

Molecular Targets of Aptamers in Gastrointestinal Cancers: Cancer Detection, Therapeutic Applications, and Associated Mechanisms

ABSTRACT

Gastrointestinal (GI) cancers are among the most common cancers that impact the global population, with high mortality and low survival rates after breast and lung cancers. Identifying useful molecular targets in GI cancers are crucial for improving diagnosis, prognosis, and treatment outcomes, however, limited by poor targeting and drug delivery system. Aptamers are often utilized in the field of biomarkers identification, targeting, and as a drug/inhibitor delivery cargo. Their natural and chemically modifiable binding capability, high affinity, and specificity are favored over antibodies and potential early diagnostic imaging and drug delivery applications. Studies have demonstrated the use of different aptamers as drug delivery agents and early molecular diagnostic and detection probes for treating cancers. This review aims to first describe aptamers' generation, characteristics, and classifications, also providing insights into their recent applications in the diagnosis and medical imaging, prognosis, and anticancer drug delivery system of GI cancers. Besides, it mainly discussed the relevant molecular targets and associated molecular mechanisms involved, as well as their applications for potential treatments for GI cancers. In addition, the current applications of aptamers in a clinical setting to treat GI cancers are deciphered. In conclusion, aptamers are multifunctional molecules that could be effectively used as an anticancer agent or drug delivery system for treating GI cancers and deserve further investigations for clinical applications.