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Development of novel nano-systems to mediate combined and multi-target antitumor therapeutic strategies

Henrique Faneca
University of Coimbra, Portugal

Cancer is one of the major causes of death, since conventional available treatments, in most of the cases, do not allow a cure of the disease. Despite the ongoing efforts, current treatment options are associated to multiple limitations, including reduced therapeutic efficacy and high side effects. The lack of effective and well-tolerated cancer treatments highlights the urgent need for the development of new therapeutic approaches, such as those involving the combination of gene therapy and chemotherapy. However, the synchronized application of these two types of strategies requires the development of efficient delivery nano-systems, to promote an effective and specific delivery of both therapeutic molecules into tumors, while avoiding their release in healthy tissues. In this context, we have recently developed new gene delivery nano-systems, polymer-based ones that have the ability to condense and efficiently deliver genetic material and lipid-based ones that have the ability to specifically and efficiently deliver genetic material into HCC cells both *in vitro* and *in vivo*. The combination of anti-tumor gene therapy strategies, such as those including therapeutic genes or anti microRNA oligonucleotides, with low amounts of chemotherapeutic agents could result in a synergistic and significant antitumor effect. Our present and future work will be focused on the engineering and characterization of novel nanoparticles, for drug and gene delivery, to mediate innovative multi-target antitumor strategies involving the combination of gene therapy and chemotherapy, in order to achieve a much higher anti-tumor efficacy and fewer side effects than conventional therapeutic strategies.

Biography

Henrique Faneca is the Principal Investigator at Centre for Neuroscience and Cell Biology and invited Assistant Professor at University of Coimbra. He has received his PhD degree in Biochemistry from Coimbra University. The focus of his research is the development of lipid and polymeric-based nano-systems for gene and drug delivery into target cells and the generation of new anti-tumor strategies, involving different gene therapy approaches either per se or in combination with chemotherapeutic agents. He is the author of more than 45 scientific papers.

henrique@cnc.uc.pt

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