

Nicolás Achúcarro Lund (1880-1918)

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ABSTRACT

Nicolás Achúcarro Lund (1880-1918) was a prestigious neurologist who was granted the title of Doctor Honoris Causa by Yale University. After finishing medical school in 1904, Nicolás chose Paris, Florence, and then Munich to complete his neurological training. He worked under Kraepelin and also in Alois Alzheimer's laboratory at a time that would be instrumental in cementing his calling as a neurohistologist. He defended his doctoral thesis, on the lesions caused by experimentally-induced rabies in rabbits, in Madrid in 1906. Achúcarro's main interest was the normal and pathological histology of glial cells, and he published more than 30 articles in four languages in less than a decade; some of these articles appeared in German journals. He proved himself ahead of his time not only by identifying individual astrocytes, but also by suggesting that they played secretory and metabolic roles even though neurotransmitter and cerebral metabolites were still unknown. His foresight also led him to hypothesise that rod cell astrocytes engaged in phagocytic activity. Using his own tannin and ammoniacal silver method—the Achúcarro stain—he obtained magnificent results in staining neuroglia and especially reticulin. Although Achúcarro died young, he made many important contributions to the field of neurology.

KEYWORDS

Nicolás Achúcarro Lund, biography, neurohistologist, neuropathologist, glia, astrocytes

Introduction

Nicolás Achúcarro was born in Calle Bidebarrieta, one of the most typical streets in the old quarter of Bilbao, into a progressive middle-class family. His father Aniceto was an ophthalmologist; his mother, Juana Lund Ugarte, was the daughter of a Norwegian merchant who had settled in Bilbao and married a young Basque woman. Nicolás was very emotionally attached to his mother. Whenever he was away on his numerous journeys, he wrote her long, frequent letters which often included photographs; this has made the work of his biographers much easier.^{1,2} In one of his most famous portraits he bears a strong resemblance to a young Scandinavian gentleman (Figure 1).

Nicolás was the oldest of four siblings; his brother Juan died very young of tuberculosis, and Nicolás feared contracting this terrible disease for the rest of his life. His other two siblings were María Federica and Severino; the latter was named after their uncle, a well-known architect.

Their street, Bidebarrieta, also hosted a magnificent building decorated with modernist touches which the elder Severino had designed for the society called *El Sítio*. This society was founded to commemorate the siege of Bilbao during which the Liberal army was able to resist an attack by Carlist rebels in one of the many civil wars waged in Spain during the 19th century.

Young Nicolás received an excellent education, well above the usual standard, with particular emphasis on languages and the arts. A lifetime lover of music, he played the piano and spoke German and French fluently, as well as some Italian and English (although he was not very fond of the latter). His mastery of languages, his cosmopolitan upbringing, and the availability of monetary support from his family undoubtedly explain Achúcarro's penchant for travel. He visited many neurological institutes and psychiatric centres during his professional career which unfortunately was quite brief; he died at the age of 37.

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Achúcarro's international journeys began when he was very young. Following a brief stay in Paris at the age of 15, he travelled to Wiesbaden where he spent 16 months at a *Gymnasium* preparing to apply for admission to the faculty of medicine at the University of Madrid. Despite winning prizes for his remarkable academic performance and his good fortune in having Dr Santiago Ramon y Cajal as his histology professor, Nicolás was disappointed by the intellectual mediocrity of Spanish universities in his day and decided to continue his medical training in Marburg, Germany. While in Madrid, however, he met Luis Simarro, a brilliant neuropsychiatrist who had introduced Golgi's silver staining techniques in Spain and shown them to Cajal. Simarro had set up a laboratory at his own expense, and this was where Achúcarro discovered the world of nervous system histological research. Following Simarro's example, Achúcarro also set up a small laboratory (presided over by a photograph of Pasteur) in the attic of his family's house in the residential district of Neguri, near Bilbao, so that he could continue with his research during the holidays.

