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EDITORIAL

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A bibliometric assessment of the incidence of amyloid-*Eszett* (Aß), a false positive of amyloid-*beta* (Aβ), in the neurodegenerative disease literature

A chance discovery in 2021 revealed an error caused by the inaccurate substitution of Greek *beta* (β) with German *Eszett* (ß) (Teixeira da Silva, 2021). We previously explored the nutrition literature to appreciate how widely *beta* (β)-carotene had been represented by its false positive, *Eszett* (ß)-carotene (Teixeira da Silva, 2021), detecting this error in 121 papers the Web of Science Core Collection (WoS-CC), mostly in Wiley journal titles (Teixeira da Silva & Nazarovets, 2023). We believe that the most plausible explanation for the existence of these errors in the scientific literature is the erroneous substitution of β for ß, most likely because authors, editors, peer reviewers and/or copyeditors might not know or be able to visually recognize the difference between them, so such errors would be considered honest errors, but errors nonetheless.

In our desire to extend knowledge about this unique linguistic phenomenon, we decided to focus on the neurosciences. In particular, we wanted to focus on amyloid-*beta* (Aβ) because it plays an important role in neurodegenerative diseases such as Alzheimer's disease (AD), caused in part by its accumulation and deposition (Ashrafian et al., 2021). When Aβ plaques and neurofibrillary tangles are abnormally deposited, this causes synaptic damage that potentiates cognitive impairments, leading to memory loss, AD and other neurodegenerative diseases (Kok et al., 2022). In AD, when Aβ oligomers bind to the postsynaptic membrane, this induces synaptotoxicity, so several treatment options to improve AD target Aβ to prevent or reduce Aβ-synaptic binding (Kok et al., 2022; Pinheiro & Faustino, 2019). Two enzymes, β- and γ-secretase, cleave the precursor of Aβ, amyloid-beta protein precursor (AβPP), to form Aβ peptides (Chen et al., 2017; Kok et al., 2022). Consequently, Aβ is seen as an important target in strategies to combat AD (Pinheiro & Faustino, 2019).

Initially, 21 cases of amyloid-*Eszett* (Aß), a false positive of Aβ, were detected in PubMed (Teixeira da Silva, 2022). To better appreciate the extent of this phenomenon in the scholarly indexed literature, using the same methodology as Teixeira da Silva and Nazarovets (2023), we explored WoS-CC and Scopus on 22 November 2022 using a search strategy that employed the terms "amyloid-β" and "amyloid-ß" in the title, abstract and keywords of any document type. The full methodology and results were recently reported in a preprint (Nazarovets & Teixeira da Silva, 2023). The objective of this editorial was to provide an updated (1 May 2023) assessment of the existence of Aß in WoS-CC and Scopus.

In WoS-CC, a total of 149 results were detected for the false positive (amyloid-ß) in 2001–2022. The number of false positives per year was particularly high (≥10) in 3 years (2012, 2020, 2022) and highest in 2012 (41 cases) (Figure 1). Among the 134 results, the journals with the highest frequency of this false positive were: *Journal of Neurochemistry* (nine times), *Journal of Alzheimer's Disease* (five times) and four times each for *Abstracts of Papers of the American Chemical Society*, *Angewandte Chemie International Edition*, *Journal of Neuroscience Research*, and *Scientific Reports*. The publisher with the highest incidence of amyloid-ß was Wiley. Authors with a US affiliation accounted for 42 false positives, followed by 21 for authors with an affiliation in China, 19 with Japanese affiliations and 18 with a German affiliation. This false positive was most frequently found in the field of Neurosciences (50), followed by Biochemistry Molecular Biology (32), then Clinical Neurology (19).

In Scopus, there were 328 results for the false positive (amyloid-ß) in 2001–2022. The years showing > 20 false positives were 2013–2014, 2017–2018 and 2020–2021, highest in 2020 (51 cases) (Figure 1). The publisher with the highest incidence (42) of the false positive was Springer-Nature. Amyloid-ß occurred most frequently in *Journal of Alzheimer's Disease* (34 times) followed by *PLOS One* (13 times), whereas authors with a US affiliation accounted for 92 false positives, followed by authors

