Neuroanniversaires 2024: A Journey Through Neurological Milestones

Neuroaniversários 2024: Uma jornada pelos marcos da Neurologia

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ABSTRACT

The commemorative studies in this paper highlight important turning points in neurology and honor the achievements of early pioneers in the field. The articles encapsulate the 450th anniversary of Bartolommeo Eustacchio's death, the 400th anniversary of Thomas Sydenham's birth, the bicentennial of James Parkinson's death, the bicentennial of Paul Broca's birth, the 250th anniversary of Charles Bell's birth, the 150th anniversary of Egas Moniz's birth, the centennial of Arnold Pick's death, the centennial of William Macewen's death, the centennial of the Nobel Prize awarded to Torsten Wiesel and David H. Hubel, and the centennial of Vladimir Lenin's death. In each section, historical context, details of the contribution of each respective figures, and discussion about the impact on the field of neurology are provided.

Keywords: History; Neurology; Milestones

RESUMO

O manuscrito apresenta uma série de estudos comemorativos apontando significantes marcos na neurologia e reconhecendo as contribuições de figuras pioneiras dentro da disciplina. O artigo engloba o 450º aniversário da morte de Bartolomeo Eustacchio, a 400º aniversário de nascimento de Thomas Sydenham, o bicentenário da morte de James Parkinson, o bicentenário do Nascimento de Paul Broca, o 250o aniversário de nascimento de Charles Bell, o 150º aniversário de nascimento de Egas Moniz, o centenário da morte de Arnold Pick, o centenário da morte de William Macewen, o centenário do prêmio Nobel concedido a Torsten Wiesel e David H. Hubel, e o centenário de morte de Vladimir Lenin. Em cada seção, contexto histórico, detalhes das contribuições de cada personalidade e discussão acerca do impacto na área de neurologia são apresentadas.

Palavras-chave: História; Neurologia; conquistas.

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INTRODUCTION

The year 2024 commemorates several significant anniversaries in neuroscience, honoring the essential contributions of key figures who have greatly enhanced our understanding of the nervous system. Each milestone showcases the extraordinary achievements of individuals who have expanded our knowledge, from elucidating the anatomical complexities of the brain to unraveling the intricacies of neuroanatomy and neurological disorders. This paper aims to highlight these milestones by outlining the historical context, detailing the contributions of these influential figures, and examining their enduring impact on the field of neurology[1]. By revisiting the work of these pioneers (Figure 1), we can appreciate the challenges they encountered and the advancements they made, which have ultimately shaped modern medical practice.

