Marta Truffi, J Pharm Drug Deliv Res 2017, 6:3 (Suppl)
http://dx.doi.org/10.4172/2325-9604.C1.017

Targeting active bowel inflammation foci by MAdCAM-1-specific nanoparticles

Marta Truffi
University of Milan, Italy

Statement of the Problem: Currently, the evaluation and treatment of inflammatory bowel disease (IBD) commonly relies on aspecific clinical signs of bowel inflammation, while specific targeted devices are still lacking. Mucosal addressin cell-adhesion molecule-1 (MAdCAM-1) has been proposed as a marker of bowel inflammation. It is upregulated on gut endothelium in IBD and is finely related to IBD activity and response to therapy. Here, we investigate a smart nano-platform targeted toward MAdCAM-1 for site-specific nano-theranostics in a preclinical model of IBD.

Methodology & Theoretical Orientation: We coupled anti-MAdCAM-1 antibodies to the surface of manganese oxide nanoparticles, and analyzed nanoconjugate biodistribution and safety in a murine model of IBD, by intravenous injection at the time of early acute phase of the disease.

Findings: Manganese oxide nanoparticles revealed good stability and negligible toxicity toward endothelial cell culture. Twenty-four hours post intravenous administration in colitic mice, fluorescent anti-MAdCAM-1-nanoparticles localized in the inflamed bowel, and specifically accumulated in the proximal part of the colon. By contrast, untargeted nanoparticles were more rapidly washed out. Nanoparticles did not induce histologic lesions in non-target organs.

Conclusion & Significance: Anti-MAdCAM-1-nanoparticles uncovered active bowel inflammation foci, by following the expression pattern of MAdCAM-1 on mucosal vessels. The implementation of this nano-platform for early and specific theranostics applications appears promising for refining clinical care and management of IBD.

Biography

Marta Truffi has her expertise in nano-biotechnology and cellular biology. Her current research is focused on the study of targeted nanosystems that will provide specific diagnosis and therapy of inflammatory bowel diseases. Her work involves in-depth study of the pathogenesis and identification of novel therapeutic targets, investigation of functional interactions between nanoparticles and cell cultures/tissues, development of *in vitro* and *in vivo* experimental models of human diseases, study of nanoparticles biodistribution and systemic toxicity. She is also interested in nanoparticles for breast cancer treatment, by coupling targeted delivery of chemotherapeutics with modulation of cancer-associated miRNAs, in order to improve patients' responsiveness to therapy.

marta.truffi@unimi.it

Notes: