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Polymer drug carriers with enhanced penetration into tumor cells

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Conjugation of anti-tumor drugs to polymer carriers can improve their pharmacological properties. An attached tumor-targeting ligand further increases therapeutic efficiency. Oligopeptides are frequently used as targeting ligands mimicking determinant protein fragments. However, selective delivery to tumor cells is not the only requirement. An enhanced cellular uptake is another key factor for the therapeutic efficiency of the polymeric drugs. This can be mediated by cell-penetrating peptides (CPP) which facilitate the conjugate's penetration through the cytoplasmic membrane. Yet another key issue is the controlled release of the cargo.

We propose a new generation of polymer therapeutics targeted to tumor cells using specific targeting ligands and CPPs. The distinct advantage of this approach is that all components, i.e. drug, targeting ligand (RGD based peptides) and CPP (PFVYLI, R9F2, etc.), are attached to a polymer carrier based on a copolymer of *N*-(2-hydroxypropyl)-methacrylamide. A cytostatic drug pirarubicin attached to the polymer is inactive during the transport in the blood; once inside the cell it is released and regains its activity. The polymer conjugates with CPP exhibited much higher cell uptake than the control conjugates as shown by FACS and fluorescence confocal microscopy.

Biography

Robert Pola has completed his PhD at the age of 29 years from Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic (IMC). He is the member of Department of Biomedicinal Polymers of IMC. He has published 15 papers in reputed international journals.His research focus is based on synthesis of peptide sequences and preparation of water-soluble polymer conjugates used as drug delivery systems for effective treatment of cancer or for vaccination.

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