Once he had finished his studies and qualified as a doctor in 1904, Nicolás chose Paris to complete his neurological education and began working at Hospice de Bicêtre under Pierre Marie, with whom he would make his first presentation to the Paris Neurological Society. He regularly attended Babinski's clinical sessions at Hôpital de la Pitié. In 1905 he left for Florence with Lugaro and Tanzi; a few months later, he travelled to Munich to work with both Kraepelin and Alzheimer, a decisive encounter that was to cement his vocation as a neurohistologist. While in Munich, he completed various studies, the most important of which was on lesions in rabbits experimentally infected with rabies. This he presented in Madrid as his doctoral thesis in 1906, and it was published as a monograph some years later.³ At the request of Alzheimer himself, he completed further work on this study so that it could be included in a book published by Nissl.⁴

During this time, Alzheimer received an offer from the Government Hospital for Insane in Washington, D.C. asking him to join the staff and organise the neuropathology laboratory. But Alzheimer declined the offer for personal reasons and recommended that they hire Achúcarro, "who, despite his youth, is as worthy as I am". Nicolás set off for Washington in September 1908. In the ensuing months, he set up the laboratory and promoted the publication of a journal (*Bulletin of the*



Figure 1. Nicolás Achúcarro Lund (1880-1918)

Government Hospital for the Insane) in which he published several original research papers. Although the working conditions in Washington were magnificent and he was received with full honours (he had even been invited to a reception for President Roosevelt in the White House), Nicolás pined for his European way of life, and above all, for his fiancée Dolores Artajo, who had remained in Madrid. Between August and November of 1909 he journeyed to Europe once more, visiting Madrid, Paris and London. He made a very favourable impression on Sherrington when they met; in fact, on his return to Washington he received a job offer from Sherrington but did not accept it since he had already decided to settle in Spain. He concluded some unfinished business and nominated as his successor



Figure 2. Haut-relief of de Nicolás Achúcarro. Juan Haro, 1966

another Spanish neuropsychiatrist, Gonzalo Rodríguez-Lafora, who had an excellent background in neuropathology and was also a disciple of Alzheimer. Rodríguez-Lafora would later describe, while in Washington, myoclonic epilepsy with concentric amyloid bodies (Lafora bodies).

When Achúcarro returned to Madrid in 1910, Cajal welcomed him into his laboratory and entrusted him with part of his teaching load. However, Nicolás enjoyed no success in the antiquated and complicated Spanish hospital and university system; he was not promoted to department head or full professor, and he had to live off his private practice. He did manage to take charge of a ward with neurological patients in Hospital Provincial de Madrid where he proved to be an outstanding clinical teacher. In the summer of 1911, following another short

visit to Alzheimer's facilities, he perfected his ammoniacal silver oxide-tannin staining method in his own laboratory.^{5,6}

Nevertheless, he was recognised outside Spain; in 1912 he was invited to present courses and lectures in the United States and was invested Doctor Honoris Causa by Yale University. On his return, and with Cajal's assistance, he was at last granted access to an official laboratory where he would later train several of his disciples, including Sacristán, Gayarre, Fortun, and Calandre. Particular mention should be made of Pío del Río Hortega, who would come to be a world-renowned neurohistologist and neuropathologist. In 1914 he became director of an organisation for children with mental deficits (*Patronato Nacional de Anormales*), his only official designation in the field of psychiatry, and he obtained a post as an adjunct professor under Cajal.

In 1911 he decided, against his family's wishes, to marry his sweetheart Dolores who suffered from deforming arthritis and was his first cousin. They had no children. In 1915 he experienced the first symptoms of the disease that he himself diagnosed as Hodgkin's lymphoma. Achúcarro suffered the distressing consequences of the disease and sought the comfort of his family's house in Neguri when he became paraplegic. He died in 1918 at the age of 37. On 18 July, 1918, his memorial session was held at the Academy of Medical Sciences of Bilbao.

Achúcarro published more than 30 original articles in four languages in less than a decade, some of them in German journals. In English, he published at least six articles in the journal he founded in the psychiatric hospital in Washington. In one study of a case of dementia exhibiting tangles but no plaques, similar to that observed by Perusini in Alzheimer's laboratory, he described the glial fibrillary inclusions now known as coils as 'rings' and 'baskets'.⁷ Achúcarro suggested that the same abnormal metabolic process by which neurofibrils become encrusted might also affect glial fibres. Although this article has gone unnoticed by modern literature, it probably constitutes the first published description of dementia due to both neuronal and glial tauopathy without amyloid deposition (tangle-only dementia). Achúcarro published articles in German,⁸ French,⁹ and Spanish in the journal founded by Cajal (*Trabajos del Laboratorio de Investigaciones Biológicas*).

