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Disputed Eponyms: Historical Errors in *Terminologia Neuroanatomica*

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ABSTRACT

Introduction: eponyms are a deeply rooted historical feature of medical nomenclature, especially in neuroanatomy. The term "eponym" comes from Greek and refers to a name used to designate a structure in honor of the person considered to have initially described it. The objective of this study was to review the presence of some eponyms in *Terminologia Neuroanatomica* whose name does not correspond to the person who first identified or described them.

Materials and Methods: a detailed review of the *Terminologia Neuroanatomica* was conducted to identify designations attributed to individuals other than the original authors or to detect historical inaccuracies due to misattribution.

Results: we identified eight misattributed eponyms. Although some appear in the "other" column, these terms remain widely used in medical teaching and practice, including arachnoid, subarachnoid space, aqueduct of Sylvius, sulcus of Rolando, sulcus of Sylvius, Betz cell, Cajal-Retzius cell, and ganglion of Gasser.

Conclusion: other researchers mentioned or described these structures before the individuals to whom the eponyms are attributed. This work demonstrates that the assignment of eponyms often reflects factors external to scientific research, including the influence of students, colleagues, or mistranslations. This practice, although intended to honor, sometimes makes the true describers invisible and hinders anatomical education based on morphological and functional criteria. Therefore, there is a need to review and update the *Terminologia Neuroanatomica* to more accurately reflect scientific history and strengthen the rational teaching of morphology.

Keywords: Neuroanatomy; Arachnoid; Mesencephalic aqueduct; Central sulcus; Lateral sulcus.

Introduction

The term eponym is of Greek origin -ἐπωνῠμία- whose meaning is a name that supposedly reflects an attribute or the given name as a nickname[1] of someone who initially described or discovered a structure in the morphological field. The term consists of the prefix epo- or epi- meaning on and the suffix -ónyma- meaning name[2]. Therefore, an eponym refers to a real or fictional name assigned to an anatomical structure[1,2].

Eponyms are frequent in medical language and reflect a tradition rooted in historical culture[3]. Most originated in the late 19th and early 20th centuries, entering English in the mid-19th century and designating both the namer and the named[1]. Eponyms have been part of medical language for many centuries, have taken strong cultural roots, and continue to be used primarily in the language of medical specialties, even though they go against the RAT rules established by FIPAT[4] and that they generate problems in education, as they do not provide any information about anatomical terms taking into account their etymological and morphological relationship[5]. These terms remain controversial and reflect historical misattributions related to their original naming.

Considering the above, this study aimed to review the eponyms included in *Terminologia Neuroanatomica*[6] whose names do not correspond to the original descriptors.

Materials and Methods

A review was conducted of neuroanatomical eponyms that persist in *Terminologia Neuroanatomica*[6] to identify designations misattributed to individuals other than the original describers or to detect historical inaccuracies in naming due to attribution errors.

Results

The *Terminologia Neuroanatomica*[6] includes eight eponyms, detailed in Table 1, whose historical attributions are incorrect. Although most appear under the 'other' category, these eponyms remain commonly used to designate these neuroanatomical structures.

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Table 1. Some eponyms in *Terminologia Neuroanatomica*[6].

	Latin term	Latin synonym	UK english	US english	US synonym	Other
263	Arachnoidea mater		Arachnoid	Arachnoid		Arachnoidea mater
265	Spatium subarachnoideum	Spatium leptomeningeum	Subarachnoid space	Subarachnoid space	Leptomeningeal space	Endnote 8
1494	Aqueductus mesencephali	Aqueductus cerebri	Mesencephalic aqueduct	Mesencephalic aqueduct	Cerebral aqueduct	Aqueduct of Sylvius
2002	Sulcus centralis		Central sulcus	Central sulcus		Sulcus of Rolando
2003	Sulcus lateralis		Lateral sulcus	Lateral sulcus		Sulcus of Sylvius
2255	Neuron pyramidale giganteum		Giant pyramidal neuron	Giant pyramidal neuron		Betz cell (for BA4) Solitary cell of Meynert (for BA17)
2266	Neuron horizontale		Horizontal neuron	Horizontal neuron		Cajal-Retzius cell
2777	Ganglion trigeminale		Trigeminal ganglion	Trigeminal ganglion	Semilunar anglion.	Ganglion of Gasser

Discussion

Eponyms for anatomical structures do not always accurately reflect who originally mentioned or described them, which can lead to historical distortions. In the case of the term arachnoid identified in *Terminologia Neuroanatomica*[6] with code 263, it represents the intermediate meninge, which Gerardus Blasius (1626–1692) was the first to describe, who named it thus, providing an eponym with a mythological background, corresponding to the name of Arachne, the skillful weaver in the myth of The Metamorphoses[7]. However, Aristotle in the 4th century BC, Herophilus and Erasistratus in the 3rd century BC, and later Haly Abbas in the 8th century CE had already mentioned the presence of this meningeal structure[4]. Therefore, in this same sense, a second structure of this meninge was named similarly, the subarachnoid space, identified under code 265.

Along these same lines, the mesencephalic aqueduct, identified under the numeral 1494 in *Terminologia Neuroanatomica*[6], is a structure that connects the third and fourth ventricle in the brainstem, through which cerebrospinal fluid flows[8]. It was a structure to which the anatomist Berengario da Carpi (1430-1530) referred in the text *Commentaria Super Anatomia Mundini*[9]. However, at this same time, Nicolo Massa (1485-1569) described it more precisely in the text *Liber Introductorius Anatomiae Sive Dissectionis Corporis Humani*[10], where he indicates "*& uidebis quedá tráfitú ad quadam cauitaté defcendentem uerfus fpaciú, quod eft intermediú cerebri anterioris iam nifi, & pofterioris, quod cerebellu appellant*". Later, although less precisely, Andreas Vesalius (1514-1564) also offered descriptions of this structure in the text *De humani corporis fabrica*[11]. Despite these early references, the most widespread name during the Middle Ages was the eponymous Aqueduct of Sylvius, attributed by some authors to the French physician Jacobus Dubois[12] and by others to the German physician and chemist François de le Boë[13], a confusion originating from the Latinization of the surnames Dubois and Boë, both translated as Sylvius, as they share the etymological root linked to the term 'forest'.

Another eponym bearing the surname Sylvius is the Sulcus of Sylvius, aptly named the lateral sulcus, which is identified under code 2003 in *Terminologia Neuroanatomica*[6]. It was first illustrated by Girolamo Fabricius d'Aquapendente (1533–1619) in the year 1600[14] , but it was not named or recognized as a constant sulcus until Thomas Bartolini published his father's work *Anatomicae institutiones*[15], which included contributions from François de le Boë or Franciscus Sylvius on the lateral sulcus, referring to it as the Sulcus of Sylvius. In later years, François de le Boë referred to the lateral sulcus in his *Disputationes Medicarum Pars Prima*[16], stating "The surface of the cerebrum is deeply marked by convolutions that resemble those of the small intestine. Particularly noticeable is the deep fissure or hiatus, which begins at the roots of the eyes and runs above the temples to the origin of the brain stem. It divides the cerebrum into a superior, more extensive part and an inferior, more compact part. The twisting occurs along the length and depth of the fissure, with subtle convolutions even arising in the uppermost region". Thus, François de le Boë never gave a term to this anatomical formation, but on the contrary, it was Thomas Bartolini who wrongly attributed it.

Regarding the sulcus of Rolando or central sulcus, identified with code 2002 in *Terminologia Neuroanatomica*[6], it is an anatomical formation located between the frontal and parietal lobes of the cerebrum[8]. Luigi Rolando described it in 1825. François Leuret later named it Rolando's sulcus in 1839. Notably, Félix Vicq d'Azyr (1748–1794) had been

the first to identify and illustrate the central sulcus in *Traité d'Anatomie et de Physiologie*[17], a recognition that Rolando himself acknowledged. Despite this, the pseudoscience of phrenology promoted exaggerated claims that made it difficult for this contribution to be accepted by the scientific community[18]. As a result, scholars wrongly credited Rolando with the discovery, and the term sulcus of Rolando has since become widely accepted[19].

A particular case in *Terminologia Neuroanatomica*[6] is provided by giant pyramidal neurons, which appear under code 2255 with two eponyms, Betz cell, and Solitary cell of Meynert. The first eponym listed, in *Terminologia Neuroanatomica*[6] honors Vladimir Alekseyevich Betz (1834–1894), who described its presence in the IV cortical layer of the precentral gyrus[20]. Since then, understanding of these layers has evolved, and current research indicates that these neurons are located in the V cortical layer[21]. The second eponym is due to Theodor Hermann Meynert (1833–1892), an Austrian anatomist who described giant pyramidal neurons in the primary visual cortex[22] two years before Vladimir Alekseyevich Betz. Despite this, Theodor Hermann Meynert has remained largely ignored in the biomedical literature about his impact on brain research.

