

# The contributions of the Spanish anatomist Barcia-Goyanes to international anatomical terminology

Carlos Barcia-Mariño<sup>1</sup>, Carlos Barcia-González<sup>2</sup>, Jorge M. Barcia-González<sup>3</sup>

<sup>1</sup>Department of Neurosurgery, General Hospital of Valencia & Royal Academy of Medicine in Valencia, Valencia, Spain, <sup>2</sup>Institut de Neurociències & School of Medicine, Department of Biochemistry and Molecular Biology, Universitat Autònoma de Barcelona, Campus de Bellaterra, Barcelona, Spain, <sup>3</sup>Department of Human Anatomy and Embryology, Universidad Católica de Valencia, Valencia, Spain

## SUMMARY

Juan José Barcia-Goyanes (Santiago de Compostela, 1901 - Valencia, 2003) was a Full Professor of Anatomy (*Catedrático de Anatomía*) in 1927 at the University of Salamanca and later on, at the University of Valencia, until his retirement. Among his bibliographical data, besides his profound knowledge of Anatomy, he also excelled for his studies on Psychiatry and Neurology and, based on this expertise, he became a pioneer of Spanish Neurosurgery, which he initiated in 1931. In addition, he was Dean of the School of Medicine and Rector of the University of Valencia. In this article, we would like to emphasize his contributions to Anatomy, addressing some of his most important publications. He described for the first time the Incisive Superior Bone, and published crucial conclusions about the foundations of Anatomy and the concept of Form. Importantly, we highlight the *Onomatología anatómica nova*, as an *opus magnum* on the language of Anatomy, which was possible due to his wide knowledge of languages. We also underline, among others, his original study on the greatest work of Vesalius.

**Key words:** J.J. Barcia-Goyanes – History of Anatomy – Terminología Anatómica – Nomina Anatómica – History of the Language of Anatomy – Incisive Superior Bone – Vesalius

**Corresponding author:** Carlos Barcia-González. Institute of Neuroscience & School of Medicine, Department of Biochemistry and Molecular Biology, Universidad Autònoma de Barcelona, Campus de Bellaterra, Cerdanyola del Vallès, 08193 Barcelona, Spain. E-mail: carlos.barcia@uab.es

## BIOGRAPHY

Juan José Barcia-Goyanes (Fig. 1) was born on December 26<sup>th</sup>, 1901 in Santiago de Compostela, Spain, within a family of four generations of medical doctors (Pascual-Bueno, 2013). He initiated his degree in Medicine in 1918 in the *Universidad de Fonseca*, traditional name for the Santiago de Compostela University, studying Anatomy with Professor Rodríguez Cadarso as *Auxiliar temporal*, a temporary position as assistant in the Chair of Anatomy, which, in those days, was led by his grandfather, Juan Barcia Caballero (Barcia-Caballero and González-Cedrón, 1898). At that time, due to the pandemic flu that devastated Europe (misleadingly known as Spanish Flu), he could not obtain human cadavers and he was forced to use rabbits to teach his first practical lessons.

He finished his studies of the medical degree on March 15<sup>th</sup>, 1924. As his medical title states, he was awarded the Rodríguez Abayúta Prize, provided by the Royal Academy to the best graduate student nation-wide.

Full professor position (*Oposiciones a cátedra*): He ran as a candidate for the Chair of Anatomy of the University of Salamanca in December 1927 and, although the entitlement is dated on January 28<sup>th</sup>, 1928, he probably was the youngest full professor in Spain at that time. He held the Salamanca position for a short period. Professor Pedro Ara Sarriá, renowned anatomist and Chair of Anatomy of the University of Valencia, Spain, was hired by contract, to the University of Rosario in Argentina, where he, among other achievements, created the

Submitted: 7 October, 2014. Accepted: 19 May, 2015.

Museum of Anatomy of the University of Rosario. Then, Dr. J.J. Barcia suggested to Dr. Ara to exchange his recently obtained position in Salamanca by the other one, temporarily vacant, in Valencia. Dr. Ara, who gained global reputation by the conservation of the cadavers of famous world leaders such as Lenin, Eva Duarte de Perón, and the Spanish musician Manuel de Falla, among others, initially refused the exchange, but he finally accepted because his permit to stay overseas was about to expire, therefore he was forced to return. Later Dr. Ara won the Chair of Anatomy in Cadiz, Spain, and finally in Madrid. After that, Dr. Barcia-Goyanes won the Chair of Anatomy in Valencia in 1929.

The rest of his biography can be reviewed in different sites (Barcia-Salorio, 2004), which are not necessary for the present article, and we will be focused on his anatomical work. In brief, he was Dean of the School of Medicine during 19 years and Rector of the University of Valencia for 6 years. He was Chief of the Department of Neurology and Neurosurgery of the General Hospital of Valencia and pioneer of the Neurosurgery in Spain, which he started to practice in 1931 according with the modern techniques initiated by Dr. Cushing at the beginning of the 20<sup>th</sup> century (Barcia-Mariño and Rodríguez-Mena, 2013). After his retirement he restlessly continued working on several research projects, including important contributions to anatomy. He died in Valencia at the age of 101 on July 13<sup>th</sup> 2003.



**Fig. 1.** Professor Juan José Barcia-Goyanes (1901 - 2003).

## SIGNIFICANT CONTRIBUTIONS OF PROF. BARCIA-GOYANES TO ANATOMY

In 1925 he defended his PhD dissertation "Atavistic variations and development interruptions studied in the superior maxilla of mentally-ill people" (*Las variaciones atávicas y las detenciones del desarrollo estudiadas en el maxilar superior de los locos*) (Barcia-Goyanes, 1925), topic of interest at that time, performed in a selection of 40 out of 100 crania from the *Manicomio de Conjo*. He described a supernumerary bone, never described before, which he named Incisive Superior Bone (Fig. 2), which Prof. Gómez-Oliveros included in his Anatomy as "Barcia-Goyanes' Incisive Superior Bone" (Gómez-Oliveros, 1960). In this thesis he discussed the significance of the term Atavistic as an expression of the interruption of development, coincident, in this case, with mental illness.

After that, in 1928 he published a study entitled, "The Scientific Foundation of Anatomy: Life, sex and heredity" (*Fundamentos científicos de la Anatomía: La vida, el sexo y la herencia*) (Barcia-Goyanes, 1928), a work which Prof. López-Piñero, pointed out as a breakthrough in the Morphology of the 20<sup>th</sup> century. The American historian, Glick, indicated that this is the best commentary on the Darwinian School in Spain, and F. Carbonell, a Spanish historian states: "This is the most complete synthesis of the Mendelian Genetics performed from the Medicine" (Barcia-Salorio, 2004).

His son, Dr. Barcia-Salorio, in his work about the Professor J.J. Barcia, *In Memoriam* (Barcia-Salorio, 2004), describes at least four significant contributions of Barcia-Goyanes to the Anatomy: 1) The analysis on the concept of *Form*, 2) The conception of Anatomy, 3) The update of the knowledge of the Anatomy of the Nervous System, and 4) Studies on the language of Anatomy. We must also add his Studies on the History of Anatomy, the reason why he was appointed as Member of Honor of the Spanish Society of the History of Medicine.

Regarding the concept of Form, it is described in two publications: "Current Orientations of Morphology" (*Orientaciones actuales de la Morfología*) (Barcia-Goyanes, 1949) and "The historical expression of the concept of Form in biology" (*La expresión histórica del concepto de forma en biología*) (Barcia-Goyanes, 1962) where he describes and supports the Galenic position in the study of the living being, against Plato's and Aristotle's opinions. Besides these publications, we should add: "The doctrine of simple tissues" (*La doctrina de los tejidos simples*) (Barcia-Goyanes, 1982a) and "The trials of building the live being" (*Los intentos de construir al ser viviente*) (Barcia-Goyanes, 1984a), two original essays about an uncommon topic, but with fundamental value.

