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Review

G-quadruplex Ligands As Therapeutic Agents Against cancer, Neurological Disorders and Viral Infections

Mock Phooi Yan , Chua Eng Wee , Khor Poh Yen , Aaron Stevens  & Lam Kok Wai  

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Abstract

G-quadruplexes (G4s) within the human genome have undergone extensive molecular investigation, with a strong focus on telomeres, gene promoters and repetitive regulatory sequences. G4s play central roles in regulating essential biological processes, including telomere maintenance, replication, transcription and translation. Targeting these molecular processes with G4-binding ligands holds substantial therapeutic potential in anticancer treatments and has also shown promise in treating neurological, skeletal and muscular disorders. The presence of G4s in bacterial and viral genomes also suggests that G4-binding ligands could be a critical tool in fighting infections. This review provides an overview of the progress and applications of G4-binding ligands, their proposed mechanisms of action, challenges faced and prospects for their utilization in anticancer treatments, neurological disorders and antiviral activities.