The Transformative Role of Artificial Intelligence in Biomedical Research

Najma Baseer
Institute of Basic Medical Sciences (IBMS), Khyber Medical University Peshawar

*For Correspondence

Dr. Najma Baseer

Associate Professor, Anatomy, Institute of Basic Medical Sciences, Managing Editor ABMS Journal, Khyber Medical University, Peshawar, Pakistan

Email: drnajma.ibms@kmu.edu.p

Artificial Intelligence (AI) has become a powerful ally in the rapidly changing field of biomedical research, thereby transforming the way scientists tackle intricate medical problems. AI's incorporation into biological research has opened up new avenues for discovery, diagnosis, and therapy that were previously unimaginable. This editorial examines the diverse applications of AI in biomedical research and emphasizes how it has revolutionized the field in a number of ways.

Genomic sequences and clinical records are just two examples of the enormous volumes of complicated data produced by biomedical research. Deciphering complex patterns and correlations within these datasets has been made possible by AI's aptitude for managing and analyzing massive datasets. Deep learning and other machine learning techniques make it possible to extract valuable insights from large datasets, which advances our understanding of illnesses and their underlying causes.[1]

The conventional method of drug discovery is expensive and time-consuming, frequently involving years of study and substantial resources. By finding new targets, forecasting possible therapeutic candidates, and improving drug design, AI speeds up this process. By utilizing biological data analysis, machine learning models can forecast the safety and efficacy of potential drugs, greatly cutting down on the duration and expenses associated with preclinical and clinical studies.[2]

AI is essential to the development of personalized medicine since it allows doctors to customize a patient's course of treatment according to their genetic composition, way of life, and surroundings. Artificial intelligence (AI) can detect biomarkers and forecast a patient's reaction to a particular treatment by evaluating patient data. This opens the door to more focused and efficient therapeutic interventions.[3] Furthermore, the accuracy of disease diagnosis has been significantly enhanced by AI applications in medical imaging and diagnostics. Machine learning algorithms can analyze medical images, such as X-rays, MRIs, and CT scans, with remarkable precision, aiding clinicians in early detection and accurate diagnosis of diseases, including cancer and neurological disorders.[4]

Hence, the integration of AI into biomedical research is a transformative force that holds the promise of accelerating scientific discovery, improving diagnostic precision, and advancing personalized medicine. As researchers continue to explore the vast potential of AI applications, it is crucial to navigate ethical considerations and ensure responsible and equitable deployment of these technologies. The collaborative synergy between AI and biomedical research heralds a future where innovative solutions to complex medical challenges are not just conceivable but achievable. Despite the many benefits of AI in biomedical research, there are also potential drawbacks that must be considered. One of the main concerns is the lack of transparency in AI algorithms. Because AI algorithms are often complex and difficult to understand, it can be challenging to determine how they arrive at their conclusions. This lack of transparency can make it difficult to identify biases or errors in the algorithms.

AI has enormous potential for biomedical research, but there are ethical issues that need to be carefully considered. To guarantee that the advantages of AI are fairly and ethically dispersed, concerns like data privacy, bias in algorithms, and the proper application of AI in healthcare contexts must be addressed.[5]

Lastly, there is a problem with the data quality that AI systems use. Biomedical data can be difficult to analyze and is frequently complex. Improper inferences and even hazardous effects might result from biased or faulty data used to train AI algorithms.[3] The possibility that AI would supplant human researchers is another cause for concern. Artificial intelligence (AI) can swiftly and accurately analyze large volumes of data, but it cannot take the place of human researchers' creativity and critical thinking abilities. It's critical to keep in mind that artificial intelligence (AI) is a technology that may support researchers—not to take their place of data, seeing trends, forecasting illness outcomes, and locating novel therapeutic targets. But there

This editorial may be cited as: Najma Baseer. The Transformative Role of Artificial Intelligence in Biomedical Research. Adv Basic Med Sci. 2023; 7(2): 33-34 DOI: https://doi.org/10.35845/abms.2023.2.308

are also possible disadvantages that need to be taken into account, like the To sum up, artificial intelligence (AI) has the power to completely transform biomedical research by evaluating enormous volumes Opaqueness of AI algorithms and the possibility that AI would eventually supplant human researchers. Researchers must utilize AI sensibly and ethically as it develops and becomes more complex in order to optimize its advantages and reduce any potential negative effects. Reputable doctor and researcher Eric Topol stated that "high-performance medicine is on the horizon, with AI as the crucial partner in refining and developing the future of healthcare."[1]

REFERENCES

1. Topol EJ. High-performance medicine: the convergence of human and artificial intelligence. Nature medicine. 2019 Jan;25(1):44-56.
2. Angermueller C, Pärnamaa T, Parts L, Stegle O. Deep learning for computational biology. Molecular systems biology. 2016 Jul;12(7):878.
3. Saria S, Goldenberg A. Subtyping: What it is and its role in precision medicine. IEEE Intelligent Systems. 2015 Jul 14;30(4):70-5.
4. Esteva A, Kuprel B, Novoa RA, Ko J, Swetter SM, Blau HM, Thrun S. Dermatologist-level classification of skin cancer with deep neural networks. nature. 2017 Feb;542(7639):115-8.
5. Obermeyer Z, Emanuel EJ. Predicting the future—big data, machine learning, and clinical medicine. The New England journal of medicine. 2016 Sep 9;375(13):1216.

CONFLICT OF INTEREST

Author declared no conflict of interest

GRANT SUPPORT & FINANCIAL DISCLOSURE

Author declared no specific grant for this research from any funding agency in the public, commercial or non-profit sectors

Author Contribution

NB: Conception, Design of the work, Data collection,Data Analysis and Drafting, Reviewed, Final approval, Agreement to be accountable.