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How Nucleic acids DNA and RNA are Misrepresented by Tortured Phrases

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ABSTRACT

OBJECTIVES: Deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) are established terms in genetics and molecular biology literature, so linguistic deviations from these terms would be equivalent to their scientific misrepresentation. This paper aimed to identify literature containing the term "nucleic corrosive," which is a 'tortured phrase' (TP), and the misrepresentation of jargon related to nucleic acid.

METHODOLOGY: The Tortured Phrase Detector of the Problematic Paper Screener (PPS) was consulted on 11 May 2025 to identify documents of any type with this TP.

RESULTS: At PPS, a total of 71 indexed and accessible documents (44 articles, 18 book chapters, seven proceedings papers and two preprints) with a DOI, 35 (49%) of which were open access, were identified. Most documents (54; 76%), which were published between 2017 and 2024, had an affiliation in India. Four of the documents have been retracted. The publishers with the highest incidence of documents containing the "nucleic corrosive" TP were Elsevier and Springer Nature: 21 (30%) and 13 (18%), respectively.

CONCLUSION: The existence of TPs in these documents, except for the preprints, points towards failure in quality control at the levels of peer review, editorial handling and copy editing.

Key words: Education; error; Genetics; Molecular biology; Nomenclature; Scientific communication and Literacy

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INTRODUCTION

What differentiates the fundamental threads of life, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA), is whether the five-carbon sugar in their nucleic acids contain deoxyribose or ribose, respectively. In other words, all forms of life are made up of only two forms of nucleic acids, DNA and RNA, which show very specific interactions during transcription.[1] The term 'nucleic acid' is thus an established form of scientific jargon in the literature, with a rich history of debate,[2,3] and any misrepresentation of this term would be factually and scientifically incorrect.

It has been argued that 'tortured phrases' (TPs)[4] are the antithesis of accurate scientific representation of language, i.e., the misrepresentation of established scientific terms, and their presence in the scientific literature may have the greatest impact on studies related to human health, especially if the intended meaning is misunderstood. The scientific accuracy of the message, and the accuracy of the scientific language, is fundamental in healthcare literature, and the presence of TPs in medical papers[5], such as those related to COVID-19,[6,7] represent a deviation from scientific writing norms to describe established scientific terms, and may mislead readers by creating ambiguity in the message, and thus ambiguity in their interpretation of the message or scientific content. At an extreme level, if a text is ridden with TPs and the message is incomprehensible, it can be argued that the paper has lost its scientific validity and credibility. In such cases, those TP-infected papers might be retracted from the scholarly record, as has already been evidenced in the biological, biomedical, chemical and environmental sciences,[8] but also in the humanities and social sciences.[9]

One specific "family" of TPs are the "corrosive acids" in which the word "acid" was converted to the synonymous term "corrosive". As one example, abscisic acid is represented by the non-existent term "abscisic corrosive".[10] The objective of this research note was to focus attention on a single "corrosive acid" TP.

METHODOLOGY

To discover any instances of "nucleic corrosive", a TP of nucleic acid, and part of the "corrosive acid" "family" of TPs, encompassing DNA and RNA, which would be misrepresented by the TPs "deoxyribonucleic corrosive" and "ribonucleic

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corrosive", respectively, the Tortured Phrase Detector of the Problematic Paper Screener (PPS)[11] was accessed (11 May 2025). Output was exported to Excel, and listed chronologically. The following aspects were examined: document type (article, proceeding, chapter, preprint), publisher, venue (e.g., journal or conference name), digital object identifier (DOI), open access status, retracted status, number of instances of "nucleic corrosive" in the PDF or HTML full text, countries indicated in authors' affiliations, and instances of any other "corrosive acid" TPs (Suppl. table). Three aspects were quantified as absolute counts and/or relative percentages: number of instances of "nucleic corrosive", publishers and the countries of affiliations. False positives, duplicate entries, and results for which full texts were not available for verification, were excluded

RESULTS

After removing three false positives and one duplicate entry, and excluding results for which full texts were not available for verification, a total of 71 documents published between 2017 and 2024 were examined (Suppl. table). Of these, 35 (49%) were published as open access, thus allowing other readers and the public to independently verify them as well. The vast majority were articles (44; 62%), followed by book chapters (18; 25%), seven proceeding papers, and two preprints. The two publishers with the most instances of TPs in those documents were Elsevier (21; 30%) and Springer Nature (13; 18%), 14 in the latter if one also considers the Research Square preprint server, which is owned by Springer Nature. Four of the documents have been retracted, with one of them (DOI: 10.1088/1757-899X/396/1/012028) explicitly alluding to the presence of "tortured phrases" in the retraction notice, while one document (DOI: 10.1109/ICECAA55415.2022.9936101) has an expression of concern, also explicit about the presence of "tortured phrases". The country of authors' affiliations most frequently associated with these cases of TPs is India (54 documents; 76%).

