INTRACELLULAR TRAFFICKING OF NANOPARTICLES: IMPLICATIONS FOR THERAPEUTIC EFFICACY OF THE ENCAPSULATED DRUG

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11.1 INTRODUCTION

Many drug molecules have intracellular sites of action and, therefore, require entry into the cell to exert their therapeutic effects. These include both macromolecules such as nucleic acids and small molecules such as taxanes. However, the cell membrane presents a formidable barrier to the entry of many drugs, either because the molecules are too large and/or polar to diffuse across the membrane (nucleic acids, proteins) or because they are actively pumped out of the cell by membrane-bound efflux transporters (paclitaxel, doxorubicin). Delivery systems that facilitate the intracellular accumulation of these drug molecules could enhance their therapeutic efficacy. Additionally, it has become obvious that for certain drugs, the localization into specific intracellular organelles is critical for their biological performance. For instance, to achieve effective gene expression, plasmid DNA

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