Folate-based nanobiodevices for integrated diagnosis/therapy targeting chronic inflammatory Diseases

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Abstract

It is estimated that inflammatory diseases affect more than 80 million people worldwide and these numbers are expected to increase in the next 20 years. Disorders such as rheumatoid arthritis (RA) can shorten life span by 10 years and its treatment remains a challenge for the medical and scientific community. More efficient strategies are required in order to improve clinical benefit. Nano-enabled drug delivery systems aim to improve therapy of chronic inflammatory disorders by creating a new, highly specific and efficient strategy, with reduced treatment costs.

The consortium of NANOFOL FP7 project produced FBN (liposomal, protein-based and PLA (poly (L-lactic acid)) nanoparticles) with encapsulated anti-inflammatory drugs that were shown to be biologically active, non cytotoxic and capable of specifically targeting folate receptor (FR)-positive cells, in particular activated macrophages, mediators of chronic inflammation in RA. The NANOFOL nanobiodevices targeting activated macrophages may be an interesting theranostics solution, i.e., simultaneous diagnosis and treatment of the site of inflammation in RA patients. The production of a validated, stable, specific FBN with incorporated imaging agent and therapeutic agent (drugs or siRNAs) by the NANOFOL consortium will have many applications in all inflammatory diseases but may also extend to cancer treatment.