Regarding the second aspect, Barcia-Goyanes

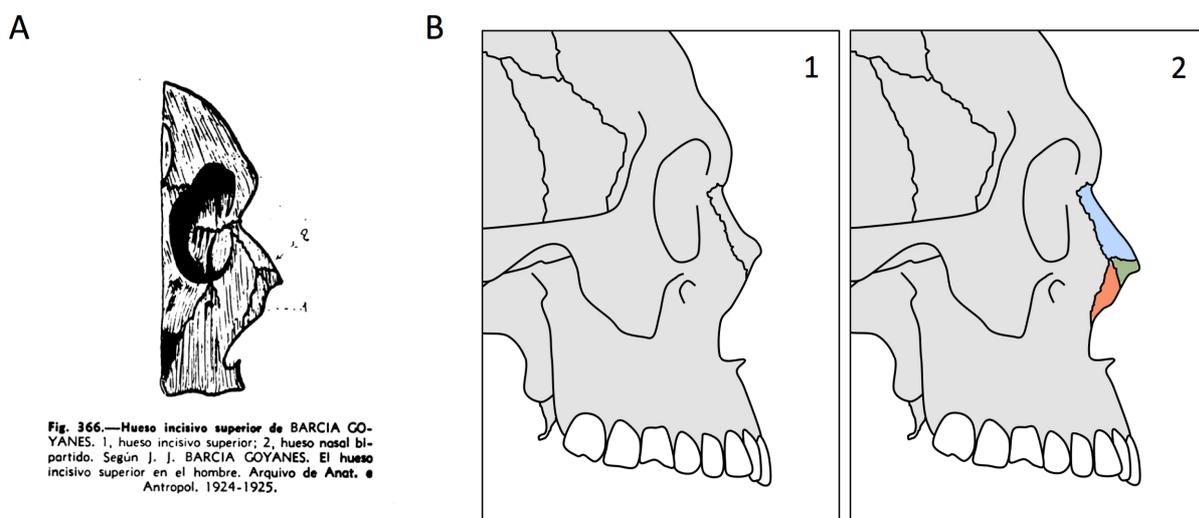
leads the "Theory of Recapitulation" in Spain, described initially by Hermann Braus (Braus, 1932) and other German authors such as von Lanz and Wachsmuth (1959) and Max Clara (1953), among others. This doctrine is characterized by the integration of Compared Morphology and Phylogenetic, Cytology, Histology, Embryology, and importantly the Functional Anatomy, to which Barcia-Goyanes added the Mendelian-Morganian genetics and the contributions of Von Uexküll (1864-1944), a Russian biologist and philosopher, pioneer of ethology, establishing a starting point of the Modern Ethology, besides reviewing the various concepts about the theories on the diversity of the living organisms (Barcia-Goyanes, 1928) (transformists, evolutionists, etc.).

Regarding the update of the knowledge of Anatomy of the Nervous System, it was a constant task along his almost 40 years of teaching, and due to his relentless study and his practice as a neurosurgeon. In 1950 he published, with important contributions, the section "Anatomy of the Temporal Lobe" (*Anatomie du lobe temporal*) (Barcia-Goyanes, 1950a) for the issue "The Temporal Lobe in Oto-Neuro-Ophthalmology" (*Le lobe temporal en oto-neuro-ophthalmologie*) by Paillas and Subirana. The auditory and optic pathways were topics of attention in some of his publications (Barcia-Goyanes, 1947). This aspect is even more evident in several fruitful syntheses, such as the localization of the macula in the cortex (Barcia-Goyanes, 1934), his studies about the procedure of Ebin, a technique performed on the pyramidal tract to avoid tremor in Parkinson's disease (Barcia-Goyanes, 1950b), the morphology of synapses (Barcia-Goyanes, 1955), and the evolution of our ideas about pain (Barcia-Goyanes, 1964).

About his lectures of anatomy, which the first author of the present article witnessed between 1959 and 1961, we have to stress his capacity of delivering an updated speech, including the recent discoveries of researches at that time, such as the neuromuscular unions, the synaptic gutters described by Couteaux in those years, or the explanation about the tone and muscular reflexes, together with the innovative contributions of Sherrington, Eccles and Kühne. Concerning the lessons on the retina, he included the precise studies of Stephen Polyak and Duke Elder, everything combined with his own drawings on the chalkboard.

For those of us, who wanted to dedicate ourselves to neurosurgery, we had the chance to obtain the position of Assistant to Practical Lessons (*Ayudantes de Clases Prácticas*), thus, we could utilize a good number of cadavers to practice surgical procedures, in addition of having teaching responsibilities. Interestingly, Dr. Barcia-Goyanes made install, presiding the room, a relief, inspired from the amphitheater of the University of Paris with a scripting in Latin that reveals the spirit that moved his way of envisioning anatomy, "*Hic locus est ubi mors gaudet succurrere vitae*", which may be translated as "This is the place where Death rejoices to help the living".

