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Impact of cargo-carrier interactions on micelles' bio-distribution

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Strategies to deliver drugs using nanocarriers, which are passively or actively targeted to their alleged site of action, might favorably, affect benefit-risk-profiles of novel therapeutics. Here, we tested the hypothesis whether the physico-chemical properties of the cargo as well as the actual conditions during encapsulation interfere during formulation of nanoparticular cargo-carrier systems. Based on previous work, a versatile class of nano-carriers is polyether-based ABC triblock terpolymer micelles with diameters below 50 nm. Their tunable chemistry and size allows to systematically varying important parameters. We demonstrate *in vivo* differences in pharmacokinetics and biodistribution not only dependent on micellar net charge but also on the properties of encapsulated (model) drugs and their localization within the micelles by intravital microscopy and plasma-disappearance rate measurements. On the basis of *in vitro* and *in vivo* evidence, we propose that depending on drug cargo and encapsulation conditions micelles with homogeneous or heterogeneous corona structure are formed, contributing to an altered pharmacokinetic profile. Thus, these interactions have to be considered when a carrier system is selected to achieve optimal delivery to a given tissue.

Biography

Adrian T Press studied in the field of Molecular Medicine and is dedicated to investigate signaling mechanism to develop novel therapeutic strategies to prevent organ failure. Coming across nanomedicine during his PhD, he got fascinated by the versatile chemical possibilities and expanded his research towards basic understanding of nanopaharmacology using his deep understanding of molecular biology to investigate interactions between drugs, drug delivery systems and organisms.

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