Supporting Information

Design, synthesis and antitumor study of novel NO-type porphyrin-ferulic acid derivatives for chemotherapy and photodynamic therapy

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Abstract: Photodynamic therapy (PDT) is a minimally invasive treatment that shows promise in replacing traditional surgery, chemotherapy, and radiotherapy. In this study, 15 NO-type porphyrin ferulic acid derivatives were synthesized by acyl chlorination, substitution, and complexation with metal salts. After 10 s of light irradiation, the NO-type porphyrin-ferulic acid derivatives could effectively quench DPBF, among which compounds **6a-6e** and compounds **7a-7e** could be reduced to below 30, indicating that they have a good ability to produce singlet oxygen. Additionally, NO-type porphyrin-ferulic acid derivatives rapidly released NO in 5 mins and substantially increased it within 60 mins. The anti-tumour activity experiments showed that NO porphyrin ferulic acid derivatives could produce different degrees of phototoxicity on A549 cells and HepG2 cells under light condition. The compounds with shorter alkyl chains showed better antitumor activity, while the prolongation of alkyl chains reduced the activity of the compounds. Among these compounds, compound **7a** showed optimal inhibition (IC_{50} = 43.82 ± 2.50) and had the potential to be a combination therapeutic agent for photodynamic therapy and chemotherapy.

Keywords:porphyrin; nitric oxide; ferulic acid; photodynamic- chemotherapy;anti-tumor activity

1.^{1}H NMR of compound 1, compound 2, and NO-type porphyrin-ferulic acid derivatives

