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Bio-functionalized colloidal nanoparticles for therapeutic applications

Multifunctional nanoparticles are promising bimodal tracers for noninvasive diagnosis and treatment of cancer and inflammatory diseases *in vitro* and *in vivo*. The design of bio-functionalized colloidal nanoparticles needs careful optimization of size and shape, optical and magnetic properties, and efficient conjugation with homing ligands to improve the signal amplification and target selectivity toward malignant cells. One of the greatest challenges in designing nanoparticles functionalized with homing peptides and proteins to optimize molecular recognition resides in the possibility to finely control the ligand orientation on the nanoparticle surface.

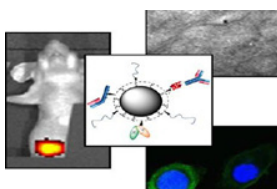


Figure1: Magnetic nanoparticles functionalized with Trastuzumab or Ab fragments for targeting and treatment of breast cancer cells *in vitro* and *in vivo*

To support the research in new drug delivery nanosystems, in the past few years new administration methods of nanoparticles rather than traditional intravenous ones have been explored. This is a highly innovative approach that is nearly unexplored at present. Because of parenteral administration draw-backs, alternative administration routes have been investigated. Among all, the oral and topical administration are the most interesting to obtain a local effect and gain a better patient's compliance.

Speaker Biography

Miriam Colombo obtained her master's degree in 2008 in Medicinal Chemistry and Technology at the University of Milano with experimental thesis in the Nanobiotechnology and she made the PhD in Biology in 2012 at the University of Milano-Bicocca. In 2010, she worked in the lab of prof. W. Parak, Marburg, Germany. In January 2009, she was awarded of a 12+24 months fellowship in the field of Medical Sciences. From September 2013, she is a researcher in clinical biochemistry (BIO/12), at the Department of Biotechnology and Bioscience of University of Milano-Bicocca. She is author of 70 scientific publications on peer-reviewed international journals and official H-Index (Scopus): 22.

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