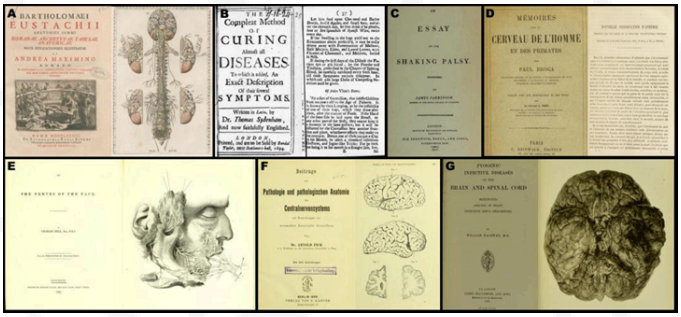

Figure 1. Iconic Works by Pioneers in Neurology and Neuroanatomy Featured in This Article.A. Cover and tabula XVIII, from the *"Romanae archetypae tabulae anatomicae novis explicationibus illustratae"* (1783 – Ancient Roman anatomical maps illustrated with new explanations), by Bartholomeu Eustacchio[40]. B. Cover and page 37, where a four-page chapter about "Saint Vitus' dance", from "The compleat method of curing almost all diseases" (1694), by Thomas Sydenham[41]. C. Cover from "An essay about shaking palsy" (1817), by James Parkinson[42]. D. Cover and a chapter of the book *"Mémoires ser le Cerveau de l'Homme et des Primates"*, (1885 – Memories of the Brain of Man and Primates), from Paul Broca. The title of the chapter is *"Nouvelle observation dáphémie – Produite par une lesion de la troisiéme circonvolution frontale"* (Nova observação de afemia – Produzido por uma lesão da terceira convolução frontal)[43]. E. Cover of "On the nerves of the face" (1829), by Charles Bell, and one figure of the book showing the third division of the fifth nerve to the muscles of the jaws and the seventh nerve of the face coming out from the stylomastoid foramen[44]. F. Cover and picture of one case cited in the book *"Beiträge zur pathologie und pathologischen Anatomie des centralnervensystems"* (1898 – Pathology and pathological anatomy of the central nervous system), from Arnold Pick[45]. G. Cover and a picture of the book, "Pyogenic infective disease of the brain and spinal cord" (1893), from William Macewen, showing a brain with necrosis[46].

Bartolommeo Eustacchio and the Foundations of Neuroanatomy

Bartolommeo Eustacchio (circa 1500/1514–1574), was an Italian anatomist, who made substantial contributions to neuroanatomy with the descriptions of the abducens nerve and the origins of the optic nerves[2]. Alongside his contemporaries at the School of Medicine of Padua, including Andreas Vesalius and Gabrielle Fallopius, Eustacchio's pioneering work in human anatomy marked a pivotal transition from the Galenic era to the modern study of anatomy[3]. Eustacchio's detailed annotations of the abducens nerve and the optic nerves furnish valuable insights into the intricate anatomy of cranial nerves and visual pathways, once he made many dissections[4]. His work, in conjunction with that of his colleagues at the School of Medicine of Padua, contributed to the establishment of modern neuroanatomy and the comprehension of the human nervous system[3,5]. On the 450th anniversaries of Bartolommeo Eustacchio's death, we commemorate his significant contributions to neuroanatomy and human anatomy, many of them only published 150 years before his death in the *Tabulae anatomicae*. Eustacchio's meticulous observations and descriptions of cranial nerves remain influential in contemporary neuroanatomical studies, serving as a testament to his enduring legacy within the history of anatomical science. In recognizing Eustacchio's achievements, we honor his impact on the advancement of anatomical knowledge and the ongoing exploration of the complexities inherent in the human body.

Thomas Sydenham and the Foundations of Modern Neurology

Thomas Sydenham (1624 – 1689) was a distinguished English physician colloquially referred to as the "English Hippocrates" for his transformative contributions to medicine. Sydenham's holistic approach to patient treatment and his keen observations of neurological disorders laid the groundwork for modern neurology[6]. On the occasion of his birth anniversary, it is pertinent to acknowledge Sydenham's profound impact on the field of neurology. Thomas Sydenham contributed to neurology with pioneering works in the description and treatment of neurological disorders during the 17th century. The historical context of 17th century medical practices influenced Sydenham's descriptions on contemporary neurological knowledge. Sydenham, like many of his contemporaries, recognized the need for a more direct and less theoretical approach to patient observation. He moved away from Galen's humoral explanations and focused on describing meticulously diseases as distinct entities, such as epilepsy and movement disorders, each with its own signs and symptoms. The hypothetico-deductive method superseded the abstract theories that preceded it. Furthermore, epidemics and the growing public interest in health issues were pivotal in the development of a new medical paradigm[6,7]. His emphasis on natural history and clinical observation revolutionized medical practice by shifting focus from theoretical speculation to practical clinical experience. Among Sydenham's notable contributions is his detailed description of chorea, commonly referred to as St. Vitus dance, which advanced our understanding of the neurological disorder[8]. Initially penned in Latin, his works became widely accessible through translations, aided significantly by the establishment of the Sydenham Society in 1843[9]. On Thomas Sydenham's 400th birth anniversary, we recognize his enduring legacy in neurology. Sydenham's dedication to patient-centered care, evidence-based medicine, and detailed clinical observations has paved the way for advancements in understanding and treating neurological disorders. By honoring Sydenham's

disorders. By honoring Sydenham's contributions to neurology, we celebrate his commitment to enhancing patient care and advancing medical knowledge, emphasizing the importance of observation and clinical experience within the practice of medicine.

