Controlling the functionality of surfaces and nanoparticles with mussel-inspired approaches

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Abstract

Engineered coatings allow for control over the interface of a material and its interactions with the surrounding environment as well as for the endorsement with functional properties such as chemical inertness, adhesion, biocompatibility, hydrophilicity/hydrophobicity, among others. Most of the coatings so far reported, either as a polymer or self-assembled monolayer, rely on specific chemical interactions between a given substrates and the material used as a coating. More recently, the development of substrate-independent functional thin films such as organic polydopamine (PDA) coatings and hybrid metal–phenolic networks (MPNs), have attracted widespread interest because the broad range of surfaces coated. Though, nowadays it is still challenging to predictably engineer a broad range of properties (e.g., charge, thickness, wettability, adhesion, transparency).
To overcome this challenge, in our group we have been working on different experimental approaches, ranging from the polymerization of catechols in the presence of amines (ammonia or bisamines). Our more recent results on different applications ranging from environmental to nanomedicine applications will be revised in this talk.

References

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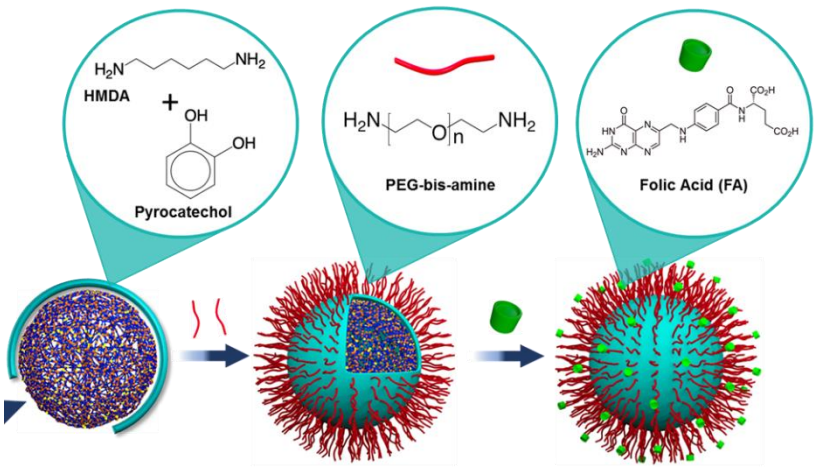

Figure 1: Representative example of application of our coatings to enhance the colloidal stability, biocompatibility and targeting of drug delivery nanocarriers