tures. This study has provided essential insight into the biomedical potential and possible problems of functionalised-nanoparticle tissue penetration.

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A18
Hybrid nanoparticles from cationic lipid and polyelectrolytes as antimicrobial agents

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Cationic lipids and polyelectrolytes with the quaternary ammonium moiety in their chemical structure are potent antimicrobial agents. In this work, cationic bilayer fragments prepared from dioctadecyldimethylammonium bromide (DODAB), carboxymethylcellulose (CMC) and polydiallyldimethylammonium chloride (PDDA), added in this sequence, produced potent antimicrobial particles that were characterized by dynamic light-scattering and tested against two bacteria species: *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Two different diameters for particles were obtained depending on DODAB concentration. At 0.1 or 0.5 mM DODAB, cationic hybrid particles of DODAB/CMC/PDDA presented final mean diameters of 108 or 500 nm, respectively and zeta-potentials of 30 or 50 mV, respectively. Both particulates yielded the same activity against *P. aeruginosa*: 0% of cell viability at 1–2 μg/mL PDDA as the outermost cationic layer. For *S. aureus*, at 2 μg/mL PDDA, cell viability for larger particles was 0%, while for smaller particles, 12–15% of cell viability was still obtained. The antimicrobial effect was dependent on the amount of positive charge on particles and independent of particle size. PDDA revealed a high potency as antimicrobial agent and *P. aeruginosa* was more sensitive to all cationic assemblies than *S. aureus*.

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A19
Novel formulations for tuberculostatic drugs based on cationic lipid

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Cationic bilayers in form of bilayer fragments (BF) or large vesicles (LV) provide adequate environment for solubilization and stabilization of antimicrobial drugs with the advantage of being also antimicrobial agents. In this work, BF or LV interaction with two tuberculostatic drugs, rifamicin (RIF) and isoniazide (ISO) is characterized and the assemblies tested against *Mycobacterium smegmatis*. Methods were employed to determine cell viability, minimal bactericidal concentration and entrapment efficiency for both drugs from dialysis experiments. The occurrence of synergism between cationic lipid and rifamicin was a major result of this investigation. The cationic lipid alone killed *M. smegmatis* over a range of low concentrations. Rifamicin drug particles above its solubilization limit could be solubilized by BF at 0.5 mM lipid. LV were leaky to isoniazide whereas Rifamicin could be incorporated in the cationic bilayer at high percentiles. The novel assemblies may become useful in chemotherapy against tuberculosis.

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A20
Antibody targeting of polymeric nanoparticles for cancer therapy

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Antibodies are now the most common form of therapeutic compound under preclinical and clinical development. Normally these proteins are clinically employed for their ability to bind to their cognate antigen and elicit biological effects such as receptor antagonism. However, the application of antibodies as drug delivery agents is also an area of keen interest. This strategy has successfully reached the clinic in the form of drugs such as the radioimmunoconjugates ibritumomab tiuxetan (Zevalin®), [131I]-tositumomab (Bexxar®) and the drug conjugate gemtuzumab ozogamicin (Mylotarg®). Despite the clinical application of these drugs, direct drug/radionuclide conjugation has many drawbacks such as the necessity for a linker that does not inactivate the drug compound and possible hapten immunogenicity concerns that may arise from systemic administration. To circumvent these issues we have investigated the development of novel drug-loaded poly(lactic-co-glycolic acid) (PLGA) nanoparticles, coated with a layer of targeting antibodies. This approach avoids direct linkage of the antibody to the drug. We have shown that the conjugation of nanoparticles to antibodies targeting the death receptor Fas can be employed for the specific targeting of colorectal carcinoma cells. Furthermore, we have demonstrated that Fas-targeted nanoparticles encapsulating camptothecin (CPT) elicit an >50-fold improvement in the IC50 of the chemotherapy alone. This improved efficacy is due to several factors including the improved uptake and internalisation of CPT and up-regulation of Fas receptor expression by CPT. The ability to exploit antibodies not only for targeting of drug-loaded nanoparticles, but also to elicit therapeutic effects themselves is an exciting approach to drug delivery. The application of this methodology in cancer and other diseases, where appropriate drug and antibody combinations can be identified, has the potential to synergistically improve their efficacies.

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A21
Cationic PLGA nanoparticles loaded with DNA for gene delivery delivery

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Nonviral gene delivery vectors such as liposomes, dendrimers and polymeric nanoparticles have recently been developed as alternatives to virus-based vectors in order to reduce immunogenicity and toxicity risks. In most formulations, anionic nucleic acids are bound to the positively charged vector surfaces through charge–charge interactions. However, a recent *in vivo* study has shown that in endosomes the DNA:nanoparticles complexes can disso-