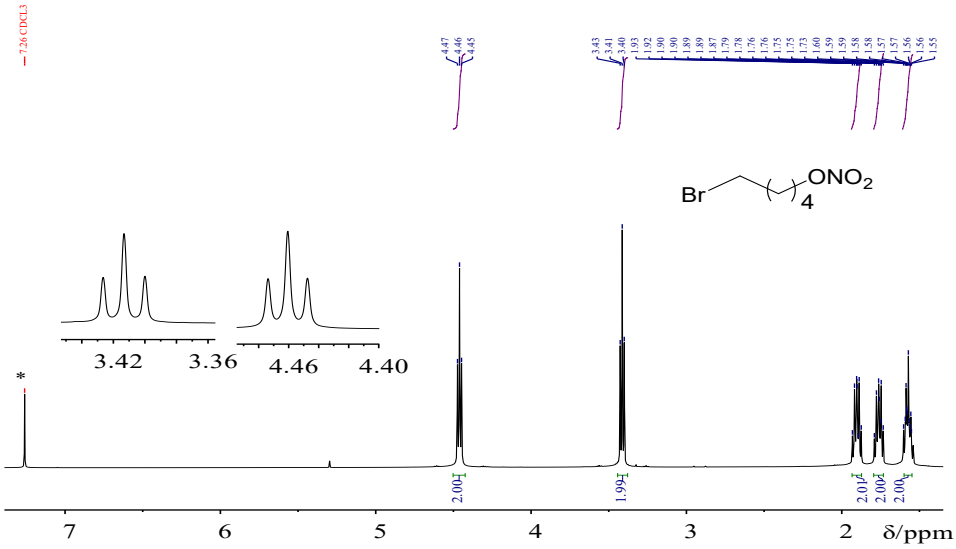

Figure 1.1. ^{1}H NMR of compound **1**

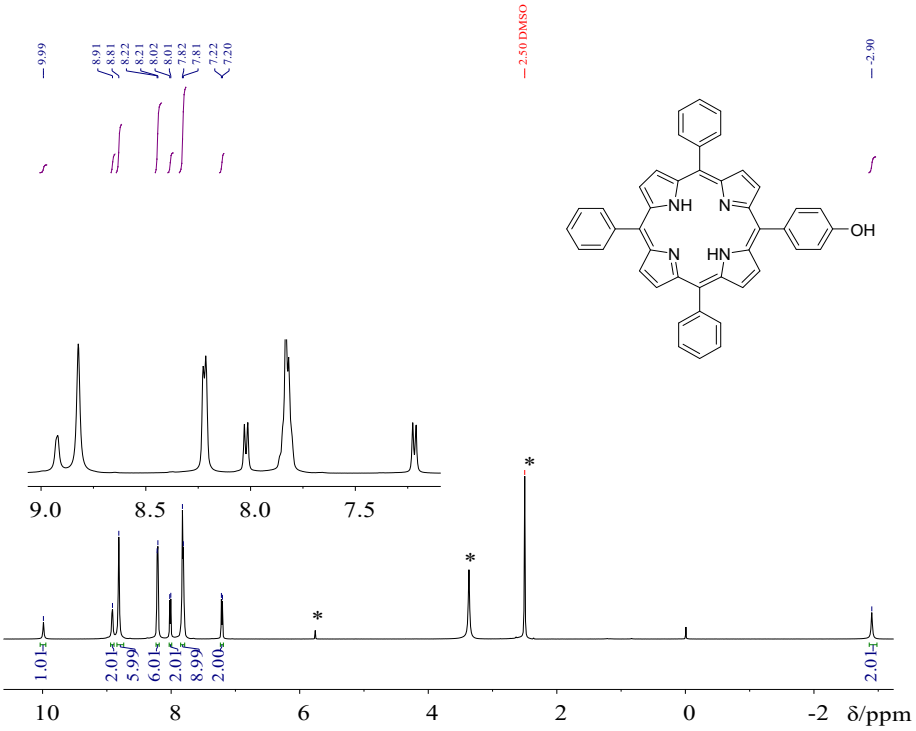

Figure 1.2. ^{1}H NMR of compound **2**

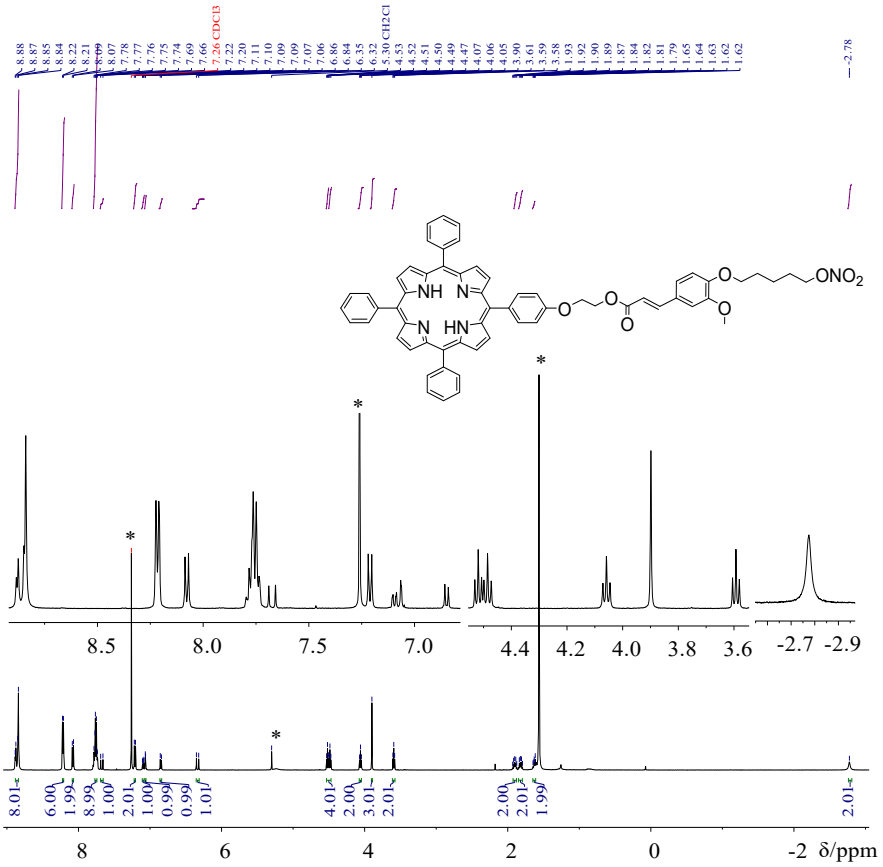

