S Skoczen et al., J Pharm Drug Deliv Res 2017, 6:5
DOI: 10.4172/2325-9604-C1-024

11TH WORLD DRUG DELIVERY SUMMIT

Pharmacokinetics of a doxorubicin loaded porphyrin-phospholipid liposome in wistar rats

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A doxorubicin (DXR) loaded porphyrin-phospholipid (PoP) liposome is currently under development for light-triggered drug release in solid tumors. In order for the light-triggered drug release concept to be viable, the DXR-PoP liposome must remain stable *in vivo*, and not undergo premature release of the encapsulated therapeutic payload, DXR, or the lipid bilayer loaded photoactivatable agent, PoP. The objective of the present study was to determine the *in vivo* stability of the construct by characterizing the pharmacokinetic profile of both the DXR and PoP components in 10-week-old, double jugular catheterized, and male Fischer 344 rats. A group of 8 rats were administered 5 mg DXR/kg of the DXR-PoP liposome i.v., and blood was collected at 0.25, 0.5, 1, 4, 8, 12, 24, 48, and 96 h time-points for preparation of plasma. Plasma samples underwent analysis for PoP and DXR by mass spectrometry. Plasma profiles for the PoP and DXR analytes were identical when presented on a % dose/mL basis. Similarly, pharmacokinetic parameters, as determined by non-compartmental analysis using Phoenix WinNonlin software, were identical for DXR and PoP. Mean clearance, volume of distribution steady state, mean residence time and half-life ranged were 1.16+0.1 mL/h/kg, 41+4 mL/kg, 33+2 h, and 26+1.2 h for DXR, and 1.33+0.1 mL/h/kg, 45+5 mL/kg, 32+2 h, and 25+1.4 h for POP. These data support the integrity of the DXR-PoP liposome construct upon *in vivo* administration, and the concept of light-triggered drug release.

Biography

S Skoczen is a Member of the Pharmacology and Toxicology section of the Nanotechnology Characterization Laboratory, with over 15 years of experience in preclinical cancer research. Her expertise includes the development of small molecule bioanalytical assays utilizing triple quadrapole and quadropole-orbitrap mass spectrometry to support drug metabolism and pharmacokinetic studies. Recently, her work has focused on the advancement of novel nanomedicine drug release methods using stable isotope tracers to quantify encapsulated and unencapsulated drug fractions in biological matrices, with application to formulation optimization and generic bioequivalence. She has received a BS in Biology from Shippensburg University and a MS in Biotechnology from Johns Hopkins University.

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