

POLYMERIC NANOPARTICLES

S. No	Type of Nanomaterial	Cargo Delivered	Cancer Targeted	Efficiency	Reference
1	Poly(β -amino ester) (PBAE) nanoparticles	CRISPR/shRNA targeting HPV16 E7)	Cervical cancer (HPV16-positive)	~70% E7 gene knockdown; suppression of malignant phenotype in vitro	Jo Dong Hyun et al., (2018)
2	HP-25K hyperbranched polymer	Cas9 plasmid	Multiple cancer cell lines (e.g., HeLa)	Higher editing than Lipofectamine	Kemao Xiu et al., (2023)
3	Thermosensitive P188/P407 hydrogel + polyamines	Cas9-sgRNA + Doxorubicin	Melanoma (B16F10)	98% tumor inhibition; dual gene/chemo strategy	Meng Li et al., (2025)
4	Chitosan-coated PLGA NPs	Cas9 RNP + Paclitaxel	Liver cancer (Hepatocellular carcinoma)	~56% PD-L1 gene editing	Suqin Zhang et al., (2025)
5	Alginate–protamine core NPs	Cas9 plasmid (Lcn2 gene)	Triple-negative breast cancer (TNBC)	~ 81% editing; tumor suppression in vivo	Meng Lin, & Wang, X. (2024)
6	Redox-sensitive polymer–lipid hybrid NPs	Cas9 plasmid + chemo combo	Colon, liver, glioma	Triggered release; tumor regression in vivo	Cory D. Sago et al., (2022)
7	PEG-PLE/C14-PEI anionic polymer-coated nanoplexes	Cs9 mRNA + sgRNA (KRAS G12S edit)	Non-small cell lung cancer (A549)	~69% indel formation; apoptosis and migration inhibition in vitro	Zaoqu Liu et al., (2023)

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8	pH-sensitive polymeric micelles	Cas9 plasmid (AR-V7) + Docetaxel	Prostate cancer	>70% knockdown; synergistic tumor suppression	Nisar Ul Khaliq et al., (2023)
9	HA-functionalized PEG-PLGA NPs	CRISPR-Cas9 plasmid targeting BCL2 + Doxorubicin	Ovarian cancer	~60% BCL2 gene editing; enhanced apoptosis and drug synergy in vitro	Jin-Ho Kang et al., (2023)
10	pH-responsive gelatin nanogels	Cas9 plasmid (HER2) + Doxorubicin	HER2+ breast cancer	~65% HER2 knockdown; improved doxorubicin efficacy	Jing Li et al., (2023)