

Electronic Supplementary Material

Upconversion nanoparticle platform for efficient dendritic cell antigen delivery and simultaneous tracking

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Formulations	Zeta potential	PDI \pm SD
	(mV) \pm SD	
UCNP/PAA	-6.91 \pm 0.07	0.15 \pm 0.02
UCNP/PAA/PEG	-21.3 \pm 2.21	0.24 \pm 0.02
UCNP/PAA/PEG/OVA24	-14.0 \pm 1.52	0.34 \pm 0.12
UCNP/PAA/PEG/Pam3CSK4	-14.6 \pm 1.37	0.28 \pm 0.12
UCNP/PAA/PEG/OVA24/Pam3CSK4	-13.8 \pm 1.30	0.70 \pm 0.04

Table S1 Physicochemical properties of UCNP before and after functionalization with OVA24 and Pam3CSK4. The data are presented as mean \pm SD (N=3).

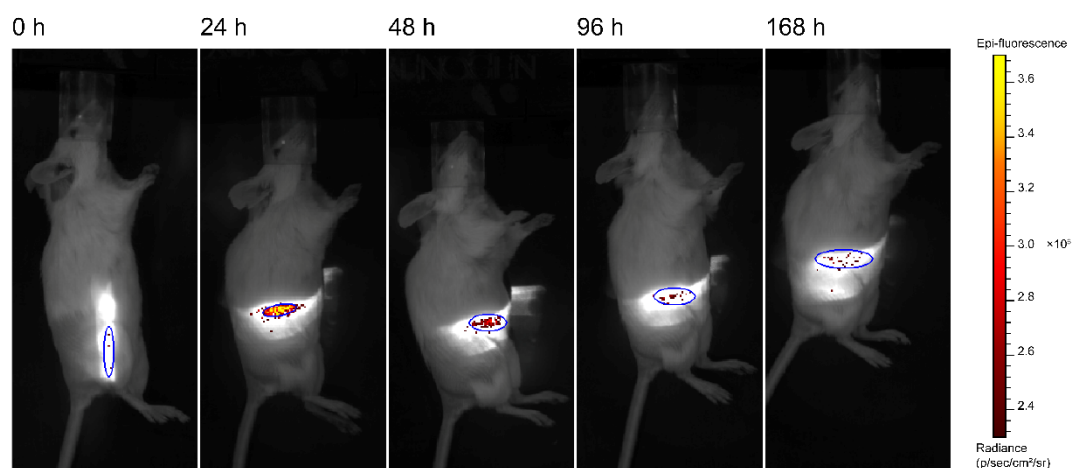


Figure S1 *In vivo* visualization of UCNP/PAA/PEG/OVA24/Pam3CSK4 at the right inguinal draining lymph nodes.

Base materials	Antigens or adjuvants	Formulation	Target	Reference
NaY/GdF ₄ : YbEr	OVA	Electrostatic interaction	DCs	[40]
β -NaYF ₄ : 20% Yb, 2% Er coated mesoporous silica	OVA/tumor cell fragment (TF)	Encapsulation	Tumor	[1]
NaYF ₄ :Tm	OVA	Conjugation	Melanoma	[2]
NaYF ₄ : 2% Er, 20% Yb@ NaYF ₄	OVA24, Pam3CSK4	Conjugation	DCs	

Table S2 An overview on recently OVA engineered UCNPs in cancer immunotherapy.

References

- [1] Ding, B., Shao, S., Yu, C., Teng, B., Wang, M., Cheng, Z., Wong, K., Ma, P, Lin, J. (2018). Large - pore mesoporous - silica - coated upconversion nanoparticles as multifunctional immunoadjuvants with ultrahigh photosensitizer and antigen loading efficiency for improved cancer photodynamic immunotherapy. *Advanced Materials* 30(52), 1802479. <https://doi.org/10.1002/adma.201802479>
- [2] Lv, F., Jin, Y., Feng, X., Fan, M., Ren, C., Dai, X., ... & Liu, H. (2021). Traceable metallic antigen release for enhanced cancer immunotherapy. *Journal of Nanoparticle Research* 23(6): 1-11. <https://doi.org/10.1007/s11051-021-05256-8>