Glyconanotechnology to develop multifunctional and multimodal nanomaterials for biomedical applications

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During the last years our laboratory has developed a new technology (*Glyconanotechnology*) for tailoring - in a simple and versatile way – bio-functional gold nanoclusters (glyconanoparticles). [1,2,3] The manipulation of the metallic cluster to obtain magnetic nanoparticles for in vivo application in cellular labeling and imaging by magnetic resonance (MRI), is comprised within the potential of this novel technology. [4, 5]

Glyconanoparticles (GNPs) bearing biological significant carbohydrates (antigens) in varying density have been prepared to study biological mechanisms [6, 7] and to intervene in cell adhesion processes. [8] The methodology includes the preparation of *hybrid* GNPs incorporating carbohydrates and other molecules such as fluorescent probes, biotin as well as biological molecules such as peptides, DNA and RNA.

The design and preparation of complex bio-functional GNPs and their application as polyvalent tools to study and intervene in carbohydrate mediated biological interactions will be highlighted. As examples of application in Nanomedicine, the preparation and study of GNPs as anti-adhesion agents in inhibition of metastasis, [8] as potential microbicides for blocking HIV-1 infection, [9] or as magnetic probes for in vivo labeling and tracking specifically cells by means of magnetic resonance imaging (MRI) will be also reviewed.

References

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