

## **Abstract**

### **Polymeric Biomaterials with Targeted Applications**

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Drug delivery is a crucial aspect of clinical intervention for patient care and cure. Different routes of drug delivery are in practice and this is a fast-evolving area, as novel solutions and formulations are added day by day and patient safety levels also rise to new heights. From early beginnings using off-the-shelf materials, the field has grown tremendously. Modern advances in drug delivery are now focused upon the rational design of polymeric materials tailored for specific load. Considering that polymeric nanoparticles have become a powerful tool to provide controlled drug delivery systems, the PhD thesis is focused on the different types of nanoscale polymer carriers used for the delivery of chemotherapeutic agents and the mechanisms that facilitate their targeted delivery to tumor cells. The thesis describes the development of intelligent drug delivery systems based on microbial polyesters (polyhydroxyalkanoates-PHAs) and proteins (silk-based proteins). The drug-loaded micro- and nanoparticles are prepared by specific methods such as nanoprecipitation and emulsification-diffusion, and they are considered as efficient vehicles for drug delivery in cancer therapy. Advanced characterization methods include morphological, dimensional, physico-chemical and biological analyses. The obtained nanocarriers could be used as viable alternatives to conventional strategies into colorectal and breast cancer therapies.