Figure 1.3. ^{1}H NMR of compound **6a**

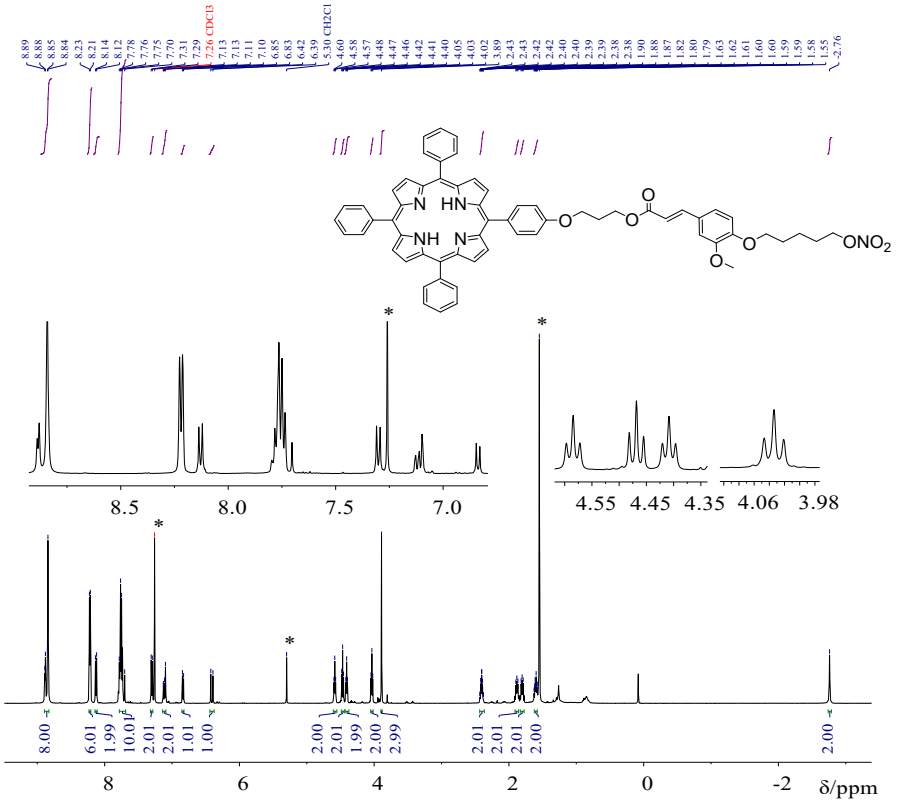

Figure 1.4. ^{1}H NMR of compound **6b**

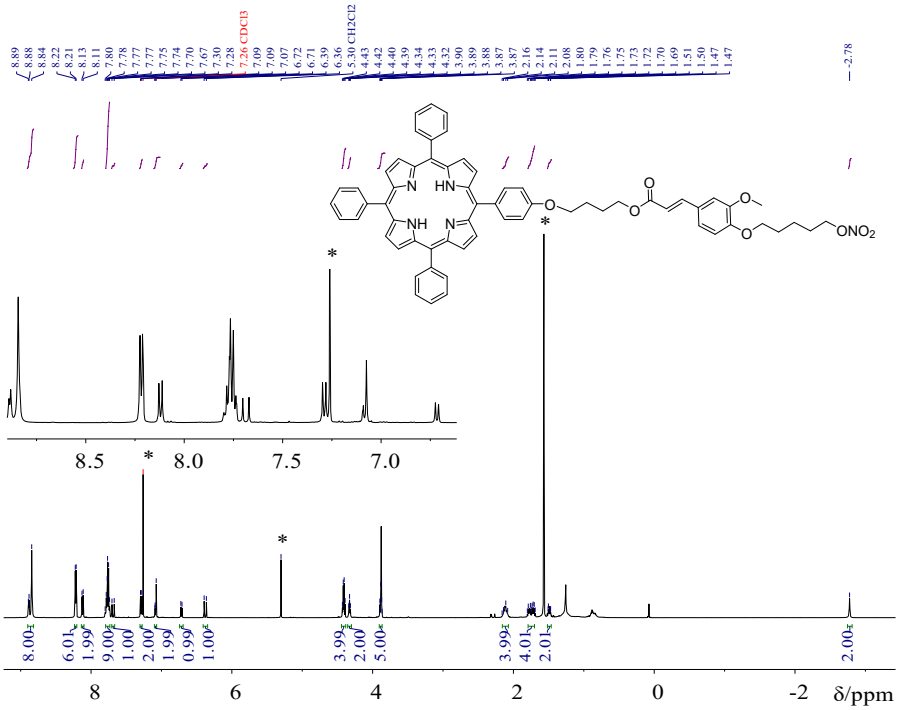

