SUPPLEMENTARY INFORMATION

FULL TITLE

Regression of melanoma after intravenous administration of plumbagin entrapped in transferrin-conjugated, lipid–polymer hybrid nanoparticles

AUTHORS NAMES AND AFFILIATION

Intouch Sakpakdeejaroen [a], Sukrut Somani [a], Partha Laskar [a], Margaret Mullin [b], Christine Dufès [a, *]

[a] Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, 161 Cathedral Street, Glasgow G4 0RE, United Kingdom

[b] College of Medical, Veterinary and Life Sciences, University of Glasgow, Glasgow G12 8QQ, United Kingdom

* CORRESPONDING AUTHOR

Christine Dufès

Strathclyde Institute of Pharmacy and Biomedical Sciences, University of Strathclyde, 161 Cathedral Street, Glasgow G4 0RE, United Kingdom

Phone: 44 -141 548 3796

Fax: 44 -141 552 2562

E-mail: C.Dufes@strath.ac.uk

Cellular uptake

For the purpose of qualitative and quantitative cellular uptake studies of lipid-polymer hybrid nanoparticles using flow cytometry and confocal microscopy, coumarin-6 was used as a fluorescent lipophilic drug model, as plumbagin does not contain a fluorophore that can emit light upon excitation. Coumarin-6 loaded lipid-polymer hybrid nanoparticles were prepared and characterised for entrapment efficiency, size and zeta potential measurements.

As shown in Table S1, Tf-bearing LPN and control LPN displayed relatively high entrapment efficiency of coumarin-6 (40.9 ± 0.6 % for Tf-bearing LPN and 47.6 ± 0.7 % for control LPN), with a similar size and zeta potential trend as for the nanoparticles entrapping plumbagin.

The conjugation of Tf to the surface of lipid-polymer hybrid nanoparticles entrapping coumarin-6 led to an increase in the mean diameter size of Tf-bearing LPN (222.4 ± 3.1 nm) compared to control LPN (139.1 ± 0.5 nm). Furthermore, the polydispersity index of all formulations was low (0.18 – 0.22), indicating a uniformly dispersed nanomedicine formulation with a narrow size distribution. In addition, both Tf-bearing LPN and control LPN were bearing a negative surface charge (-37.6 ± 0.2 mV for Tf-bearing LPN and -49.9 ± 0.3 mV for control LPN).

These results therefore demonstrated that the entrapment of coumarin-6 in the lipid-polymer hybrid nanoparticles did not change their physico-chemical properties, such as the particle size and surface charge, compared with the original formulations entrapping plumbagin.

Table S1. Entrapment efficiency, size and zeta potential of lipid-polymer hybrid nanoparticles entrapping coumarin-6 (n=3)

Nanoparticle formulations	Entrapment efficiency (%)	Particle Size (nm)	Polydispersity Index	Zeta Potential (mV)
Tf-bearing LPN	40.9 ± 0.6	222.4 ± 3.1	0.22 ± 0.01	-37.6 ± 0.2
Control LPN	47.6 ± 0.7	139.1 ± 0.5	0.18 ± 0.01	-49.9 ± 0.3

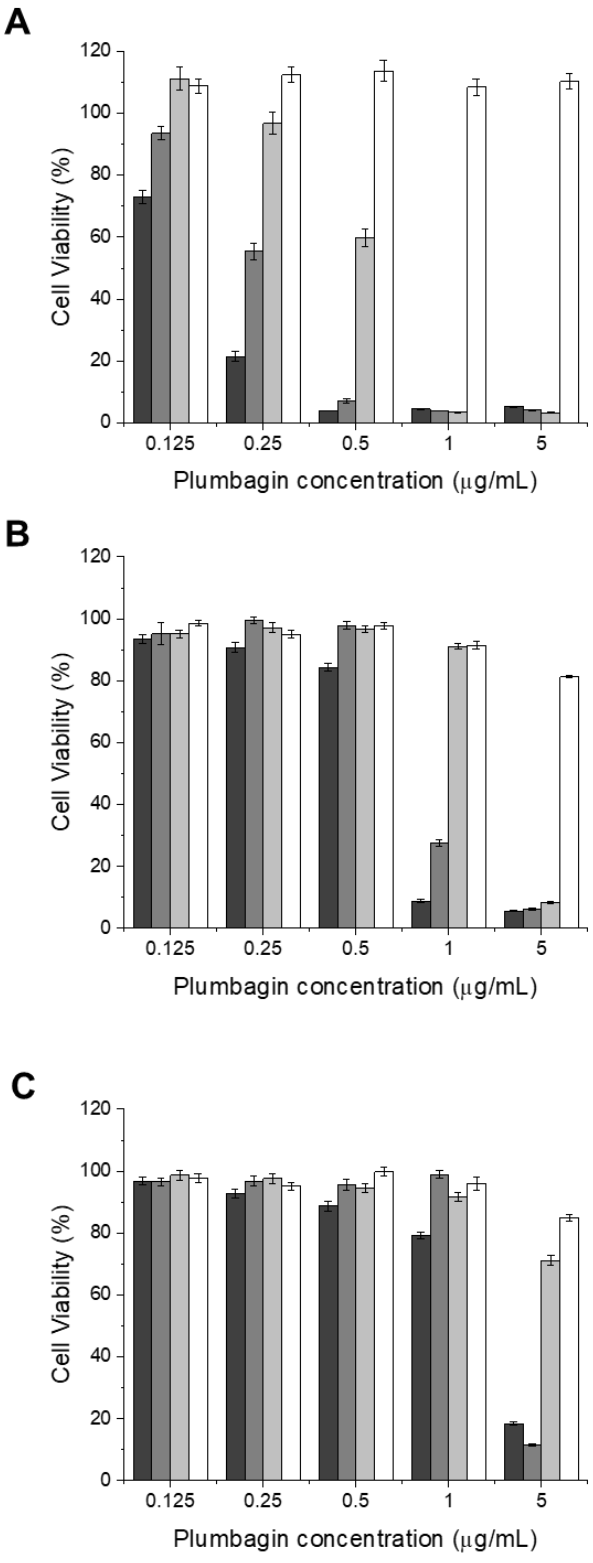

Figure S1. Anti-proliferative effect of plumbagin either entrapped in Tf-bearing LPN (dark grey), control LPN (grey) or in solution (light grey) on B16-F10 (A), A431 (B) and T98G cells (C) after 24h treatment (control: blank vesicles (white)) (n=15).