Achúcarro's main interest was normal and pathological histology of the glia.¹⁰⁻¹⁵ It is tempting to speculate that, as a researcher overshadowed by the figure of Cajal, he may have felt there was little left to study in the area of neurons and their connections, and therefore preferred to focus his efforts on the glia. In those days, an astroglial cell was seen as a syncytium whose only purpose was to provide support for nervous tissue. Achúcarro was ahead of his time not only in identifying individual astrocytes but also in suggesting that they played a metabolic and secretory role at a time when neurotransmitters and cerebral metabolites were not yet understood. He also believed that the cerebral cortex exhibited specific glial architecture^{12,13} similar to that already described for neurons and he planned a systematic study beginning with Ammon's horn, his favourite brain structure. He also showed foresight in thinking that microglial rod cells (*Stäbchenzellen*) played a phagocytic role. He searched diligently for a staining method that would allow him to establish the origin of these cells and differentiate any satellite cells or those without cytoplasmic projections. He obtained magnificent results in staining the neuroglia, and especially reticulin, using the ammoniacal-tannin method, but he was unable to resolve their main enigma; that honour is attributed to his student Río Hortega, who described both the microglia¹⁶ and the oligodendroglia.¹⁷ Another two structures that he investigated repeatedly were the pineal gland¹⁸⁻²⁰ and the superior cervical sympathetic ganglion in dementia cases.²¹

Achúcarro seemed destined to become the leader of a modern and robust current in neurology and psychiatry based on histology and neuropathology in early 20th century Spain. Unfortunately, his premature death and the scattering of all his disciples, especially Lafora and Río Hortega, after the Spanish Civil War of 1936-1939, would hamper Spanish advances in neurology and neuropathology for several decades. In 1966, Dr Gonzalo Moya, a disciple of Raymond Garcin and Ludo van Bogaert, named the first modern Spanish neurology department in Madrid after his hero Achúcarro before dying young himself. A fine high-relief bust of Achúcarro decorated the main hall of that department in Hospital de la Beneficencia del Estado (Figure 2). After the change in political regime, the hospital recovered its original name, Hospital de la Princesa, and the neurology department was no longer known as the Achúcarro wing. In Zamudio, near Bilbao, a psychiatric hospital was

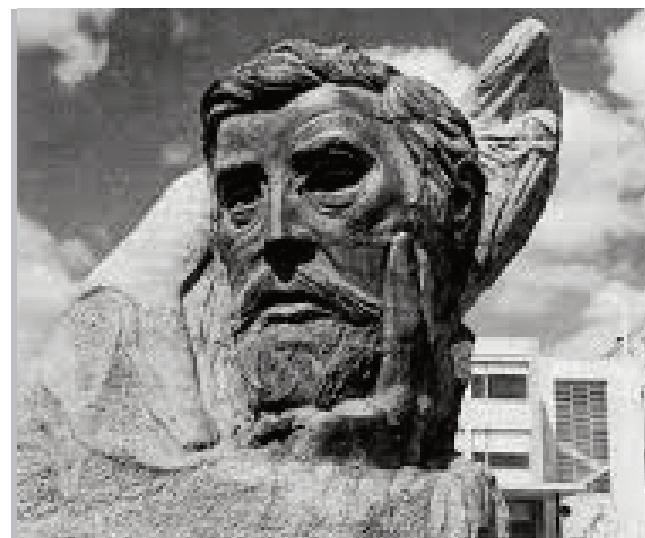


Figure 3. Monument to Nicolás Achúcarro in Zamudio (Vizcaya).

named after Achúcarro and an imposing sculpture of that scientist dominates its front garden (Figure 3). More recently, the new Achúcarro Basque Center for Neuroscience was inaugurated in the technological park in the same town.

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