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Dendrimers PAMAM grafted on smart Fe3O4@PDA composite and its application in cancer treatment

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Current development of nanotechnology influences on a synthesis of novel and more efficent drug carriers for nanomedicine, especially in cancer treatment. The application of specific nanomaterials like dendrimers PAMAM is currently a prominent topic in cancer therapy due to their internal cavities, water solubility, and modifiable surface functionality rhat render them as interesting carrier for drug delivery .

The other most commonly used material in cancer treatment are magnetic nanoparticles of iron oxide. In particular, the magnetite (Fe3O4) nanoparticles has drawn a lot of attention since they are biocompatible, nontoxic, size/shape-tunable and they havehigh surface/volume ratio and allow easy separation from mixtures by application of an external magnetic field. Morover, that magnetite can be used as contrasting agents in nuclear magnetic resonance imaging (MRI), thus they arean ideal component to construct advanced teranostatic-nanotools. Further, polydopamine (PDA) coated magnetite exhibit high photothermal properties and they are recently extensively investigated in cancer treatemnt.

Here we present, the PAMAM dendrimers grafted to the PDA a coated magnetic nanoparticles as atractive theranostic for dual chemo- and phothermal theraphy. Obtained Fe3O4@PDA@PAMAM nanocarriers were characterized by means of TEM, zeta potential, FT-IR, XPS, magnetic meseremnsts and MRI. Further the results regarding drug loading and it release profile will be discussed as well as their application in vitro in combined chemo- and phothermal theraphy of liver cancer.

Biography

Artur Jędrzak received the M.Sc., Eng. degree in Organic Chemistry in 2016 at Poznan University of Technology. Since 2016 he is a Ph.D. student of Chemical Technologyat Poznan University of Technology and he is also a member of NanoBioMedical Centre in Poznan. His research interests are biosensors, enzymatic and catalytic systems and synthesis of hybrid/composite materials for nanomedicine.

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