DOI: doi.org/10.47363/JMSMR/NanoMaterials2025/2025(6)2

Cutting-Edge Alteration of Scaffolds in Collaboration with Computational Processes for the Design of Feasible Androgen Receptor Antagonists in the Arena of Prostate Cancer Treatment

Sanmati Kumar Jain

Department of Pharmacy, Drug Discovery and Research Laboratory, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, Chhattisgarh, India

Abstract

Androgens like testosterone and dihydrotestosterone are crucial for prostate growth, but excessive expression of androgenic receptors can lead to prostate cancer, making them a significant therapeutic target. The research aims to develop safer analogues of Enzalutamide (ENZ), a prostate cancer medication, while predicting its pharmacokinetics and toxicity profiles. It also conducts molecular docking studies to predict its biological interactions with the androgen receptor. A total of 200 analogues were designed by substituting ENZ's amide group, with 15 bioisosteres chosen based on pharmacokinetic and toxicological evaluations and docking studies. The bioisosteres had optimal physicochemical, medical, and ADMET characteristics compared to ENZ. The analogues' drug similarity and drug score exceeded ENZ's. Analogues ENZ2, ENZ5, and ENZ8 formed hydrogen bonds with the SER778 residue, suggesting they could be potential anti-androgen agents for prostate cancer treatment.

Keywords: Enzalutamide, Bio-isosteric Approach, ADMET Study, Molecular Docking Study, Prostate Cancer