James Parkinson and the Origins of Parkinson's Disease

James Parkinson (1755 - 1824) was an English physician and geologist, who is recognized for his foundational description of Parkinson's disease. His monograph, "An Essay on the Shaking Palsy," published in 1817, established a basis for understanding the clinical manifestations of the disease[10]. However, his observations were constrained by the medical knowledge and diagnostic tools available at the time. The historical background of medical practice and scientific knowledge in the early 19th century are fundamental to contextualize Parkinson's observations. His description of Parkinson's disease, while rudimentary by modern standards, focused on observable symptoms such as tremors and postural changes[11]. The absence of comprehensive neurological examination and the limited diagnostic tools of the time hindered the precision of his observations. Nonetheless, Parkinson's work established foundational knowledge for future understanding and investigation of Parkinson's disease[12]. Commemorating the bicentennial of James Parkinson's death, we acknowledge his pioneering contributions to neurology through his early descriptions of Parkinson's disease. Through a historical lens, we can appreciate the challenges and advancements in medical knowledge that have informed our comprehension of neurological disorders. Parkinson's legacy continues to motivate research and innovation in movement disorders, underscoring the significance of historical perspectives in shaping contemporary medical practice[10,12].

Arnold Pick and the Legacy of Frontotemporal Dementia

Arnold Pick (1851-1924), a pioneering neurologist, made substantial contributions to neuroscience through his descriptions of a degenerative condition affecting the frontal and/or temporal lobes, now recognized as Pick's disease[13]. In 1892, Pick's groundbreaking insights challenged conventional views of dementia by emphasizing the presence of focal signs and symptoms within neurodegenerative disorders[14]. This part addresses Arnold Pick's seminal work on the clinical description of Pick's disease, stressing the unique cortical and white matter involvement characteristic of this neurodegenerative condition and its implications for the understanding of dementia[15,16]. Pick's identification of a degenerative condition with primary lobar involvement in the frontal and/or temporal lobes facilitated the recognition of frontotemporal dementia as a discrete clinical entity[16]. On occasion of the centennial of Arnold Pick's death, we honor his enduring contributions to neurology through his characterization of Pick's disease, a subtype of frontotemporal dementia. Pick's insights into the focal nature of neurodegenerative disorders revolutionized the understanding of dementia and laid essential groundwork for future research in the field[14]. By acknowledging Pick's legacy, we celebrate his pioneering spirit and dedication to advancing knowledge and treatment of neurological conditions.

Paul Broca and the Localization of Speech Centers

Paul Broca (1824-1880) was a pioneering French physician, anatomist, and anthropologist recognized for his substantial contributions to neurology, particularly concerning the study of brain functions and the localization of speech centers[17]. This section explores Paul Broca on his birth anniversary by highlighting his groundbreaking contributions to neurology, with an emphasis on his research concerning speech impairments and the brain regions associated with language[18]. Broca's research focused on patients with speech disorders, specifically those with lesions in the left frontal lobe (now categorized as Broca's area), which yielded crucial insights into the localization of speech production in the brain[19]. His work laid the theoretical framework for understanding the brain regions responsible for language processing, thereby revolutionizing the field of neurology[19]. On Paul Broca's 200th birth anniversary, we celebrate his invaluable contributions to neurology and brain science. His pioneering inquiries into speech localization persist as influential elements in contemporary research concerning brain functions, underscoring his enduring legacy as a visionary neurologist and anatomist.

