Nanoparticles of plant origin exploited for multiple applications.

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Plant-made viral nanoparticles (VNPs) are natural nano-objects with the characteristics of typical nanoparticles such as size, monodispersity and symmetry, which can be exploited as scaffolds for building modified nanostructures with multiple applications. In addition, plant VNPs are produced at a rather low cost; being composed of proteins they are completely biocompatible; and they do not have the ability to infect animals or humans, thus offering an extremely high degree of biosafety.

(VNPs) can take several forms, which mainly fall into two biological categories. Either the particles enclose and pack a nucleic acid (virions) or they do not (virus-like particles, VLPs). Each of them has its particular pros and cons for nanotechnological deployment. The modifications performed on VNPs also can be achieved by two main approaches: genetic or chemical modifications. Using combinations of these possibilities we are currently developing VNPs derived from *Turnip mosaic virus* (TuMV) as a nanoplatform for several applications.

Each TuMV VNP is a flexuous nanorod with a diameter of *ca*. 15nm, made up of over 2000 identical protein subunits helically arrayed (Figure 1). This structure can be conveniently modified for different purposes depending on the particular application sought. We will be presenting and discussing our progress in the exploitation of TuMV VNPs as scaffolds for peptide and protein presentation. These modifications have allowed us to develop applications in the areas of enhanced immunization and antibody production, sensitive detection of antibodies and infectious agents, and enzyme nanoimmobilization for improved industrial biocatalysis.

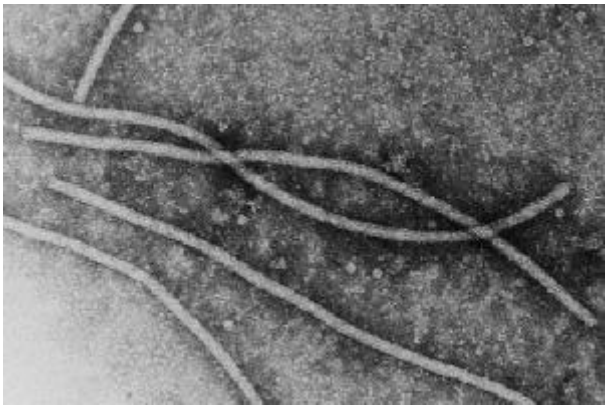

Figure 1. Electron micrograph of purified TuMV VNPs, showing their structural characteristics of flexuous nanorods.