 3 – related to more than one thing or person.