Charles Bell and the Elucidation of Nerve Functions

Charles Bell (1774-1842), a Scottish surgeon and anatomist, was integral to the field of neurology, particularly in elucidating the functions of the nervous system and the distinction between sensory and motor nerve pathways[20]. This section intends to commemorate the 250th birth anniversary of Charles Bell and emphasizes his foundational role in enhancing our understanding of the nervous system, particularly regarding the functions of afferent and efferent nerves and its correlation with Gall's localization theories[21,22]. While Franz Joseph Gall's (1758-1828) early localizationist theories contributed to the initial exploration of brain function localization, Bell's endorsement scientific discoveries refined and expanded upon these ideas, leading to a more comprehensive understanding of neurological disorders[20,23]. We pay tribute to Bell's enduring contributions to neurology and the elucidation of nerve functions. His emphasis on the roles of afferent and efferent

nerves has had a lasting impact on the field of neuroscience, reinforcing his legacy as a pioneering anatomist and neurologist.

Egas Moniz and the Development of Prefrontal Lobotomy and Angiography

Antônio Caetano de Abreu Freire Egas Moniz (1874-1955), a Portuguese neurosurgeon, writer and politician, alongside Pedro Manuel de Almeida Lima (1903-1985), played a crucial role in developing prefrontal lobotomy, which was widely utilized until the advent of psychotropic medications in the 1950s[24]. In 1949, Egas Moniz was awarded the Nobel Prize in Medicine for his discoveries regarding the therapeutic value of leukotomy in specific psychoses and his pioneering advancements in angiography[25]. His works credited him with the description of the course of the internal carotid artery within the temporal bone, which coined it as the Carotid Siphon or Egas Moniz' Siphon[26]. This section covers Egas Moniz's 150th birth anniversary, highlighting his collaboration with Pedro M. de Almeida Lima in the development of prefrontal lobotomy, as well as their pioneering work in neurology. The partnership between Egas Moniz and Pedro Almeida Lima made the emergence of psychosurgery possible[24]. Furthermore, Moniz's pioneering work in angiography transformed the landscape of diagnostic imaging in neurology[27]. Their combined efforts paved the way for advancements in neurosurgery and diagnostic techniques. On the occasion of Egas Moniz's birth anniversary and in recognition of their contributions to neurology, we celebrate their pioneering work in prefrontal lobotomy and angiography. Their innovative methodologies have substantially influenced the field of neurology, demonstrating the critical nature of collaboration and innovation in advancing medical treatments and diagnostic approaches.

William Macewen and the Advancements in Neurosurgery

William Macewen (1848 - 1924) was a pioneering figure in neurosurgery, celebrated for his innovative techniques and remarkable success rates in treating brain abscesses. As we commemorate the centenary of his passing, it is pertinent to reflect on his contributions and legacy in medicine[28]. This part addresses the life and work of William Macewen by highlighting his key achievements and influences in neurosurgery, with a focus on his pioneering techniques for treating brain abscesses and his enduring impact on the field, which transformed neurosurgery and laid the foundation for future advancements in the discipline[29]. His high success rates and commitment to patient care solidified his reputation as a trailblazer in medicine[28,29]. In conclusion, William Macewen's legacy continues to inspire generations of neurosurgeons and medical professionals. His contributions to the field of neurosurgery have left an indelible mark on medical history, and we honor his memory on the centennial of his passing.

Torsten Wiesel and David H. Hubel: Advancements in Visual Neuroscience and Neuroesthetics

Torsten Wiesel, a Swedish neurophysiologist and Nobel laureate, was born on June 3, 1924. His pioneering contributions to visual neuroscience, in collaboration with the Canadian neurophysiologist David H. Hubel (1926-2013), have profoundly advanced our understanding of how the brain processes visual stimuli[30]. As we celebrate the birth anniversary of Torsten Wiesel, we reflect on the groundbreaking research conducted by him and David H. Hubel, which revolutionized our understanding of how the brain processes visual information. Their collaborative work, which earned them the Nobel Prize in Physiology or Medicine in 1981, made significant strides in uncovering the brain's mechanisms for interpreting visual stimuli[31,32]. Wiesel and Hubel provided critical insights into how neurons in the visual cortex respond to specific stimuli, such as orientation and movement[30]. One of their most notable discoveries was the concept of orientation selectivity in visual cortex neurons, revealing how certain neurons are tuned to respond to specific orientations of objects within the visual field. This discovery helped shape our understanding of how the brain organizes visual information and paved the way for further exploration of the visual cortex's columnar organization, particularly in relation to ocular dominance and binocular vision[31,33]. Their research also offered valuable insights into potential treatments for visual disorders[34,35]. Beyond their contributions to visual neuroscience, Wiesel and Hubel's work has influenced the emerging field of neuroesthetics, which seeks to bridge the gap between art and science by exploring the neural mechanisms underlying aesthetic experiences. Neuroesthetics investigates how the brain perceives and responds to beauty, providing new perspectives on art through the lens of neuroscience[36]. By integrating their findings with neuroesthetic principles, Wiesel and Hubel's legacy extends beyond neuroscience, offering fresh insights into the intersection of art, perception, and brain function. Their pioneering work not only advanced visual neuroscience but also laid the groundwork for exploring the neural basis of aesthetic experience. This integration of art and science, or "neuroculture," highlights how the brain's complex neural networks shape our perception and appreciation of beauty[36].