DISCUSSION

Of particular concern is the presence of TPs in peer-reviewed literature, reflecting a clear failure of the authors' use of non-standard terms rather than established jargon, which peer reviewers should have detected and corrected. One possible reason for their existence is the authors' use of synonymization or translation software, as a way to avoid the detection of plagiarism or to reduce textual similarity.[4] However, peer reviewers, editors and copy editors[12] are also to blame since they have failed to detect and correct these errors, i.e., TPs, during peer review and prior to publication. In literature that is not peer-reviewed, such as preprints,[13] the existence of TPs should not be emphasized any less than in peer-reviewed literature.

For authors and journal editors who are willing to adopt a responsible approach, TP-related errors should ideally be corrected, and an erratum can easily list the TPs alongside the correct and intended jargon, to alert readers not to use the former and thus not propagate these errors downstream into the citing literature, which, if left uncorrected, might lead to an erosion of its bibliometric value and scientific messaging. Such advice is debatable if only one or very few TPs exist, as is the case with several of the documents indicated in the Suppl. table. However, in corrigenda, authors and journal editors also have the responsibility of informing readers how such TPs emerged. While the vast majority (61/71 or 86%) of the cases discovered in this study include only between one and three copies of "nucleic corrosive" or any derivatives (e.g., "deoxyribonucleic corrosive"), the most egregious case of a Taylor & Francis book chapter (DOI: 10.1201/9781003187608-5) includes 25 instances, suggesting failed peer review and insufficient editorial scrutiny. In addition, the presence of only one or a few instances of "nucleic corrosive", or any of its derivatives, does not preclude the presence of other "corrosive" TPs. For example, in an article (DOI: 10.9734/ARRB/2018/37827), although there is only a single instance of "nucleic corrosive," other "corrosive"-related TPs were detected: "bile corrosive", "gadoxetic corrosive", "lysophosphatidic corrosive", "feeble corrosive", "boronic corrosive", "lithocholic corrosive poly-lactobionic corrosive", where the first, fourth and fifth TPs were most likely meant to represent bilic acid, weak acid and boronic acid, respectively. LIMITATIONS: This paper has several limitations. Unfortunately, due to access restrictions, not all of the documents corresponding to the results revealed by PPS were accessible, while a search for "nucleic corrosive" at Google Scholar on the same date revealed about 330 results, likely including the same ones covered by PPS, but also others straddling the grey literature, as well as probable false positives. While some may deemphasize the importance of Google Scholar, the use of this source of literature that is then cited in indexed literature should not be underestimated, especially if texts are published as open access, which would allow them to be easily accessed and conveniently cited. Therefore, a more comprehensive systematic study of this phenomenon in the nucleic acids-related literature, using Google Scholar and indexed literature in Scopus and Web of Science, is likely needed. Moreover, multiple documents contained many TPs, as evidenced in PPS, but these were not examined, quantified or interpreted. Finally, there is no guarantee that papers' indicated DOIs are recognized by Crossref.

To overcome some of the study's limitations, and to fortify its

conclusions, several suggestions are made: 1) ideally, the authors of the discovered documents should be interviewed to gain an understanding about the source of these TPs; 2) the editors of the journals in which papers that were peer reviewed, but contained these TPs, need to conduct investigations to ascertain their source, impact and importance; 3) although this research note only employed PPS to source possible cases, which were then manually examined, more advanced scientometric analyses to appreciate content networks[14] and citation biases and networks[15] might reveal some interesting details or patterns about these TPs or inter-document links. Readers should appreciate that research into TPs is still a very nascent field of research in itself, so there are currently no established research guidelines or recommended procedures for analysis

CONCLUSION

The objective of this paper was to identify documents that contained the TP "nucleic corrosive", assessed using PPS. In May 2025, 71 documents – mostly articles and book chapters, but also including proceedings and preprints – were identified. These had been published in 2017-2024, most (86%) contained 1-3 mentions of the "nucleic corrosive" TP, one document had 25 instances, while four documents had already been retracted. A more in-depth linguistic analysis of these documents might identify additional TPs or other "issues" that may merit editorial scrutiny and correction.

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CONFLICT OF INTEREST

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