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Novel polymer-peptide conjugates and polymer-based peptidomimetics

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Peptides are essential biomolecules with widespread applications, including pharmaceutical, biotechnological and in biomaterials. They are in particular an emerging class of new therapeutic candidates, but their clinical development can be limited by a number of shortcomings. Conjugation to polymers and peptidomimetic conversion are among the main technologies which have been successfully implemented to improve the pharmacokinetic and pharmacodynamic properties of peptides and proteins. In this research, both novel functionalised linear poly(ethylene glycol)s for peptide conjugation and polymer-based peptidomimetics are presented. In the former case, modified PEG backbones with high peptide loading capacities were synthesised and different conjugation chemistries investigated for their functionalization. The candidates produced can be used as peptide-based targeted drug delivery vehicles, nanomedicines or polymeric prodrugs. In the latter case, 2 classes of biologically active peptides were subjected to the novel peptidomimetic conversion. The candidates generated by this approach can reproduce or surpass the biological activity of their parent peptides, while displaying no toxicity (determined by epithelial cell viability, mitochondrial membrane potential, plasma membrane permeability and nuclear morphology). The performances of some of these candidates are close to those of reference commercial reagents.

Biography

Marc Devocelle has completed his PhD at the University of Lille (France) under contract with a pharmaceutical company. He subsequently joined RCSI in 1999 as a Post-doctoral researcher and became Manager of the Peptide Synthesis Laboratory in 2000. He has since been appointed as a Lecturer in 2004, a Senior Lecturer in 2008 and an Associate Professor of Chemistry in 2014. His laboratory is involved in over 25 collaborations with 14 academic groups across 8 HEIs in Ireland, 2 SMEs and 1 MNC.

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