

Supporting Information

Facile Construction of Dual-Targeting Delivery System by Using Lipid Capped Polymer Nanoparticles for Anti-Glioma Therapy

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Additional methods and results.

1. Conjugation efficiency of Apt on DSPE-PEG-COOH.

The conjugation efficiency of Apt on DSPE-PEG-COOH was measured by a UV adsorption method as described in our previous work.¹ Briefly, after the conjugation reaction, the reactant was transferred into an ultrafiltration tube (MWCO: 10 kD) for centrifugation at 3000 rpm for 20 min, and the unreacted DSPE-PEG₂₀₀₀-COOH and AS1411 was collected. Apt has a characteristic adsorption at 260 nm, while neither the blank buffer solution nor free DSPE-PEG showed any adsorption at 260 nm (Figure S1A). We therefore built a calibration curve based on the Apt concentration as a function of UV adsorption at 260 nm, which is used for free Apt measurement (Figure S1B). The conjugation efficiency of Apt with DSPE-PEG₂₀₀₀-COOH was calculated according to the following equation:

The conjugation efficiency (%) = $(1 - \text{Amount of free Apt} / \text{Amount of Apt used in the formulation}) \times 100$

With this equation, the conjugation efficiency of Apt on DSPE-PEG-COOH was determined to be 51.2%.

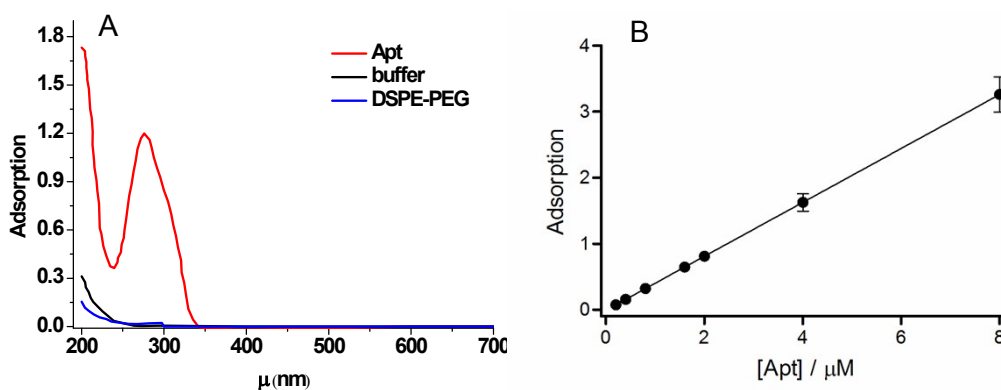


Figure S1. (A) UV spectra of Apt, blank buffer solution and DSPE-PEG-COOH. The concentration of Apt and DSPE-PEG-COOH were both at 3 μM. (B) The calibration curve for free Apt determination.

1. Conjugation efficiency of ANG-2 on DSPE-PEG-COOH.

The conjugation efficiency of ANG-2 on DSPE-PEG-COOH was determined by a fluorescamine method as reported in our previous work,² and the overall process is quite similar to that of Apt measurement. After reaction, the unreacted DSPE-PEG₂₀₀₀-COOH and AS1411 was collected through an ultrafiltration tube (MWCO: 5 kD). The solution (0.5 mL) was diluted with phosphate buffer (0.2 M, pH 8.0, 350 mL) and then reacted with fluorescamine acetone solution (2.89 M, 350 mL) for 20 min. ANG-2 has several active anime group to generate fluorescent product after reaction with fluorescamine, while no fluorescence signal was observed for DSPE-PEG-COOH (Figure S2A). Thus, the fluorescamine method can be used for ANG-2 detection, and a calibration curve was built (Figure S2B). The conjugation efficiency of ANG-2 with DSPE-PEG₂₀₀₀-COOH was calculated based on the following equation:

The conjugation efficiency (%) = (1 - Amount of free ANG-2 / Amount of ANG-2 used in the formulation) × 100

With this equation, the conjugation efficiency of ANG-2 on DSPE-PEG-COOH was determined to be 50.4%.

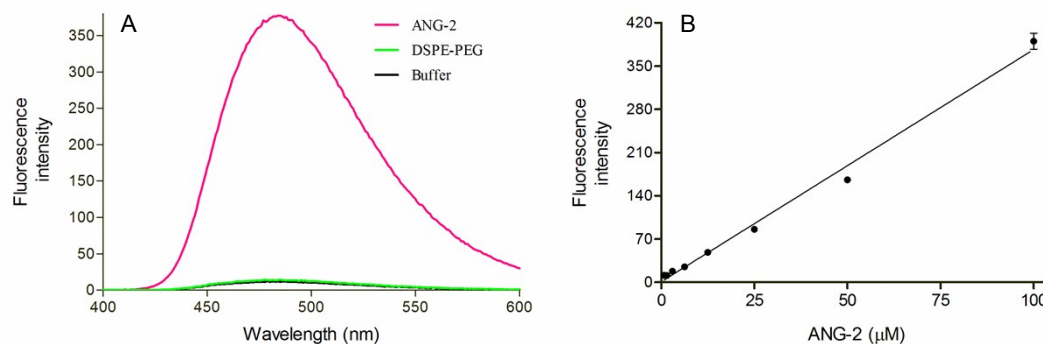


Figure S2. (A) The fluorescence spectra showing the specificity of the fluorescamine method for ANG-2 against DSPE-PEG-COOH. The concentration of ANG-2 and DSPE-PEG-COOH were both at 100 μM. (B) A calibration curve for ANG-2 calculation.

Additional References

1. Z. Liu, H. Zhao, L. He, Y. Yao, Y. Zhou, J. Wu, J. Liu, J. Ding, *RSC Advances*, 2015, **5**, 16931-16939.
2. J. M. Li, J. Mao, J. Tang, G. Li, F. L. Fang, Y. N. Tang, J. S. Ding, *RSC Advances*, 2017, **7**, 22954-22963.