Supporting Information

Synergies in Antimicrobial Treatment by a Levofloxacin-Loaded Halloysite and Gold Nanoparticles with a Conjugation to a Cell-Penetrating Peptide

Reza Taheri-Ledari[1,*], Mohammad Reza Ahghari[1], Fatemeh Ansari[1], Mohadeseh Forouzandeh-Malati[1], Seyedeh Shadi Mirmohammadi[1], Simindokht Zarei-Shokat[1], Sorour Ramezanpour[2], Wenjie Zhang[3], Ye Tian*[,4] and Ali Maleki*[,1]

[1] *Catalysts and Organic Synthesis Research Laboratory, Department of Chemistry, Iran University of Science and Technology, Tehran 16846-13114, Iran.*

[2] *Department of Chemistry, K. N. Toosi University of Technology, P.O. Box 15875-4416, Tehran, Iran.*

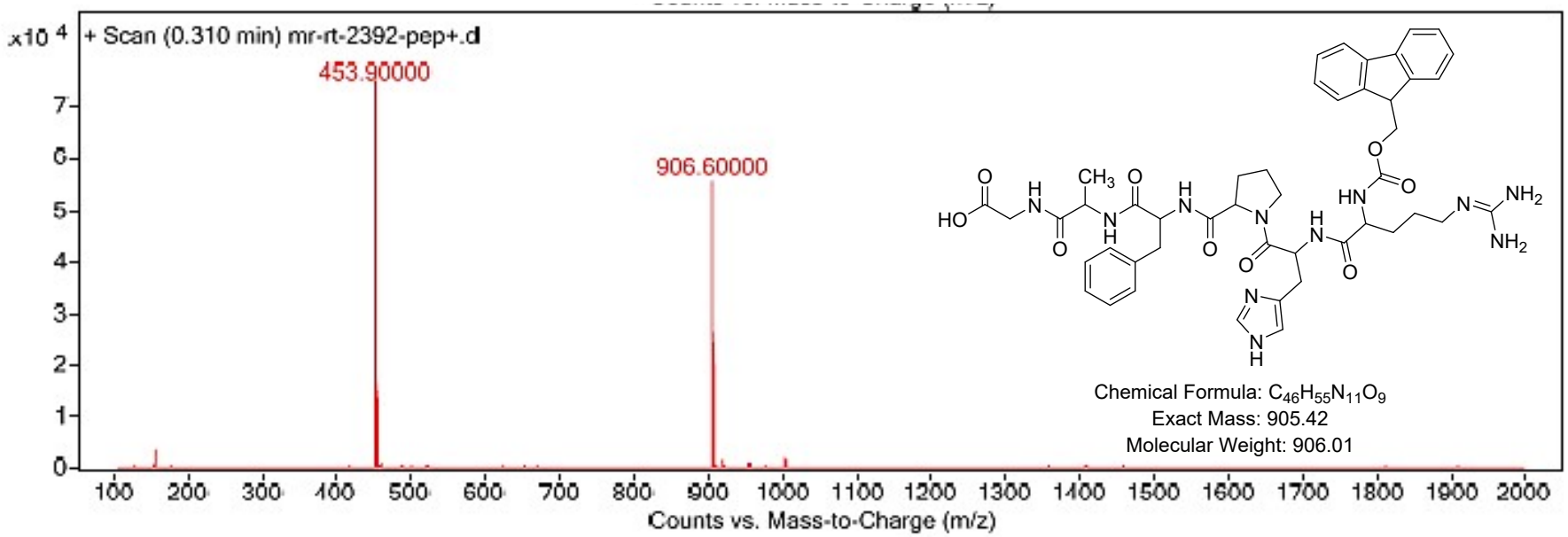
[3] *Department of Nuclear Medicine, West China Hospital, Sichuan University, No. 37, Guoxue Alley, Chengdu 610041, Sichuan Province, P.R. China.*

[4] *State Key Laboratory of Oral Diseases & National Clinical Research Center for Oral Diseases, Department of Orthodontics, West China Hospital of Stomatology, Sichuan University, No.14, 3rd section of South Renmin Road, Chengdu 610041, P.R. China. E-mail: tianye@scu.edu.cn.*

**Corresponding authors: (Reza Taheri-Ledari) E-mail: Rezataheri13661206@gmail.com, R_Taheri94@alumni.iust.ac.ir; (Ye Tian) E-mail: tianye@scu.edu.cn; (Ali Maleki) E-mail: maleki@iust.ac.ir; Fax: +98-21-73021584; Tel: +98-21-73228313.*

Table of Content

Figure S1. LC-MS spectrum and chemical structure of the synthesized CPP sequence.



LC-MS result:

ESI technique: $[M+1]^+$ = *m/z* 906.60000 and $[M+2H]^{2+}/2$ = *m/z* 453.90000.

Calculation of the released lvx and drug content of lvx@HNT/Au–CPP nano-cargo

$$X = \frac{Y - 0.1227}{0.2941} \times 100 \qquad (Eq.\ 1)$$

Entry 4 (pH = 4.6/LSPR conditions): Y = 0.593 (the highest value of the UV-Vis absorbance activity in release profile)

X = 159.91 ~ 160 ppm (the concentration of the released lvx, obtained from Eq. 1)

160 ppm = 0.16 mg/mL = 1.6 mg in 10 mL (since 10 mg of lvx@HNT/Au–CPP was dispersed in 10 mL buffer medium)

$$\frac{1.6\ mg\ (released\ lvx\ in\ 10\ mL\ buffer)}{10\ mg\ (initial\ amount\ of\ lvx@HNT/Au–CPP} \times 100 = 16\ wt\%$$

It means that ca. 16.0 wt% of the prepared lvx@HNT/Au–CPP nano-cargo is formed by the loaded lvx.

In the same way;

Entry 1 (pH = 6.8/37 °C): Y = 0.522 → X = 135.77 ppm → 0.13577 mg/mL → 1.3577 mg/ 10 mL → 1.357 mg/ 10 mg × 100 = 13.57 %

=> 13.57 % / 16.0 % × 100 = **84.5%**

Entry 2 (pH = 8.0/37 °C): Y = 0.540 → X = 141.89 ppm → 0.1418 mg/mL → 1.418 mg/ 10 mL → 1.418 mg/ 10 mg × 100 = 14.18 %

=> 14.18 % / 16.0 % × 100 = **88.6%**

Entry 2 (pH = 4.6/37 °C): Y = 0.542 → X = 142.57 ppm → 0.1425mg/mL → 1.425 mg/ 10 mL → 1.425 mg/ 10 mg × 100 = 14.25 %

=> 14.25 % / 16.0 % × 100 = **89.0%**

Figure S2. Digital photos of the colony-count disks related to the controls.