"Multifunctional Nanoformulations based on Colloidal Nanoparticles for Drug Delivery: New Tool for Treatment of Specific Diseases",

Dans le cadre de la convention de coopération entre le Laboratoire LASTID du Département de Physique, Faculté des Sciences de Kénitra et le Centre de Recherche CNR-IPCF, Université de Bari, Italie, le Laboratoire LASTID a organisé le Mardi 28/11/2017 à 15h dans la salle Polyvalente de La Faculté des Sciences de Kénitra une conférence intitulée :

"Multifunctional Nanoformulations based on Colloidal Nanoparticles for Drug Delivery: New Tool for Treatment of Specific Diseases",

Cette conférence est animée par : Pr. Marinella STRICOLLI et Pr. Nicoletta DEPALO

Le contenu de cette conférence se résume comme suit :

“Multifunctional nanoformulations based on colloidal nanoparticles (NP) offer new and original tools for targeted drug delivery, diagnostics, and innovative therapeutic approaches. Their use in biomedical field can provide the overcome of some relevant limitations typically associated with diagnostic techniques and conventional therapeutic treatments,currently adopted by conventional medicine,for the detection and treatment of numerous diseases [1].Colloidal inorganic NPs are particularly interesting nanomaterials, as they are characterized by peculiar chemical-physical properties, strictly dependent on their composition, shape and size. The typical versatility of NP surface chemistry allow to develop more complex nanosystems, thanks to their combination with specific therapeutic agents and/or with specific ligands, thus obtaining directional multifunctional nanoformulations, with highly selective affinity, towards certain cells or target tissues.

Here, NPs characterized by luminescent, or superparamagnetic properties, as well as nanocrystalline heterostructures capable of combining two different compositional domains (magnetic and photoactive) have been synthesized by colloidal chemistry techniques. Their functionalization by their incorporation in organic nanovectors, such as phospholipid based micelles or solid lipid nanoparticles (SLNs) or polymeric NPs has ensured their dispersibility in physiological means. Namely, heterostructures with superparamagnetic and photoactive properties have been embedded in micelles, conjugated with a specifically designed peptide supplied by RGD motif, and proposed as

targeted the ranosticnanosystems for the treatment of solid tumors [2]. The co-incorporation of superparamagnetic NPs and sorafenib in lipid basednanocarriers (micelle and SLNs) has provided nanoformulations useful for the magnetically targeted treatment of hepatocellular carcinoma [3]. Finally, luminescent carbon dots and darunavirhave been embedded in polymeric NPs, thus obtaining biodegradable nanoformulations for the optically guided treatment ofHIV-associated neurocognitive disorders (HAND).The use of complementary techniques of optical, magnetic, morphological and structural characterization has allowed to monitor, identify and consequently optimize the most suitable experimental parameters for the development of multifunctional nanostructures able to preserve the peculiar chemical-physical properties of NPs, and furthermore characterized by good colloidal stability in aqueous media, size and surface charge suitable for an efficient interaction with biological systems. Finally, their biological activity has been evaluated by cytotoxicity and cellular internalization studies using techniques such as confocal microscopy and fluorescence spectroscopy."

1. *J. T. Cole et al., Drug Delivery and Translational Research, 2015*
2. *G. Valente, N.Depalo et al, Nanoresearch, 2015*
3. *N. Depalo et al.,Nanoresearch, 2017*