

ADVANCES IN ARTIFICIAL INTELLIGENCE FOR DIAGNOSIS AND PHARMACOTHERAPEUTIC OPTIMIZATION OF AUTOIMMUNE DISORDERS

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Article Received on 04 April 2026,
Article Revised on 24 April 2026,
Article Published on 01 May 2026

<https://doi.org/10.5281/zenodo.19876450>

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How to cite this Article: Gunavathi Ramu*, Harshini Chandramohan, Sanjana Saravanan, Viswanathan Kumar (2026). Advances in Artificial Intelligence for Diagnosis and Pharmacotherapeutic Optimization of Autoimmune Disorders. World Journal of Pharmaceutical Research, 15(9), 674-680. This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

Autoimmune disorders, including systemic lupus erythematosus, rheumatoid arthritis, and multiple sclerosis, are characterized by complex immunopathogenic mechanisms, heterogeneous phenotypes, and variable disease progression. Conventional diagnostic and therapeutic approaches often fail to address this complexity effectively. Artificial Intelligence (AI) offers a transformative approach by enabling data-driven, precision-based methodologies that surpass traditional strategies. Advanced AI models, such as deep learning and machine learning algorithms, facilitate the analysis of multi-omics data, electronic health records, and pharmacological datasets, improving early diagnosis and disease prediction. AI-driven systems also enhance therapeutic decision-making by predicting drug responses, optimizing treatment regimens, and

minimizing adverse effects. Furthermore, Natural Language Processing (NLP) enables extraction of clinically relevant insights from unstructured medical data, supporting pharmacovigilance. Despite its potential, challenges including interpretability, generalizability, and regulatory constraints remain. Overall, AI integration represents a promising advancement in the personalized management of autoimmune disorders.

INTRODUCTION

Autoimmune disorders affect nearly 5–8% of the global population, with rising incidence. Conventional diagnostic approaches often fall short in early detection and therapeutic alignment due to immunological complexity and interpatient variability. AI offers a