Figure 1.5. ^{1}H NMR of compound **6c**

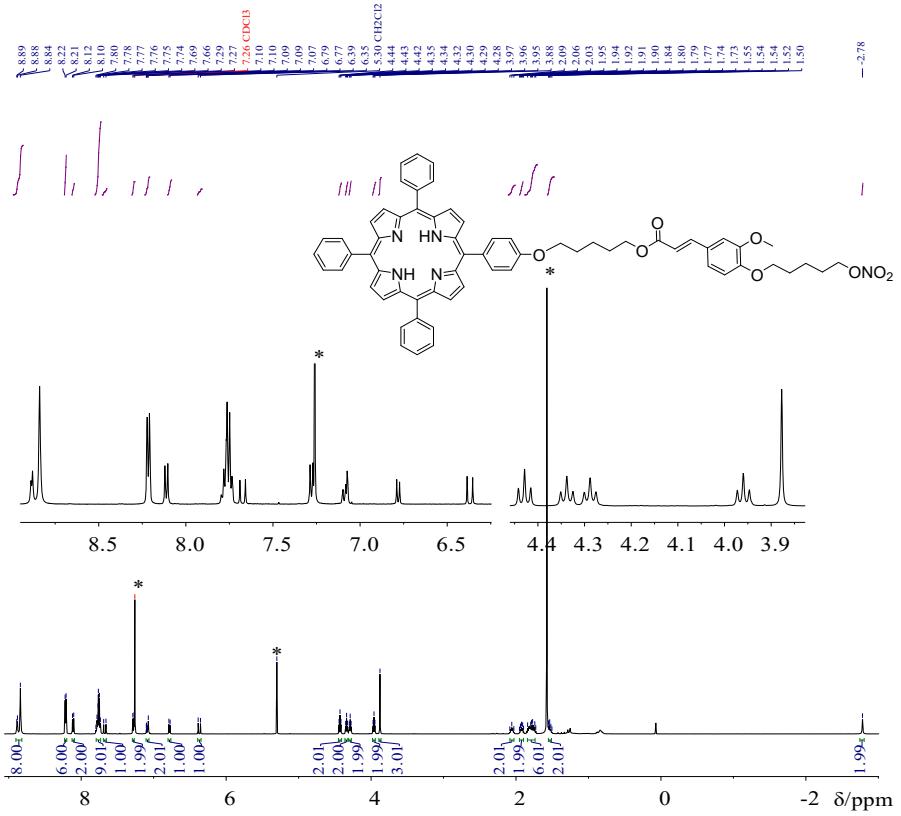

Figure 1.6. ^{1}H NMR of compound **6d**

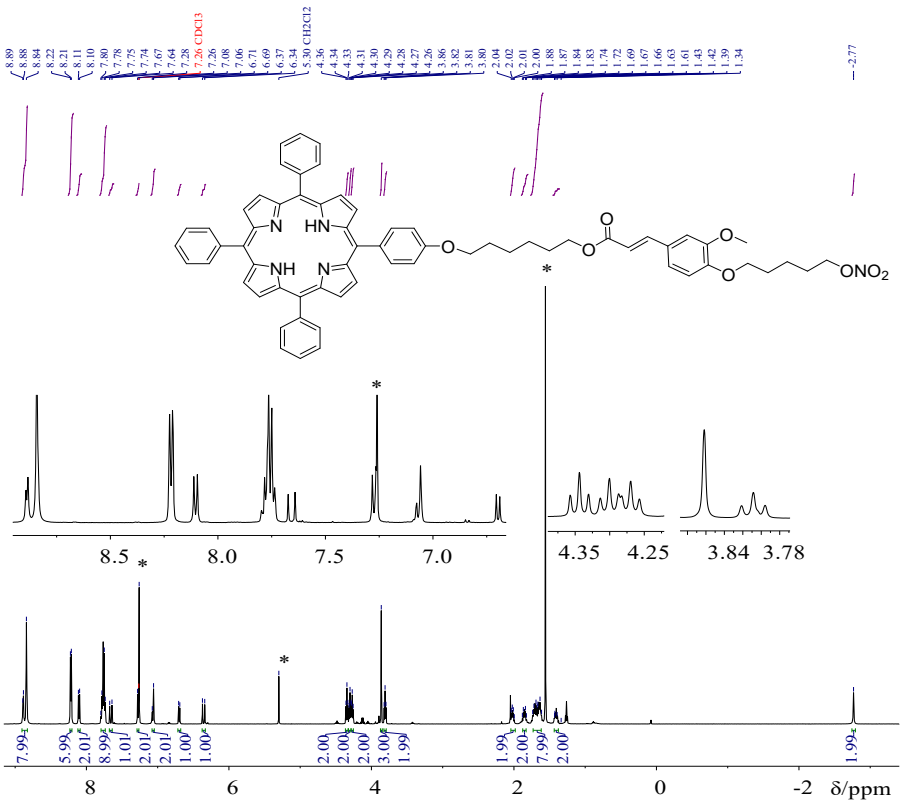

Figure 1.7. ^{1}H NMR of compound **6e**