The anatomical language was, without a doubt, one of the highest concerns of Barcia-Goyanes (Barcia-Goyanes and Recio-Amat, 1948; Barcia-Goyanes and Moncayo Marques, 1960), which ends in his opera magna of maturity, *Onomatologia anatomica nova* (Barcia-Goyanes, 1978) named this way honoring the Austrian author Joseph Hyrtl (Hyrtl, 1880), to whom the work is symbolically dedicated. This is a historical and linguis-



**Fig. 2.** Os Barciae according to Gómez-Oliveros' description. The Barcia-Goyanes Incisive Bone is a small bone piece, triangular and articulated in harmonious suture with the anterior border of the superior maxilla, and the nasal bone, with the third side free, limiting the *Apertura Piriformis*. **(A)** Original image taken from Gómez-Oliveros' book. **(B)** Diagrammatic interpretation of *Os Barciae*. (1) Normal skull, (2) abnormal split nasal bone (blue and green) and Barcia-Goyanes Incisive Bone (red).

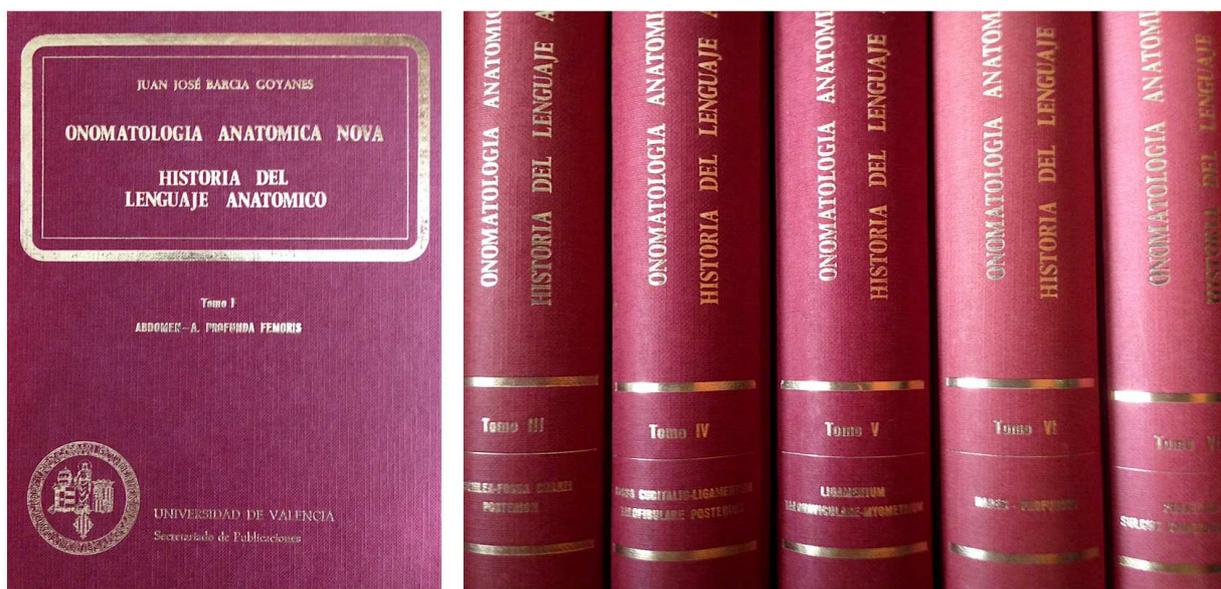
tic study of the anatomical terms, edited in 8 volumes, which he compiled between 1978 and 1986 (Fig. 3). This work is the product of the fortunate coincidence of different expertise of his author: the anatomical knowledge, (he compiled works on anatomy from almost every part of the world); he was a passionate linguist, who knew the western live languages (Spanish, Galician, Valencian, Portuguese, German, French, English, Italian, Swedish, Danish, Russian, Modern Greek, Arab and Polish) but also diverse ancient languages (Classical Greek, Latin, Hebrew, Sanskrit and Persian); and as said above, had a commitment to the normalization of the anatomical language (Diaz-Rojo, 2003).

This opus magnum received the best criticism from renowned historians, like P. Laín, G.A.G. Mitchell, E.H.L. Ackernecht and J.M. López Piñero, among others (Barcia-Goyanes, 2003), in addition to a number of prestigious anatomists, as the already cited L. Gómez-Oliveros (Gómez-Oliveros, 1960). Many of his historical and linguistic publications emerged during the elaboration of this work (Barcia-Goyanes, 1980, 1982b, 1984b, 1985). He analyzed more than 5,000 terms, 4,799 taken from the Latin and Greek and 916 from the Arab and Hebrew. Importantly, Dr. Barcia-Goyanes worked based on facsimile, obtained directly from originals, both ancient and recent works, fact that authorizes even more his conclusions. A colossal effort, surprising just for one person, with no more help that the patient examination of the documents, which not always arrived on time, considered as a paradox “in these times of speed and telecommunication... waiting months to receive a document, and not always for free!” as he used to say (considering the assumed government funding of public libraries).