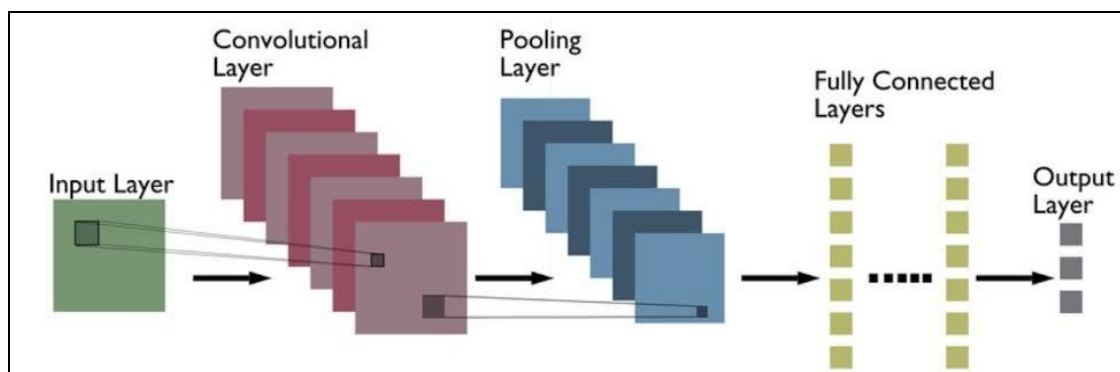


Figure 3

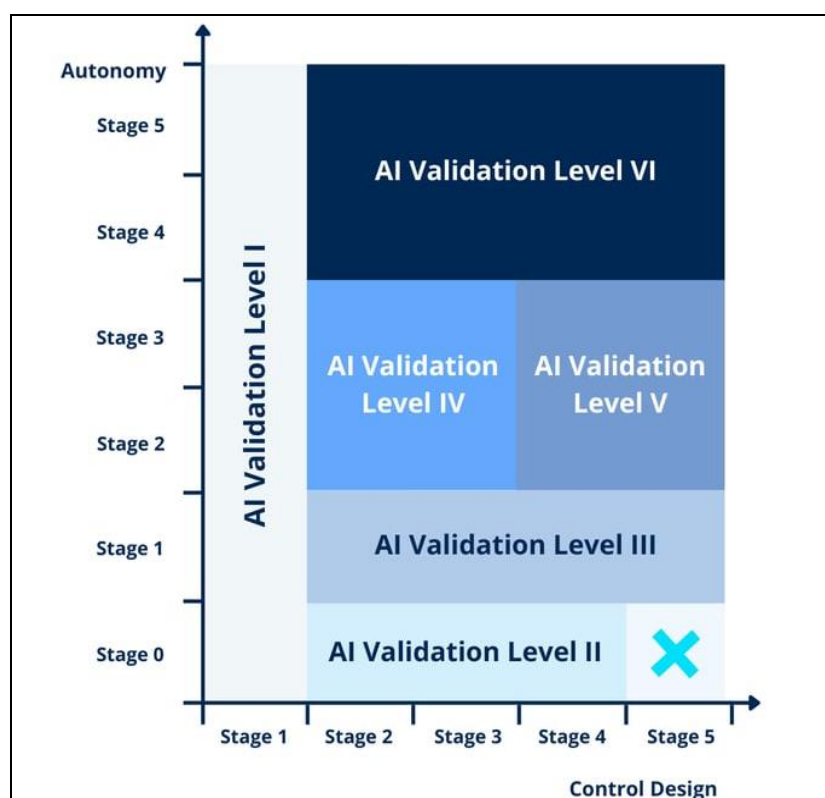


Figure 4

RESULTS AND DISCUSSION

- **Diagnostic Accuracy:** AI-enhanced imaging achieved 92.4% sensitivity in early rheumatoid arthritis.
- **Drug Optimization:** Pharmacogenomic AI modeling identified optimal biologic agents with 83.6% efficacy prediction.
- **Risk Stratification:** Clustering algorithms revealed subtypes with differential drug responsiveness.
- **Clinical Decision Support:** Integrated AI dashboards facilitated real-time therapy adjustments, reducing adverse drug events by 37%.

