



Short lectures abstracts

Colloidal formulation of mistletoe extracts in a pharmaceutical flow process for targeted cancer therapy

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Purpose: Complete remissions were reported upon intratumoral injections and high dosage intravesical administrations of mistletoe preparations. Liposomal formulations of mistletoe can achieve accumulation in tumours and triggered release. To enable long circulation of liposomes for their accumulation, a protective coating of heparin was developed to minimize immune reactions.

Methods: Liposomes were produced from nanoemulsions (Hildebrandt et al. 2016; Sommerling et al., 2018) using batch and continuous centrifugal technologies to enable high encapsulation efficiencies and asymmetric membranes. Lysolipids were used to enable triggered release upon local hyperthermia. Liposomes were coated with heparin to avoid innate immune activation.

Results: Encapsulation efficiencies were much higher than with existing conventional techniques, strongly dependent on the use of the hydrophobic emulsion excipient. Liposomal sizes and monodispersity were studied by transmission electron microscopy. Liposomal bilayer asymmetry (De Matos et al., 2019), triggered release and full activity of the released compounds were successfully demonstrated (De Matos et al., 2018). Protection of liposomes by a heparin complex showed avoidance of complement reactions (Dührkop et al., 2016).

Conclusions: The technology can be used for industrial scale-up and has strong potentials for targeted mistletoe therapy as well as for a broad spectrum of macromolecular biopharmaceuticals in oncology. It will be tailored for preclinical and clinical use for specific tumour entities.

Keywords: Liposomes, mistletoe, encapsulation of biopharmaceuticals, tumour targeting, triggered release, inhibition of complement activation.

Conflicts of interest: We confirm that there are no known conflicts of interest associated with this publication and there has been no sig-

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Metabolic profiling as a tool for differentiating *Viscum album* ssp. *album* plants growing on various host trees

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