

# Tumor-penetrating polymersomes encapsulating a novel anthracycline for cancer treatment

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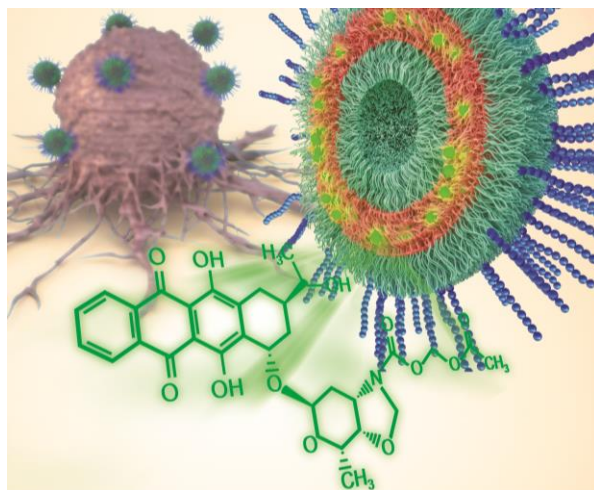
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Novel anticancer compounds and their precision delivery systems are actively developed to create potent and well-tolerated anticancer therapeutics. Tumour-penetrating peptides (TPPs) can be used to increase the accumulation and penetration of nanocarriers in the tumour [1]. We encapsulated a novel anthracycline, Utorubicin (UTO), which is more toxic to cultured tumour cell lines than doxorubicin, in biocompatible polymeric nanovesicles (polymersomes, PS) functionalized with TPPs [2]. Nanoformulated UTO reduced the viability of cultured malignant cells and this effect was potentiated by functionalization with the TPP. Systemic peptide-guided PS showed preferential accumulation in triple-negative breast tumour xenografts implanted in mice (Fig. 2A), and enhanced the UTO accumulation in tumour. Moreover, in an experimental treatment of mice with peritoneal carcinomatosis, UTO-loaded PS decreased the tumour growth after systemic administration (Fig. 2B). Our studies show the potential application of our novel UTO-loaded polymersomes in precision cancer therapy.

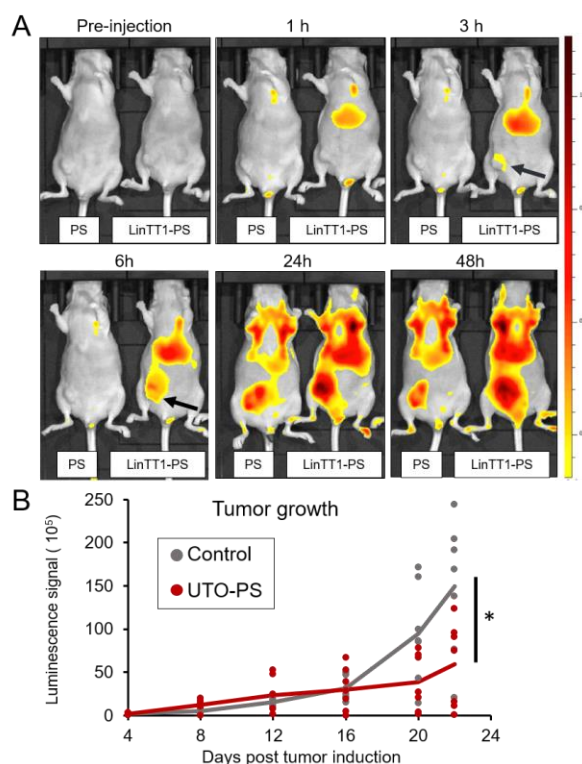
## References

- [1] Teesalu et al. *Frontiers in Oncology*, 216 (2013),1
- [2] Simón-Gracia and Sidorenko et al. *Angew. Chem. Int. Ed.*, 31 (2021), 17018

## Figures



**Figure 1:** New anthracycline Utorubicin loaded in peptide-functionalized polymersomes for targeting solid tumours



**Figure 2: A)** Peptide-guided polymersomes (LinTT1-PS) accumulated in triple-negative breast tumour xenografts. PS=untargeted polymersomes. **B)** UTO-loaded PS decreased the tumour growth in experimental treatment of peritoneal carcinomatosis