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Glyconanoparticle uptake profile in lung carcinoma cells

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ABSTRACT: Non-small cell lung carcinoma (NSCLC) is responsible for nearly 85% of lung cancer, and early diagnosis and treatment of lung cancer can circumvent possible death. We focus on glyconanoparticles with a magnetic or a fluorescent core that act as multivalent glyco-scaffold to study cell surface interaction and internalization. The glyconanoparticles were synthesized by conjugating various carbohydrates on magnetic nanoparticles and fluorescent silica nanoparticles by a photocoupling technique developed in our laboratory. The size of nanoparticles used varies from 6 nm to 60 nm. The resulting glyconanoparticles were treated with human adenocarcinoma non-small lung epithelial cells (A549) and the primary small airway epithelial cells (PCS-301-010). The cellular uptake was studied and quantified by confocal fluorescence microscopy, flow cytometry, thin section TEM, and prussian blue staining. We found that the extent of cellular uptake was dependent on the type of carbohydrate ligands and the nature of the nanoparticles used. Experiments were conducted to investigate the mechanism of the uptake, and results will be discussed.