

# Review of: "Critical Review on Carbon Nanomaterial Based Electrochemical Sensing of Dopamine the Vital Neurotransmitter"

Sathish Kumar Ponnaiah<sup>1</sup>

<sup>1</sup> Daegu Gyeongbuk Institute of Science and Technology, Daegu, South Korea

Potential competing interests: No potential competing interests to declare.

Carbon nanomaterial-based electrochemical sensing of dopamine presents a promising option for electrochemical sensor studies. This review provides an exhaustive overview of dopamine diagnosis, its clinical significance, and electrochemical sensing of dopamine, examining their advantages and potential for dopamine detection. The review also addresses future challenges and perspectives in the development and utilization of electrochemical sensing of dopamine, offering insights into potential research avenues for advancing this exciting field. Overall, the review is well-written, but in my opinion, it requires the following revisions before acceptance.

1. The title mentions "Carbon Nanomaterial-Based Electrochemical Sensing," but the review only covers GO and CNT. Why is this? Please discuss other types of carbon-based materials (such as fullerenes (C<sub>60</sub>), carbon nanorods, carbon dots, g-C<sub>3</sub>N<sub>4</sub>, etc.).
2. In the abstract section, add a sentence explaining the importance of carbon-based materials for dopamine sensing and their interaction with dopamine molecules.
3. The electroactive material and dopamine sensing mechanism are crucial for this review. The author should provide a clearer explanation of the electrochemical mechanism in this context.
4. The author could include the principles of each electrochemical sensing method (CV, DPV, LSV, etc.).
5. Why haven't the authors provided any electrochemical sensing images of the dopamine sensor work in this review?
6. In Section 4.0, it would be beneficial to briefly describe the function of each carbon material in dopamine sensing.
7. The author should provide one or two lines describing the information obtained from each characterization method in Section 4.0.
8. All abbreviations should be defined upon first use, and the entire manuscript should be carefully examined for this. For example, the author states, "CNs-based electrodes have been utilized in numerous dopamine sensors." What does "CNs" refer to?
9. The authors should include the mechanism behind the electrochemical sensor studies in some sections (4.1 and 4.2).
10. It is crucial for such a review to clearly identify and propose potential solutions to the existing challenges in the field.
11. In the discussion of carbon-based materials, electrochemical sensor work, and its mechanisms, it is recommended to reference 1) The Journal of Physical Chemistry B 122 (12) (2018) 3037-3046, 2) Ultrasonics Sonochemistry 44 (2018) 196-203, 3) Electrochimica Acta 283 (2018) 914-921, 4) Bioinspired Nanomaterials: Synthesis and Emerging

Applications 111 (2021) 224-263, 5) Microchemical Journal 193 (2023) 109116, 6) ACS Nano 18(40) (2024) 27287–27316, 7) ACS Applied Nano Materials 7 (7) (2024) 6839-6850, 8) Chemosphere, 355 (2024) 141838.