

Supplementary Information

Fucoidan-Coated Metal-Organic Framework Nanoparticles for Targeted Delivery of Nimodipine in Subarachnoid Hemorrhage-Induced Vasospasm

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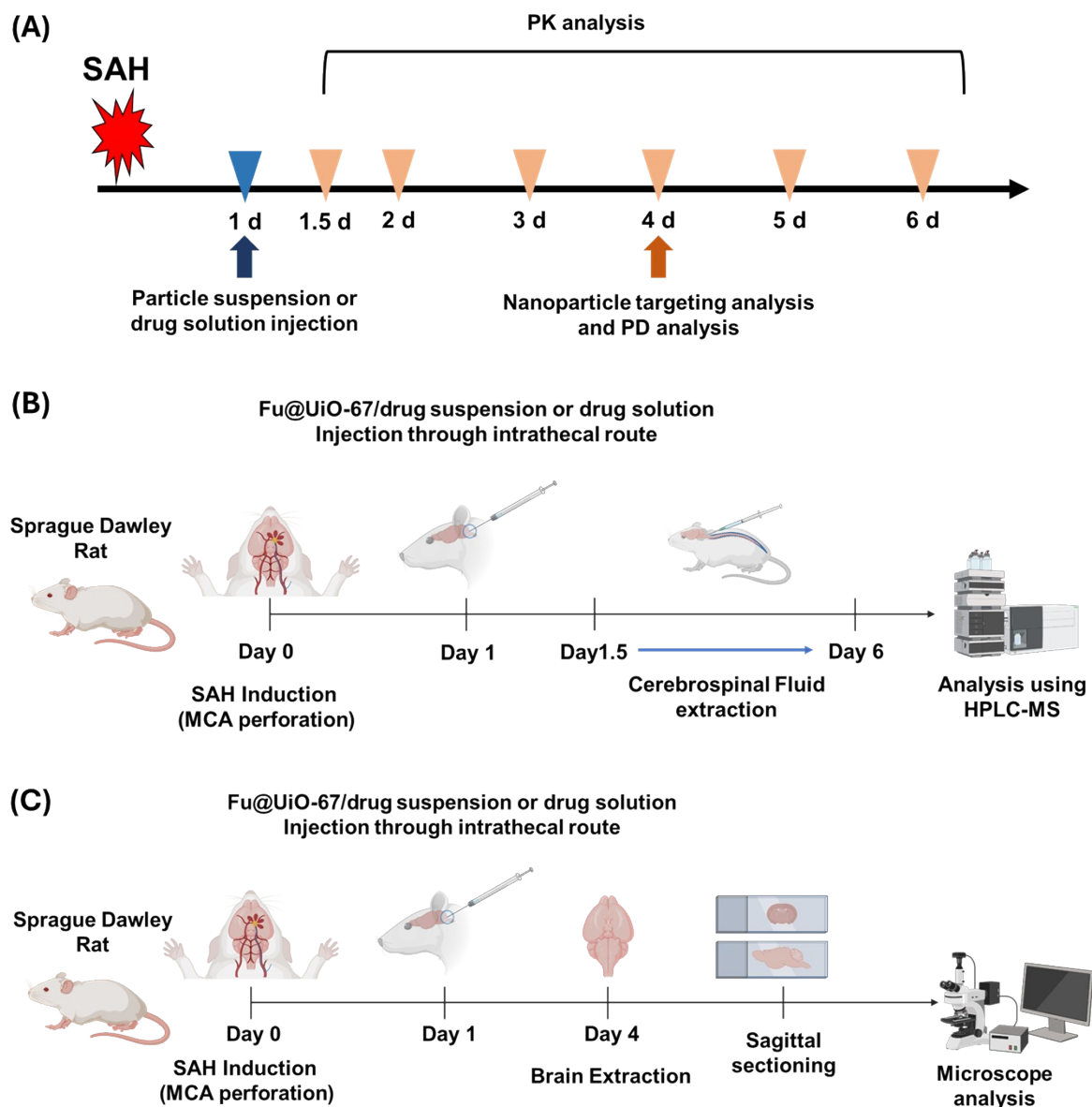


Fig. S1 Experimental design and procedures for *in vivo* pharmacokinetic (PK) and pharmacodynamic (PD) studies. (A) Schematic timeline of the *in vivo* experiment, illustrating the sequence of SAH induction (day 0), drug administration (day 1), longitudinal PK analysis (days 1.5–6), and PD evaluation (day 4). (B) Procedural workflow for PK analysis, including SAH induction via MCA perforation in Sprague Dawley rats, intrathecal injection of the formulations, CSF sampling, and quantification using LC-MS. (C) Procedural workflow for PD analysis, covering the steps from SAH induction and treatment to brain extraction on day 4, followed by histological sectioning and microscopic evaluation of the cerebral vasospasm.

