Engineered nanoparticles for improved neuropeptide biomedical applications: immunotargeting and control of autoinmune diseases

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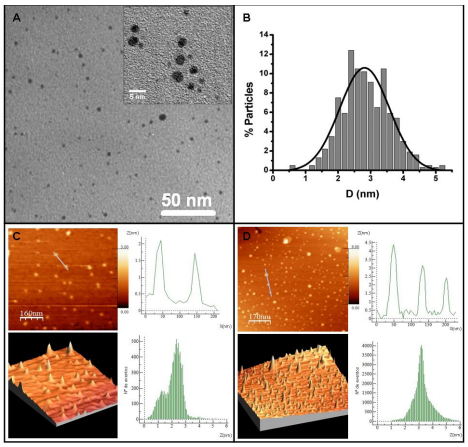
Engineering nanoconjugates constitute an extensive field of research due to its translational potential for biomedical applications. These conceptual advances can represent a lifeline for some of the limitations shown by translational neuropeptide research despite overwhelming evidence for key physiological roles. A neuropeptide is a small protein-like molecule -regardless of whether it is secreted by neurons or nonneural cells that expresses the same genetic information and undergoes identical processes of synthesis and transport, and binds to similar families of receptors, in order to act on specific target cells. Among these neuropeptides, sustained interest in therapeutic applications of vasoactive intestinal peptide (VIP) include areas related to neuroprotection, inflammation and autoimmune disorders. In this keynote lecture, we will summarized and update our ongoing research effort related to nano-applications that use VIP as surface ligands in order to induce antigen-specific regulatory T cells, increase its effectiveness, and achieve a smart manipulation of the immune system. In this sense, special attention will be paid to the interaction of nanoparticles with immunocompetent cells.



Characterization of VIP-gold nanoparticles. (A) TEM image of AuNPs, scale bar; 50 nm. The inset shows a higher magnification image, scale bar; 5 nm. (B) Statistical analysis of colloid diameter, as evaluated from TEM image. (C) TM-AFM image of tiopronin AuNPs and (D) TM-AFM image of VIP AuNPs.

References

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