As a result of this research environment, he published a singular work, “The Myth of Vesalius” (*El mito de Vesalio*) (Barcia-Goyanes, 1994). Against all evidence, and with the burden of the established tradition, with a critical work, meticulous and almost surgical, he emphasized the work of Galen, who was insulted, forgotten and ignored until the publication of the study “*De Humani Corporis Fabrica*” from Vesalius, in which there was an apparent rebirth of the anatomy after the “countless errors” of Galen. However, Barcia-Goyanes demonstrated that this was not the case, indicating, not only the 660 citations that Vesalius took from Galen, but also the mistakes that contained the work of the mythicized Vesalius when he tried to correct the Galenic works. Probably the most valuable work of Vesalius’ publication was the incomparable drawings performed by the painter Johan Stephen van Kalkar, Flemish disciple of Titian, combined with the great and deniable personality of the author. The intention of Barcia-Goyanes was not to destroy the great work of the Anatomist from Bologna, but to put everyone in their proper place in history, des-mythicizing the Vesalius work and performing a scrupulous research of the anatomy of the middle ages.

Another interesting work is the “Anatomy in the Bible” (*Anatomía en la Biblia*) (Barcia-Goyanes, 1999) study that also was elaborated in several languages. In this revision, he highlighted the errors and confusing terms described in the Scripture, giving their correct meaning.

As a final note, we would like to add that Prof. Barcia-Goyanes was a founding member of the *Sociedad Anatómica Española* in 1950, and its President during two terms since 1962. He also founded in 1941 *Archivo Español de Morfología*, a scientific journal, in Spanish, owned by the Conse-



**Fig. 3.** Frontal cover of the first volume (left), and general view of the collection of volumes (right) of the *Onomatologia Anatomica Nova, Historia del Lenguaje Anatómico*. Edited by the *Universidad de Valencia*.

jo *Superior de Investigaciones Científicas* (CSIC), especially interested in works on Anatomy and Embryology, including comments on books etc.

## SCHOOL OF ANATOMY

Although he never wanted to be called master, he provided a pathway to anatomists when he was in the Chair of Anatomy. Some of us who consider ourselves as his disciples, had to dedicate our lives to other medical activities, usually due to economical reasons, with the exception of Prof. L. Jiménez González, who was Chairman of Anatomy in Zaragoza and Author of "Anatomy of the Nervous System" (*Anatomía del Sistema Nervioso*), a very didactic work, and from which there is an issue dedicated to his master (Giménez-González, 1953).

Here we list some of them: C. Recio Amat, J. Moncayo Marqués, R. Calabuig Campos, F. Prósper Brú, J. García Sebastián, W. Calvo Garra, F. Pallardó Salcedo, E. Amat Aguirre and J. Cabanes Pecourt. In his family there is still a trace of this tradition in Anatomy, represented here by the authors of this small piece that is intended to be a small homage in order to rescue some of his anatomical work, which is special but has also been largely forgotten.

