

CD206-Targeted Low Molecular Weight Drug Delivery System Against Triple Negative Breast Cancer

Intellectual Property:

IP: IN 202531064486

TRL: 5

Category of the invention:

- Anti-Cancer Drugs
- Drug Repurposing
- DNA-Targeting Agents

Applicant/Innovator:

Chittaranjan National Cancer Institute

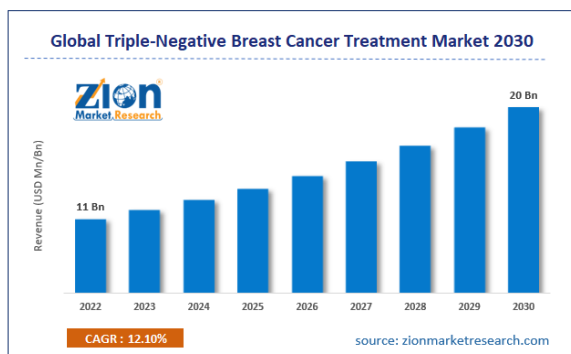
TECHNOLOGY:

The invention presents a low molecular weight, CD206-targeted drug delivery system (DDS) for selectively delivering podophyllotoxin, a potent cytotoxic agent, to tumor-associated macrophages (TAMs) overexpressing CD206 in the TNBC microenvironment. These conjugates use a mannose ligand for CD206 targeting, a biocompatible peptide linker for enhanced cell penetration, and modular synthesis strategies compatible with scalable production.

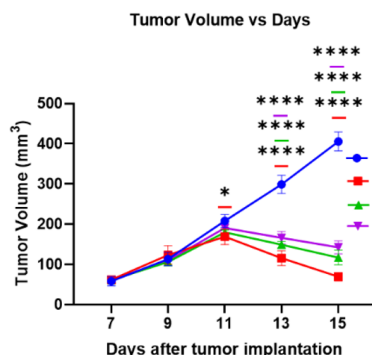
PROBLEM ADDRESSED

Triple Negative Breast Cancer (TNBC) is an aggressive subtype lacking estrogen, progesterone, and HER2 receptors, rendering conventional therapies ineffective. Existing chemotherapies suffer from systemic toxicity, multidrug resistance, and poor tumor selectivity. There's a need for a safer, targeted approach that penetrates the tumor microenvironment effectively.

MARKET POTENTIAL



Ref: zionmarketresearch.com



Tumor volume in untreated and treated groups in days after tumor transplantation.

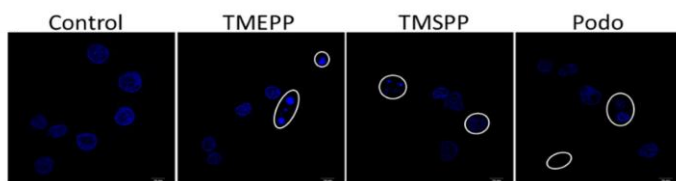


Fig: Nuclear fragmentation assay depicting DNA damage and fragmentation through invitro assay

ADVANTAGE

- Superior cytotoxicity compared to Tamoxifen
- Low systemic toxicity in mice models (up to 10 mg/kg)
- Dual-action mechanism: Topoisomerase inhibition + tubulin depolymerisation
- Efficient synthetic route (3–4 steps, high yield, low cost) Uses readily available starting materials
- Compatibility with click chemistry (modular drug development)

USP

Unlike bulky nanoparticle or antibody-based DDS, this small molecule construct offers a cost-effective, TAM-specific therapy with superior tumor infiltration, low toxicity, and enhanced anti-cancer activity over podophyllotoxin alone or conventional drugs like tamoxifen.

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