Another case related to neurons is the horizontal neuron, classified under code 2266, whose eponymous name corresponds to the Cajal-Retzius cell. Santiago Ramón y Cajal described these neurons in the I layer of the cerebral cortex of rabbits[23]. Three years later, Gustaf Retzius identified these cells in embryos of various species (rabbit, cat, and dog) and named them Cajal cells[24]. The formation of the eponym Cajal-Retzius occurred as a result of Kölliker[25] using the term Cajal cells for horizontal neurons in adult mammals and Retzius cells for horizontal cells in human fetuses, which is why the eponym Cajal-Retzius cell have been consolidated to this day, in honor of both researchers, even though it was Cajal who provided the first description.

As for the trigeminal ganglion, it is a structure identified in *Terminologia Neuroanatomica*[6] with the code 2777 and under the eponym ganglion of Gasser, whose primary function is the transmission of sensory information, such as touch, pain, and temperature, from the craniofacial regions to the brain[26]. Raymond Vieussens (1641–1715) first described it in 1685 in his work *Nevrographia universalis*[27], where he referred to this formation as the *plexus ganglioformis*. Ten years later, the British physician Humphrey Ridley (1653-1708) called this structure "ganglion" in his work The Anatomy of the Brain[28], the first treatise in the history of neuroanatomy written in English. However, since it used a language not commonly employed in science, its dissemination within the scientific community was likely limited at the time. Later, in 1732, Jacques-Bénigne Winslow (1669–1760), in his work Exposition Anatomique de la Structure du Corps Humain[29], also referred to this structure as a "ganglion" called this fifth cranial nerve "nerf trumeau" -trigeminal nerve-. Years later, Antonius Balthazar Raymundus Hirsch (1744–1778), an Austrian anatomist, applied new dissection techniques in his thesis, leading to the most detailed report of this ganglion. Thus, his thesis, titled *Paris quinti nervorum encephali disquisitio anatomica in quantum ad ganglion sibi proprium, semilunare, et ad originem nervi intercostalis pertinet*[30], was published in 1765 and included two names for this structure, semilunar ganglion and ganglion of Gasser, the first attributed to its anatomical characteristics, and the second in honor of his teacher Johann Lorenz Gasser (1723–1765), who died before he could defend his thesis.

The first anatomical descriptions of the human body, developed by the pioneers of anatomy, were essential for the emergence of modern medicine. Furthermore, they laid the foundation upon which the terminologies that underpin the morphological and health sciences today were built[31], as exemplified by the *Terminologia Neuroanatomica*[6]. Although some of these contributions have faced criticism, their relevance and impact on scientific knowledge remain undisputed. To acknowledge those who first identified or described specific structures of the human body, naming them after the individuals who first recognized them became a common convention, giving rise to eponyms.

In this sense, assigning an eponym to an anatomical structure may not accurately reflect who discovered it and often responds to arbitrary factors that generate historical errors and injustices. However, one should not assume that this is due to the arrogance of its describers. In many cases, flatterers, friends, students, or followers promoted the adoption of these eponyms, likely as a way to pay tribute to his memory. This work highlights a historical mistake in maintaining these eponyms in *Terminologia Neuroanatomica*[6] and the continued insistence by individuals who were not the original authors on perpetuating this practice. Far from paying homage, this contributes to infamy towards the true describer. Furthermore, eponyms are inappropriate within rational morphological education, which relies on the structure and function of anatomical structures. Therefore, we consider it essential to update *Terminologia Neuroanatomica*[6] after review and approval by the respective FIPAT committee.

Conclusion

Several eponyms in *Terminologia Neuroanatomica* reflect historical inaccuracies that remain unresolved, such as Arachnoid and Subarachnoid space, Aqueduct of Sylvius, Sulcus of Rolando, Sulcus of Sylvius, Betz cell, Cajal-Retzius cell, and Ganglion of Gasserian. These were initially identified correspondingly by

Aristotle, Berengario da Carpi, Félix Vicq d'Azyr, Girolamo Fabricius d'Aquapendente, Theodor Hermann Meynert, Santiago Ramón y Cajal, and Antonius Balthazar Raymundus Hirsch. These eponyms were identified in *Terminologia Neuroanatomica*. However, it would be pertinent to advance studies that involve the other terminologies that govern the morphological area, such as *Terminologia Anatomica*, *Terminologia Histologica*, and *Terminologia Embriologica*, allowing this to honor those who correspond.

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Mini Curriculum and Author's Contribution

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