

पेटेंट कार्यालय
शासकीय जर्नल

**OFFICIAL JOURNAL
OF
THE PATENT OFFICE**

निर्गमन सं. 22/2026
ISSUE NO. 22/2026

शुक्रवार
FRIDAY

दिनांक: 29/05/2026
DATE: 29/05/2026

पेटेंट कार्यालय का एक प्रकाशन
PUBLICATION OF THE PATENT OFFICE

(54) Title of the invention : DUAL-RESPONSIVE LIPOSOMAL DRUG DELIVERY SYSTEM FOR TARGETED CANCER THERAPY

(51) International classification	:A61K9/127, A61K47/50, A61K47/54, A61K47/24, A61K47/28, A61K31/00, A61P35/00, A61K9/1277	(71)Name of Applicant : 1)Mr. Akash Vikal Address of Applicant :Sahu Onkar Saran School of Pharmacy, Faculty of Pharmacy, IFTM University, Moradabad, Uttar Pradesh, India – 244102 Uttar Pradesh India 2)Mr. Samarendra Singh 3)Mr. Hasibullah Khairi 4)Mr. Faisal Sheikh 5)Mr. Issac V. Cherian
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(61) Patent of Addition to Application Number	:NA	
Filing Date	:NA	
(62) Divisional to Application Number	:NA	
Filing Date	:NA	

(57) Abstract :

The present invention relates to a dual-responsive liposomal drug delivery system for targeted cancer therapy, comprising a phospholipid bilayer vesicle formed of pH-sensitive dioleoylphosphatidylethanolamine, a reactive oxygen species responsive lipid bearing thioketal or boronic ester linkages, and cholesterol, encapsulating a therapeutic payload such as doxorubicin, a nucleic acid, or an immunomodulator. The vesicle is surface-functionalized with a tumour-targeting ligand selected from a cyclic Arg-Gly-Asp peptide, a monoclonal antibody, or an aptamer, conjugated through carbodiimide or click chemistry. The bilayer remains stable at physiological pH and low reactive oxygen species levels in circulation, but is cooperatively destabilized only upon simultaneous exposure to acidic tumour pH and elevated reactive oxygen species, triggering rapid payload release with high spatial and temporal selectivity. An optional fluorescent dye or gadolinium contrast agent confers theranostic-capability. The invention overcomes premature drug leakage and systemic toxicity of conventional liposomes and is applicable to solid, metastatic, and drug-resistant cancers.

No. of Pages : 12 No. of Claims : 10