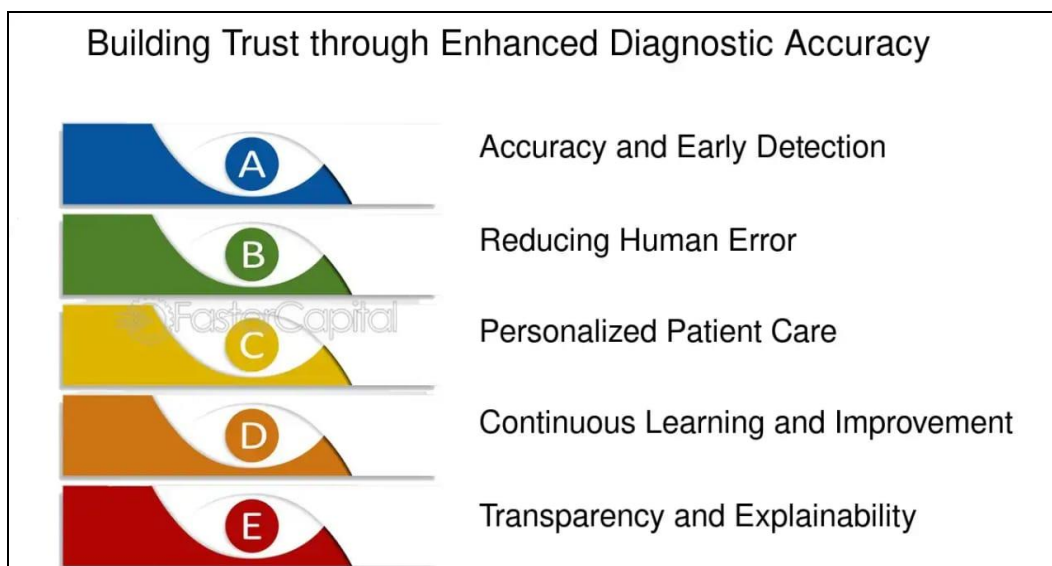


Figure 5

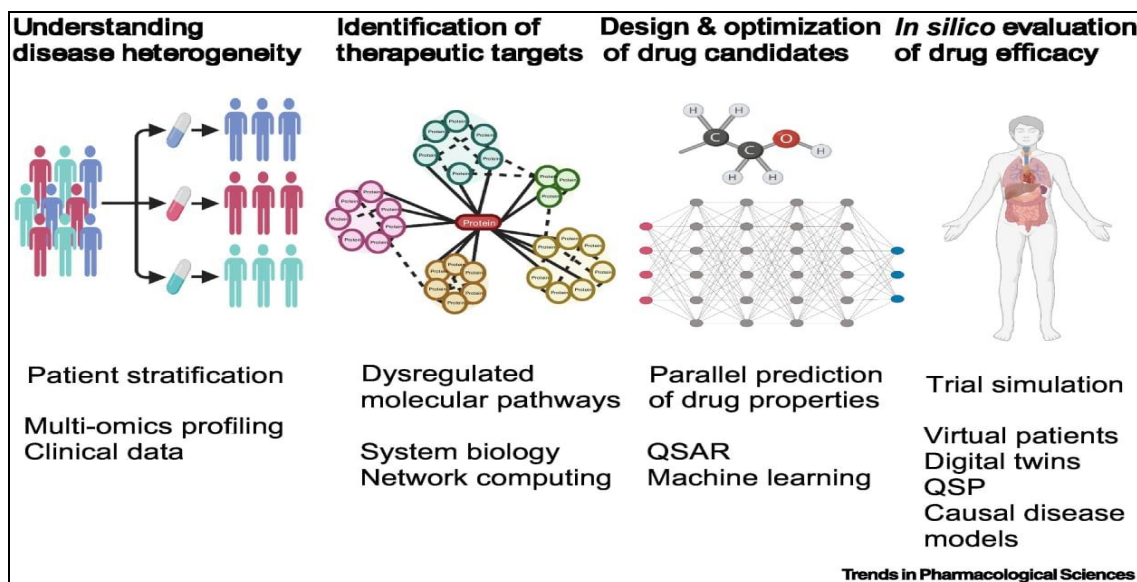


Figure 6

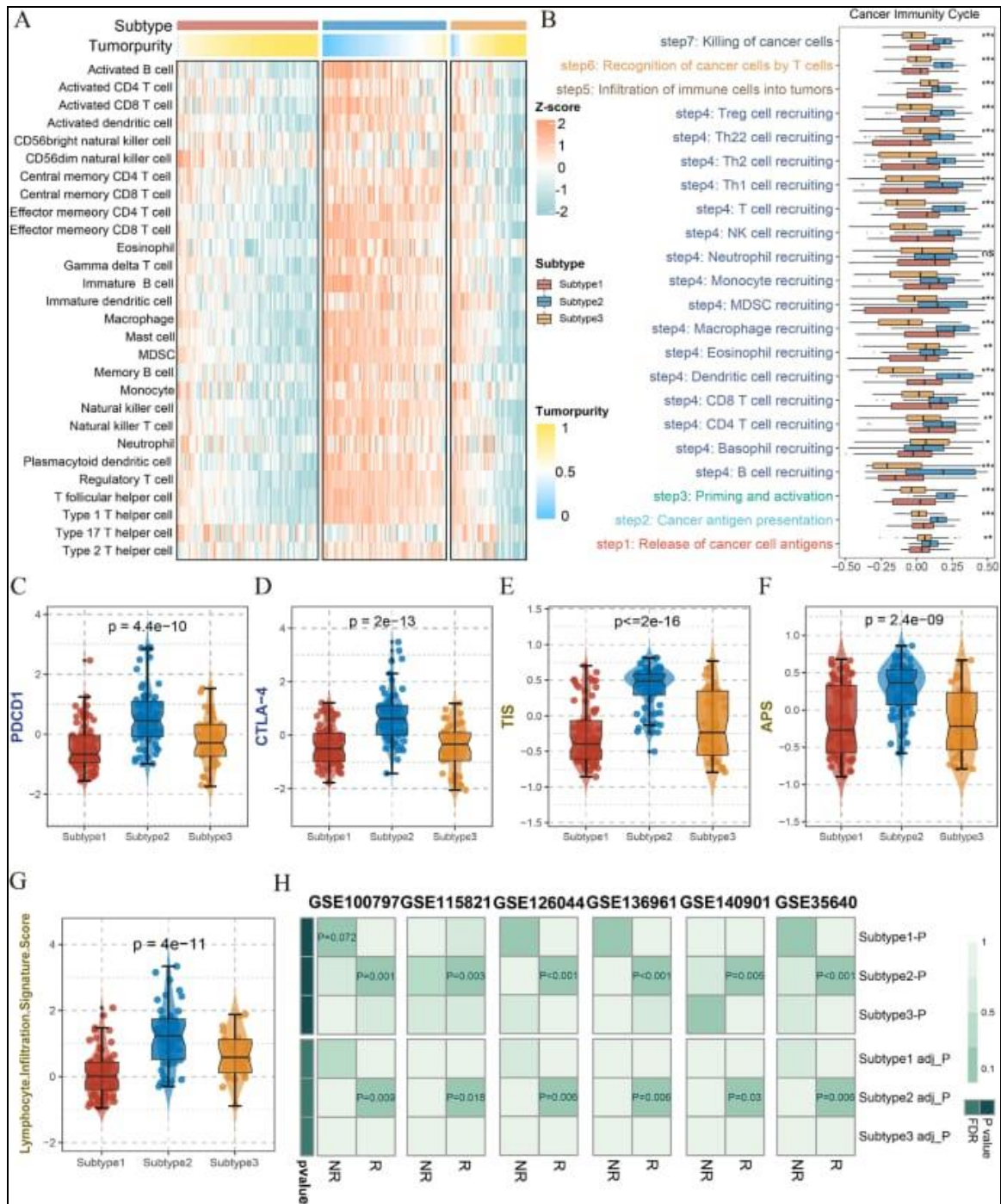


Figure 7

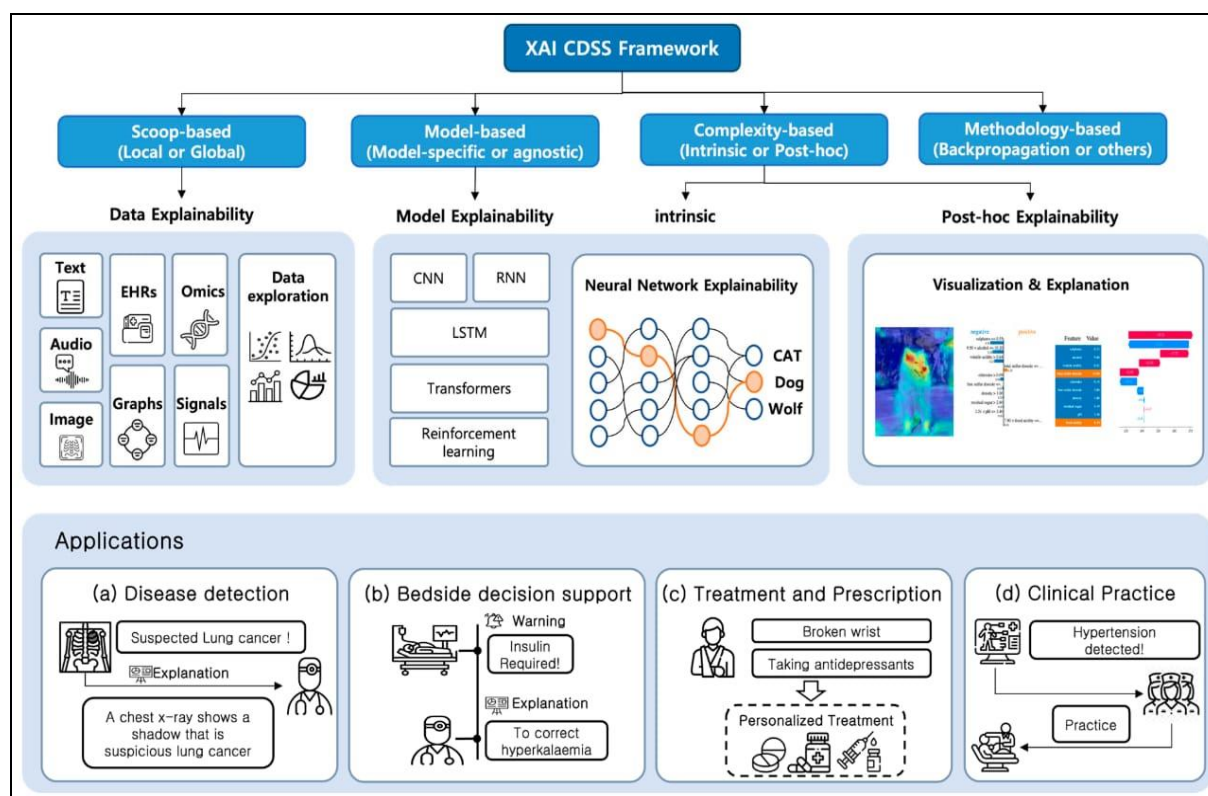


Figure 8

CONCLUSION

AI-augmented frameworks significantly improve diagnostic accuracy and pharmacotherapeutic precision in autoimmune disorders. By integrating multi-dimensional data, AI enables a paradigm shift toward precision immunology. Continued integration of AI into clinical workflows is imperative for enhancing patient-specific outcomes in autoimmune disease management.

REFERENCES

1. Topol EJ. *Deep medicine: how artificial intelligence can make healthcare human again*. New York: Basic Books; 2019.
2. Wu H, et al. Machine learning for autoimmune disease diagnosis and subtype prediction. *Nat. Med.*, 2022; 28(4): 672–681.
3. Li X, et al. AI in precision medicine for autoimmune disorders. *Front Pharmacol.*, 2021; 12: 774239.
4. Hossain E, Rana R, Higgins N, Soar J, Barua PD, Pisani AR, Turner K. Natural language processing in electronic health records in relation to healthcare decision-making: a systematic review. *JMIR Med. Inform.*, 2020; 8(9): e17259.

5. Li T, Jiang L, Wang L, Bao C, Xu H. Artificial intelligence for prediction of lupus nephritis based on full-phenotype database using natural language processing. *Lupus Sci. Med.*, 2019; 6(1): A212.
6. Dubey S, Chan A, Adebajo AO, Walker D, Bukhari M. Artificial intelligence and machine learning in rheumatology. *Nat Rev Rheumatol.*, 2020; 16(10): 1–2.