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Enzyme triggered nanomaterial for cancer therapy

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Polymer vesicles are attracting much attention as alternative nano-delivery system to implement drug targeting strategies. Polymersomes have several interesting features. For instance, ease of chemical modification of the polymer chains can be used to modulate their tissue specificity and organ distribution. A wide variety of polymers is available, however a good candidate for pharmaceutical formulations is the di-block copolymer poly(dimethylsiloxane)-b-poly(2methyloxazoline) (PDMS-PMOXA). This polymer is formed by two subunits which are FDA approved for the development of novel nanomaterials with a potential human use. In our work, we are developing a responsive nanomaterial for the treatment of breast cancer. In order to develop a targeted delivery system a very good understanding of the cancer biology is necessary. In particular cancer biomarker are of particular interest due to their specificity for cancer cells. The enzyme family of cathepsins is highly expressed in certain type of cancers as breast tumor. Moreover, they are responsible for the degradation of proteins in the lysosomes. The elevate expression of these enzymes in tumors is an evidence of the increased metabolism of cancer cells. For this reason, these enzymes are a very interesting target for the development of a novel nanomaterial. In this work, we are presenting a peptide cross linked polymeric nanoparticle with the main goal to encapsulate anticancer compounds and to release them only upon activation of the system by cathepsin B.

Biography

Fabiola Porta has studied Medicinal Chemistry and Pharmaceutical Technology in Milan from the Universita' degli studi, where she obtained her Master's degree in Pharmacy in the year 2008. She then moved to the Leiden Institute of Chemistry, where she graduated in Chemistry with a special focus on nanoparticles synthesis and characterization in the year 2012. She has done her post-doctoral studies from FHNW and University of Basel. Recently, she joined the group of Bio-pharmacy, where she is developing-self assembled nanoparticles for cancer therapy. She has expertise in the design and development of nano-vehicles for cancer therapy with a particular focus on targeted nanocarriers for breast cancer therapy.

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