## REFERENCES

- BARCIA-CABALLERO J, GOYANES CEDRÓN V (1898) *Anatomía práctica*. Imprenta J. Paredes, Santiago de Compostela, p 414.
- BARCIA-GOYANES JJ (1925) El hueso incisivo superior en el hombre [doctoral thesis]. Santiago de Compostela, Spain, Universidad de Santiago de Compostela.
- BARCIA-GOYANES JJ (1928) *Fundamentos científicos de la Anatomía: La vida, el sexo y la herencia*. Ed. Morata, Madrid. Page 233 (Re-edited in 2001, *Arch esp morfol*, 6: 1-76).
- BARCIA-GOYANES JJ (1934) Sobre la localización cortical de la mácula. In: *Anales de Medicina interna*.
- BARCIA-GOYANES JJ (1947) Recientes adquisiciones sobre anatomía y fisiología del tálamo óptico. *Rev esp Otoneur oftalm*, 30: 5-11.
- BARCIA-GOYANES JJ (1949) Las orientaciones actuales de la morfología. *Arch esp morfol*, 21: 3-27.
- BARCIA-GOYANES JJ (1950a) Anatomie du lobe temporal. *Rev d'Oto et Neuro-Ophthalmologie*, 20: 71-102.
- BARCIA-GOYANES JJ (1950b) La operación de Ebin y nuestras ideas sobre la vía pyramidal. *Med Clin*, 5: 3-6.
- BARCIA-GOYANES JJ (1955) Algunas consideraciones sobre la morfología de la sinapsis. *Med Esp*, 200:5-15.
- BARCIA-GOYANES JJ (1962) La expresión histórica del concepto de forma en biología. *Anales de la Universidad de Valencia*, 36: 9-51.
- BARCIA-GOYANES JJ (1964) Evolución de nuestras ideas sobre el dolor. *Med Esp*, 51: 169-173.
- BARCIA-GOYANES JJ (1978) *Onomatología anatómica nova: Historia del lenguaje anatómico*. 8 Volumes, Universidad de Valencia, Valencia, Spain.
- BARCIA-GOYANES JJ (1980) Los albores del lenguaje anatómico en las lenguas neolatinas. La traducción del *Inventarium* de Guy de Chauliac por Bernat de Casaldovol. *Med Esp*, 79: 235-249.
- BARCIA-GOYANES JJ (1982a) La teoría de los tejidos simples. Estudios dedicados a Juan Peset Aleixandre. Universidad de Valencia, 1: 201-273.
- BARCIA-GOYANES JJ (1982b) Los nombres medievales del esfenoides. *Med Esp*, 81: 167-170.
- BARCIA-GOYANES JJ (1984a) Los intentos de construcción del ser viviente. In: *Actas del III Symposium de Teología Histórica*; 1984 May, Valencia, Spain, pp 383-389.
- BARCIA-GOYANES JJ (1984b) Los términos árabes en la osteología de Vesalio. *Al-Qantara*, 2: 294-327.
- BARCIA-GOYANES JJ (1985) Medieval hebrew anatomical names: A contribution to their history. *Korot*, 11: 192-202.
- BARCIA-GOYANES JJ (1994) El mito de Vesalio. Real Academia de Medicina de Valencia, Universidad de Valencia, Valencia, p 241.
- BARCIA-GOYANES JJ (1999) La anatomía en la Biblia. *Anales Valentinios*, 49: 109-193.
- BARCIA-GOYANES JJ (2003) *La saga de los Barcia*. Gráficas Soler, Valencia, p 365.
- BARCIA-GOYANES JJ, MONCAYO MARQUÉS J (1960) *La nomenclatura anatómica de París (P.N.A.) y su concordancia con la nomenclatura anatómica de Jena (I.N.A.) y las denominaciones usuales en español*. Ed. Saber, Valencia.
- BARCIA-GOYANES JJ, RECIO AMAT C (1948) *La nomenclatura anatómica de Jena (I.N.A.) y su concordancia con la nomenclatura anatómica usada en España*. Ed. Saber, Valencia.
- BARCIA-MARIÑO C, RODRÍGUEZ-MENA R (2013) Historia de la Neurocirugía española. La escuela de Valencia: J.J. Barcia Goyanes. *Neurocirugía*, 24: 262-271.
- BARCIA-SALORIO D (2004) Profesor Juan José Barcia-Goyanes (1901-2003) *In Memoriam*. Ed. Sociedad de Psiquiatría de la Comunidad Valenciana, Valencia, p 191.
- BRAUS H (1932) *Anatomie des Menschen*. Springer-Verlag, Berlin.
- CLARA M (1953) *Das Nervensystem des Menschen*. Johan Ambrosius Barth Verlag, Leipzig, p 772.
- DIAZ-ROJO JA (2003) Juan José Barcia Goyanes (1901 – 2003), estudioso de la historia del lenguaje anatómico. *Panace@*, 4: 13-14.
- GIMÉNEZ-GONZÁLEZ L (1953) Sistema nervioso central. In: *Anatomía funcional y fundamentos de patología*. Ed. Heraldo de Aragón, Zaragoza, p 4665.
- GÓMEZ-OLIVEROS L (1960) *Lecciones de Anatomía hu-*

*mana*. Ed. Marban, Madrid. Volume I, Issue II. Osteología, p 880.

HYRTL J (1880) *Onomatologia anatomica* Geschichte und Kritik der Anatomischen Sprache der Gegenwart Vienna. W Braumüller.

PASCUAL-BUENO J (2013) Inventario y estudio del archivo del Dr. Juan José Barcia Goyanes legado a la Generalitat Valenciana [doctoral thesis]. Universidad Católica de Valencia, p 439.

VON LANZ T, WACHSMUTH W (1959) *Praktische Anatomie*. Springer-Verlag, Berlin.