



FIG. 16 Schematic represents the interactions between nanoparticles with different surface chemistry and target cells. (Reprinted from G. Su, et al., Effects of protein corona on active and passive targeting of cyclic RGD peptide-functionalized PEGylation nanoparticles, *Mol. Pharm.* 15 (11) (2018) 5019–5030 with permission from American Chemical Society.)

breast tumors bearing mice [96]. Targeting, functionalization, and physiological responses of nanoparticles can be altered by protein corona. In this regard, Su et al. investigated the effect of corona protein on the efficiency and targeting functions of cyclic RGD peptide-functionalized nanoparticles as well as their relationship with PEG length and density of targeting ligands bound to the nanoparticles. In this study, they synthesized 20 types of nanoparticles with different surface chemistry and observed that nanoparticles containing short PEG and medium RGD showed efficient targeting. It was shown that due to the presence of PEG on the surface of nanoparticles, protein corona could be useful for passive targeting by reducing macrophage cellular uptake (Fig. 16) [97].

5. CONCLUSION

As discussed in this chapter, the design and development of targeted drug delivery systems have played a significant role in advancing the treatment of various diseases. In conventional drug delivery methods, any drug that is introduced into the body is distributed throughout the body and affects the normal areas in

addition to the diseased site, resulting in many side effects. Although in conventional therapies, a high dose of a drug is introduced into the body, but it is often insufficient for complete ablation of tumors, yet. The advent of medical nanotechnology and targeted delivery methods has revolutionized drug delivery. Advantages of targeted drug delivery over conventional drug delivery methods include (1) use the lowest dose of the drug; (2) specific delivery of the drug to the diseased site and not to normal areas of the body; (3) very low side effects compared to conventional drug delivery methods; (4) increase the therapeutic efficacy; (5) increase drug accumulation in the diseased site; and so on.

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