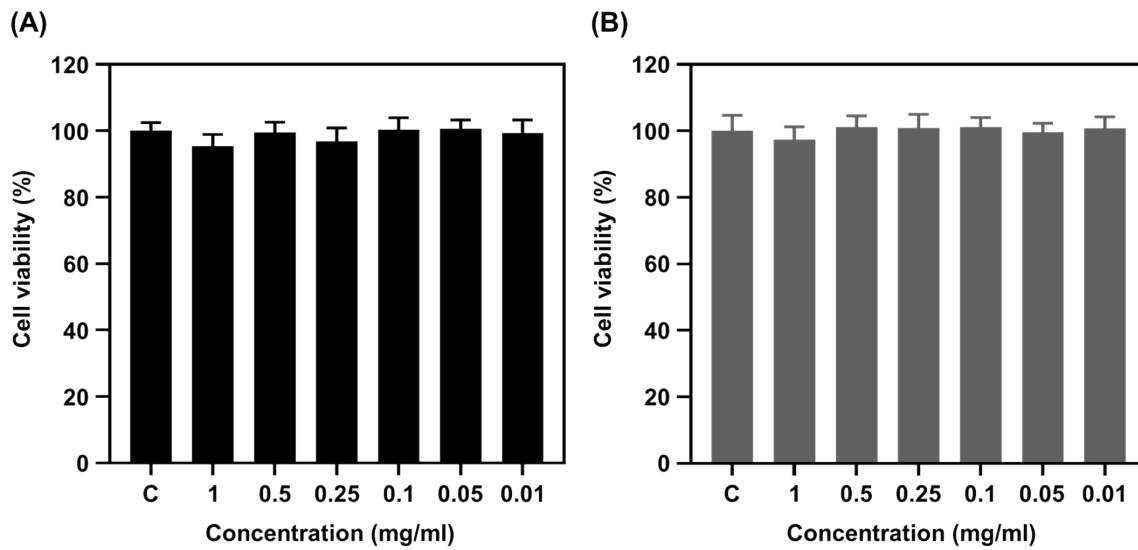


Fig. S2 *In vitro* cytotoxicity evaluation of (A) UiO-67/drug and (B) Fu@UiO-67/drug nanoparticles. For both nanoparticles, no significant cytotoxicity was observed. Data are presented as mean \pm SD ($n = 8$). The evaluation was performed using L929 mouse fibroblasts and a water-soluble tetrazolium salt-based assay (Ez-Cytox, Daeil Lab Service, Seoul, Korea).¹ The cells were cultured in RPMI 1640 medium supplemented with 10% FBS and 1% penicillin–streptomycin. For the cytotoxicity assay, L929 cells were seeded in a 96-well plate at a density of 1×10^4 cells/well and grown at 37 °C in a humidified 5% CO₂ atmosphere for 24 h. The culture medium in each well was replaced with 100 μ L of UiO-67/drug or Fu@UiO-67/drug suspensions at varying concentrations (0.01, 0.05, 0.1, 0.5, 0.25 and 1 mg/mL). Following a further 24 h incubation, the wells were washed three times with medium. Subsequently, 100 μ L of fresh medium and 10 μ L of Ez-cytox reagent were added to each well, followed by incubation for 2 h under the same conditions. The absorbance of the reaction mixture was measured at 450 nm using a microplate reader (VersaMax ELISA Microplate Reader; Molecular Devices, San Jose, CA, USA) at a reference wavelength of 600 nm. Cell viability was calculated using the following equation:

$$\text{Cell viability (\%)} = \frac{\text{Absorbance of treated cells} - \text{Absorbance of medium}}{\text{Absorbance of control cells} - \text{Absorbance of medium}} \times 100$$

Reference

1. Y. J. Ahn, W. S. Yun, J. S. Choi, W. C. Kim, S. H. Lee, D. J. Park, J. E. Park, J. Key and Y. J. Seo, *Biomed Eng Lett*, 2021, **11**, 39–53.