

# ARTIFICIAL INTELLIGENCE AND PHARMACOLOGISTS: THREAT OR OPPORTUNITY?

**F. Visioli**

Department of Molecular Medicine, University of Padua, Padua, Italy

**E-mail:** francesco.visioli@imdea.org

**Doi:** 10.36118/pharmadvances.2023.54

With some marketing coups, artificial intelligence (AI) has entered (for now) the lives of many mind workers. Among them: pharmacologists and biomedical researchers in general (1). AI is multifaceted and includes, for example, machine learning and data mining. In this regard, we should expect AI to greatly aid pharmacological research and facilitate the discovery of new drugs and new mechanisms of action, thereby easing and accelerating the overall pipeline. It is easy to echo the excitement that exists in radiology (2), where AI is both welcomed and feared.

However, conducting experiments and then writing or reviewing a scientific manuscript entails responsibilities that only humans can assume. The critical thinking and evaluation required to develop new directions in research and peer review are outside the realm of generative AI and AI-enabled technologies, and there is a risk that the technology will lead to incorrect, incomplete, or biased conclusions. With respect to scientific publications, these considerations, together with the principle that submitted manuscripts should be treated as confidential documents, underlie the Generative AI guidelines for reviewers and editors. Indeed, it is tempting to upload the manuscript or portions of it to a generative AI tool because there is no guarantee of where the material will be sent, stored, or viewed, or how it may be used to train the model in the future, and this may violate the confidentiality, property, and/or privacy rights of the authors.

One area where – likely - AI will be of great help is that of Real-World Data (3), where an enormous amount of data of remarkable value - precisely because it was obtained “out there” where physicians treat patients - can be analyzed to inform future clinical practices.

Certainly, this issue of PharmAdvances contains articles (4-6) written by real researchers who sat down, meticulously analyzed the data, and wrote an article. Two things should be pointed out: 1) Two papers be-

long in the field of natural products. This is a rapidly growing field, and IUPHAR itself has dedicated a separate section to this area (<https://iuphar.org/sections-subcoms/natural-products/>) as well as a complete database (<https://www.guidetopharmacology.org/GRAC/LigandListForward?type=Natural-product&database=all>) that will be soon used in an appropriate setting. Another example of the importance of natural products is the most cited paper (to date) published in *PharmAdvances* (7); (2) the other paper is from the real-world data approach described above (8). In short, pharmacology is rapidly evolving and diversifying, and AI seems to be a well-suited tool that will help us keep up with the latest developments. Imagine if in clinical pharmacology all data be dynamically tracked in real time using wearable sensor technology. The application of AI to such areas will certainly have a transformational near-term impact (8). Finally, methodological advances and future AI-assisted analyzes of all data will provide sound insights to realize the goal of personalized medicine, and we should not forget that, according to US CDC, medical errors are the third leading cause of death in that country (2). In summary, artificial intelligence is also very promising for pharmacologists, but it needs to be tamed. It must be remembered that science is hard, and information must come from reputable sources such as scientific journals where real people publish their hard-earned data. By the way, was this Editorial written by AI?

## REFERENCES

1. Gomes B, Ashley EA. Artificial Intelligence in Molecular Medicine. *N Engl J Med.* 2023;388(26):2456-65. doi: 10.1056/NEJMra2204787.
2. Strohm L, Hehakaya C, Ranschaert ER, Boon WPC, Moors EHM. Implementation of artificial intelligence (AI) applications in radiology: hindering and facilitating factors. *Eur Radiol.* 2020;30(10):5525-32. doi: 10.1007/s00330-020-06946-y.
3. Martini N, Trifiro G, Capuano A, Corrao G, Pierini A, Racagni G, et al. Expert opinion on Real-World Evidence (RWE) in drug development and usage. *Pharmadvances.* 2020;2(2):41-50. doi: 10.36118/pharmadvances.02.2020.01.
4. Drago V, Platania CBM, D'Agata MA, Sortino MA. The use of biological and biosimilar drugs in Rheumatology and Dermatology: analysis of two prescribing centers in Sicily from 2019 to 2020. *Pharmadvances.* 2023;5(1):5-14. doi: 10.36118/pharmadvances.2023.51.
5. Di Napoli A, Germani F, Parisi F, Zucchetti P. The beneficial effects of pomegranate (*Punica granatum* L.) consumption on human health: a review. *Pharmadvances.* 2023;5(1): 15-28. doi: 10.36118/pharmadvances.2022.45.
6. Biagi M, Rigillo G, Sarill M, Collotta D, Di Giacomo S, Di Sotto A, et al. From preclinical to clinical evidence: exploring the multiple

perspectives and healing power of *Boswellia serrata* Roxb. ex Colebr. *Pharmadvances*. 2023;5(1):29-53. doi: 10.36118/pharmadvances.2023.53.

7. Canistro D, Chiavaroli A, Cicia D, Cimino F, Curro D, Dell'Agli M, et al. The pharmacological basis of the curcumin nutraceutical uses: an update. *Pharmadvances*. 2021;3(2):421-66. doi: 10.36118/pharmadvances.2021.06.
8. Subbiah V. The next generation of evidence-based medicine. *Nat Med*. 2023;29(1):49-58. doi: 10.1038/s41591-022-02160-z.