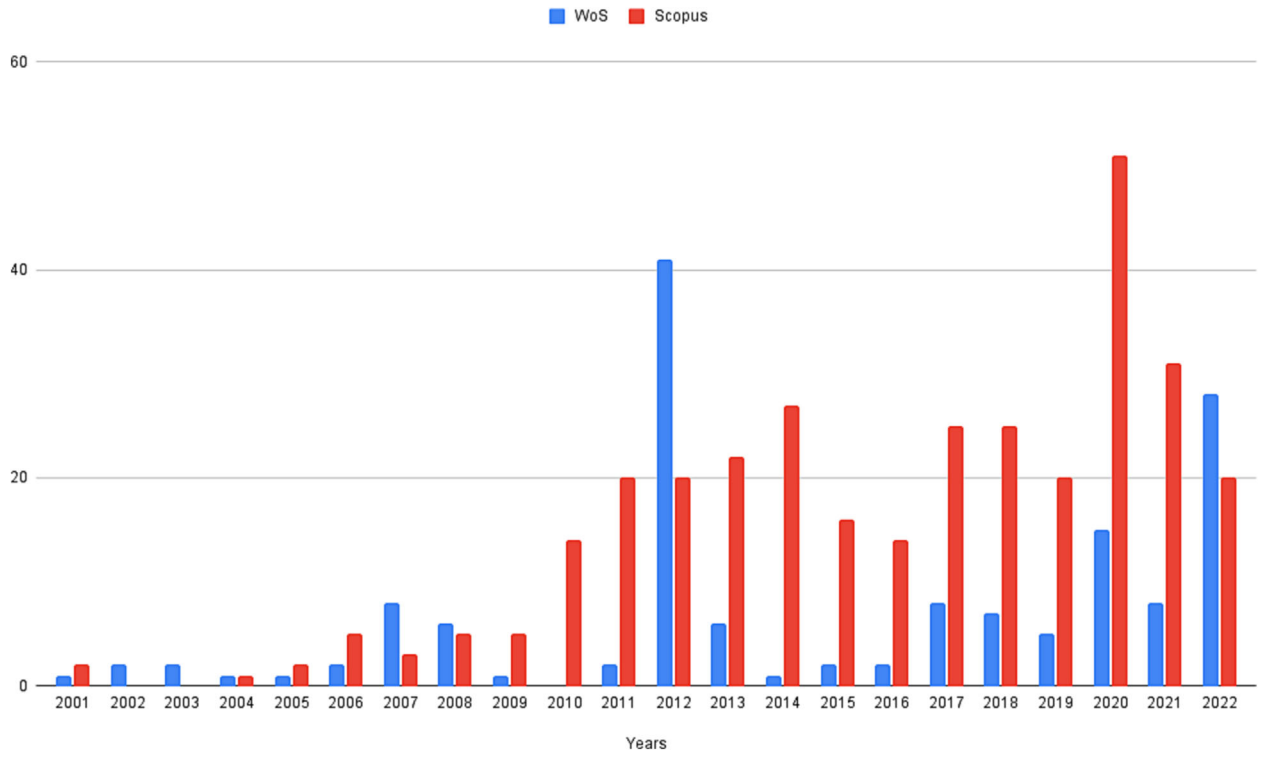

FIGURE 1 A search for amyloid-*Eszett* (Aß), a false positive of Aβ, in the Web of Science Core Collection and Scopus (1 May 2023) between 2001 and 2022.

with a Chinese affiliation (44 times), a Japanese affiliation (37 times) and a German affiliation (31 times). According to the Scopus classification, most papers in which the false positive was found belonged to the fields of Medicine (163) and Neuroscience (144).

We note that there are some limitations to this analysis, as noted in more detail in Nazarovets and Teixeira da Silva (2023), including discrepancies in records between Scopus and WoS-CC, even though coverage between these two databases is strongly comparable (Singh et al., 2021).

The linguistically unique phenomenon that we have bibliometrically analyzed most likely will not affect the scientific validity of the findings of the papers that were found to contain the Aβ false positive (Aß). For example, even if a hypothetical statement were to say 'Aß is found in cognitively impaired individuals' as opposed to 'Aβ is found in cognitively impaired individuals', the scientific 'fact' in itself does not change, although the correct compound being described (Aβ), might, in the eyes of the reader, be unrecognizable, or may cause confusion. The most undesirable outcome of this error that we can envision is that citing authors might unconsciously copy-paste the erroneous Aß into their own papers, thereby introducing an error into their own work.

Although we recognize that scientific databases are imperfect (Falagas et al., 2008), this should not be an excuse nor should it prevent data managers and journal copyeditors from carefully screening papers for very specific issues, such as the accurate linguistic representation of Aβ (rather than Aß), prior to publication. Our hope is that this editorial will trigger a discussion among authors whose papers employed the erroneous version of Aβ, in particular those cases with multiple mentions of the erroneous Aß, and conscientiously issue an erratum. This would require a collective effort and similar conscientious action on the part of the editors and publishers.

AUTHOR CONTRIBUTIONS

Except for the database searches in Web of Science (WoS) and Scopus, which were conducted by the first author, the authors contributed equally to all other aspects of the paper, including, but not exclusively limited to, conceptual design, methodology, analysis and validation, writing and editing all versions of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no relevant conflicts of interest.

PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/ejn.16058.

DATA AVAILABILITY STATEMENT

The raw data of the analyses in Web of Science Core Collection (WoS-CC) and Scopus are available on Zenodo: 10.5281/zenodo.7950723.

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