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Targeting phosphatidylinositol-3-kinase signaling with simultaneous DNA damage in cancer cells by using cholesterol based chimeric nanoparticle

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Phosphatidylinositol-3-kinase (PI3K) signaling has been a major target as it is found to be mutated and over expressed in many types of cancers. PI3K inhibition alone by small molecules failed to offer effective therapy since drug resistance has been a major problem. Recent studies revealed that inhibiting singling pathways with simultaneous DNA damage is effective to combat cancer. However, targeting PI3K signaling with small molecules in combination with DNA damaging drugs would be challenging as it leads to severe side effects due to nonspecific interactions in cancer patients. To this end, we have developed a biocompatible, biodegradable cholesterol-based chimeric nanoparticle (CNP), which can simultaneously load PI103, cisplatin and doxorubicin in a controlled ratiometric manner. Size, shape, and morphology of these CNPs were characterized by dynamic light scattering (DLS), field-emission scanning electron microscopy (FESEM), atomic force microscopy (AFM), and transmission electron microscopy (TEM). CNPs.

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