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(57) Abstract :

The invention discloses a Silver-Bismuth nanoparticle-embedded Andrographolide system integrated with advanced computational technologies for precision cancer therapy and enhanced drug delivery. The system comprises biocompatible SilverBismuth nanoparticles synthesized via green chemistry, embedded within an Andrographolide matrix to achieve synergistic anticancer effects. The nanoparticles generate reactive oxygen species (ROS) and enable targeted therapy, while the Andrographolide matrix ensures controlled and sustained drug release. Biosensors integrated into the system monitor tumor microenvironment parameters in real time, including pH levels, oxygen saturation, and biomarkers. These sensors communicate with an AI-powered computational platform that analyzes patient-specific data and dynamically adjusts drug release patterns. The platform employs machine learning algorithms to recommend personalized treatment protocols, optimizing therapeutic efficacy while minimizing side effects. This invention provides a sustainable, precise, and adaptive approach to cancer treatment, with applications across various cancer types.

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