Table 1. A comprehensive overview of five types of phospholipid-based nanoparticles. (**Abbreviations:** MDR, Multidrug-resistant; MTX, Methotrexate; NLC, Nanostructured lipid carrier; PEG, polyethylene glycol; PTX, paclitaxel; SLN, Solid lipid nanoparticle; THC,Tetrahydrocannabinol)

Phospholipid coated nanoparticle	Advantage	Disadvantage	Disease	Drug	Ref.
Liposome	Fabrication and modification are easy	Non-affordable methods	Kaposi sarcoma and ovarian cancer	Liposomal doxorubicin modified by (PEG) (Doxil	(26, 39, 40)
		Low drug loading capacity			
	Triggered drug release	Low stability			
	Specific targeting	Rapid decomposition in the human body	Breast cancer	Abraxane (PTX) loaded in albumin nanoparticles	
				Ambisome (amphotericin B liposomes)	
		Oxidation and hydrolysis	Osteosarcoma	Liposomal mifamurtide	
			Significant effect on cell division and angiogenesis of breast tumor cells	Active targeting: Diacerein encapsulation in Tyr-3-octreotide-PEG-liposomes	

Solid lipid nanoparticle	Easy sterilization and scale-up process.	Low drug loading	A549 human lung epithelial cancer cells	Passive targeting: Sclareol-SLNs
		Drug leakage because of polymorphism	Breast cancer/growth inhibition of Hodgkin's lymphoma xenograft	Curcumin-with SLN
	Lower toxicity			
	Prolonged drug release			
	Enhance the drug solubility and bioavailability	Hydrophobic matrix of SLNs limits the loading capability for water-soluble agents.	Inhibition in proliferation: glioblastoma and melanoma	Temozolomide-SLN
			Active tumor targeting/ enhanced cytotoxic effect in MCF-7 breast cancer cells in rats with induced breast cancer	Methotrexate-loaded SLNs
		Expulsion of encapsulated drug molecules from the lipid matrix due to the higher-ordered solid lipid structure during storage and high dispersion medium of water.	Increased cellular uptake pattern	Intratracheal administration of naringenin-loaded SLNs
			Lowered the IC50 value in vitro against M109HiFR lung cancer cells/ increased drug concentration in the lungs of healthy and sick mice	Paclitaxel loaded into SLNs coated with a polymer composed of folate-poly (ethylene glycol) and chitosan

Lipid polymer hybrid	Encapsulate multiple cargos	Unpredictable and uncontrollable physical and biological characteristic	Osteosarcoma	Pre-clinical:Paclitaxel- and etoposide-loaded hybrid nanoparticles	(31, 40, 42, 43)
	Enhancement in encapsulation	Scaleup difficulty			
		Presence of residual solvents	Breast cancer	Lipophilic doxorubicin-loaded polymer core-shell structured hybrid particles created by Tahir et al	
	Stability				
	Structural disintegration	Burst release			
	Affordable and easy				
	Higher and prolonged in vivo activity because of their outer PEGylated lipid layer:		MCF-7 breast cancer	Ructose-modified beta carotene and (MTX)-co-loaded PLHNPs	
	Reduce degradation and shield the drug molecules				

Nanostructured lipid carriers	Sustained release	Poor stability at a higher temperature	T41 breast cancer cells	Citral-loaded NLCs by (Nordin et al)	(31, 44-46)
	Biocompatible				
	Enhanced drug loading capacity				
	Stability				
	Higher load and controlled release for hydrophilic and hydrophobic therapeutic agents to improve physical stability in comparison with SNLs		Anti-cancer activity against human breast cancer cell lines MCF-7 and MDA-MB-231	Quercetin-loaded NLCs	
	The ability of this system to encapsulate more than one drug with different physicochemical properties		Colon cancer: Female Kunming mice/ CT26, HCT116 and B16 cell	Active targeting: PTX- Hyaluronic acid	
			Metastatic Breast: Female Kunming mice/HepG2, SKOV3, A549, and B16 cells	Docetaxel VEGFR-2 Antibody	
			Efficiently deliver docetaxel to ovarian cancer cells overcoming docetaxel MDR	Nanoemulsions functionalized with folate	

Nanoemulsions	Great stability	Pharmacokinetic, biological and manufacturing challenges	Breast cancer	Co-encapsulation of paclitaxel and baicalein in nanoemulsions	(32, 37)
	Controlled drug release				
	Increased drug solubility				
	Minimal damage to normal cells		Colon cancer	Nanoemulsions carrying gold nanoparticles Tween 80	
	Overcoming MDR