Vladimir Lenin and the Neurological Challenges of a Revolutionary

Vladimir Ilyich Lenin (1870-1924), the Russian revolutionary and political leader, faced substantial health

challenges, encompassing motor and cognitive impairments Authors have illuminated the presence of episodic stroke symptoms and epileptic seizures, revealing the complexities of Lenin's neurological condition[37]. Despite his relatively youthful age, Lenin exhibited advanced diffuse atherosclerosis linked to hereditary factors that impacted his intracranial vessels. Lenin's attending physician epitomized the medical understanding of the era regarding neurological disorders, delineating conditions such as motor aphasia, anatomical lesions associated with alexia, and convulsions induced by transient cortical irritability. The diagnosis of multi-infarct further highlighted Lenin's neurological challenges; however, the absence of documented intervention efforts raises questions regarding his care and management[38]. The evolving insights into neurology provide a deeper understanding of cerebrovascular diseases similar to those experienced by Lenin[39]. By reassessing his case through a contemporary lens, one can identify advancements in neurology and medical care that may have influenced his health outcomes and quality of life. On the centenary of Vladimir Lenin's death, contemplation arises regarding the intricate neurological dilemmas he confronted and their ramifications on his political leadership and personal well-being. Through a retrospective analysis of his health adversities, we recognize the complexities of neurological disorders and the imperative of comprehensive care in their management. Lenin's case stands as a poignant reminder of the nexus between health and history, emphasizing the necessity for ongoing research and medical advancements in addressing the myriad neurological complexities individuals may encounter. The insights uncovered, including those of Oskar and Cecile Vogt, enrich the dialogue surrounding Lenin's enigmatic neurological journey, further elucidating the complexities underlying his health narrative[39].

Figure 2. Pioneers' Portraits: A Tapestry of Neuroscientific Legends showcases ten portraits of distinguished figures in neuroscience. This includes a fictional depiction of James Parkinson, rendered in the Romantic style at approximately 60 years of age, created by Dall-E with the guidance of one of the authors (MMG). Additionally, the collection features Oskar and Cecile Vogt, who conducted Lenin's autopsy, portrayed in the context of his passing 100 years ago. These portraits not only honor individuals who have made substantial contributions to neuroscience but also illuminate the intricate relationship between history, science, and art in enhancing our understanding of the brain and its disorders. All portraits, except for one, were sourced from Wikipedia and subsequently adapted .

These summaries offer an overview of each individual's life, their contributions to neurology, and the key events or works associated with them. Figure 2 encapsulates these endeavors.

CONCLUSION

The year 2024 serves as a significant marker of various anniversaries within the domain of neuroscience, celebrating the contributions of pioneering figures whose efforts have fundamentally transformed our understanding of the nervous system. This paper has underscored these milestones, providing a historical context, detailing the contributions of respective figures, and elucidating their enduring impact on the field of neurology. By revisiting the works of these pioneers, we can appreciate the challenges and advancements in medical knowledge that have shaped contemporary medical practices. The legacies of these pioneers continue to inspire research and innovation in neurology, emphasizing the importance of historical perspectives in shaping modern medical practice.

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