SUPPORTING INFORMATION

An Efficient Drug Metabolism Strategy Based on Microsome-Mesoporous Organosilica Nanoreactors

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Experimental Section.

For the UV-HPLC analysis of nifedipine sample, the mobile phase consisted of solvent A: 5% methanol in water; and solvent B: 95% methanol in water. The LC run started with 55% B continued for 25 min, followed by a gradient to 80% B in 10 min, and then back to 55% B with a gradient in 5 min. At the end of the run, the column was allowed to equilibrate at 55% B for 5min. Absorbance at 254 nm was recorded.

For the UV-HPLC analysis of testosterone sample, the mobile phase consisted of solvent A: 5% ACN in water; and solvent B: 95% ACN in water. The LC run started with 5% B, followed by a gradient to 50% B in 10 min, then to 90% B in 30 min, and back to 5% B by a gradient in 5 min. Absorbance at 244 nm was recorded.

Electrospray ionization mass spectrometry (ESI-MS) was run on a 6460 QQQ mass spectrometer operated in positive ion mode under the conditions: gas temperature 350 ^{0}C, gas flow 5 L/min, nebulizer gas pressure 310.275 kPa (45.0 psi), sheath gas temperature 250 ^{0}C, sheath gas flow 11.0 L/min, capillary voltage: 4000 V (for positive mode) / -3500 V (for negative mode), Nozzle voltage: 500 V, collision energy 30 V.

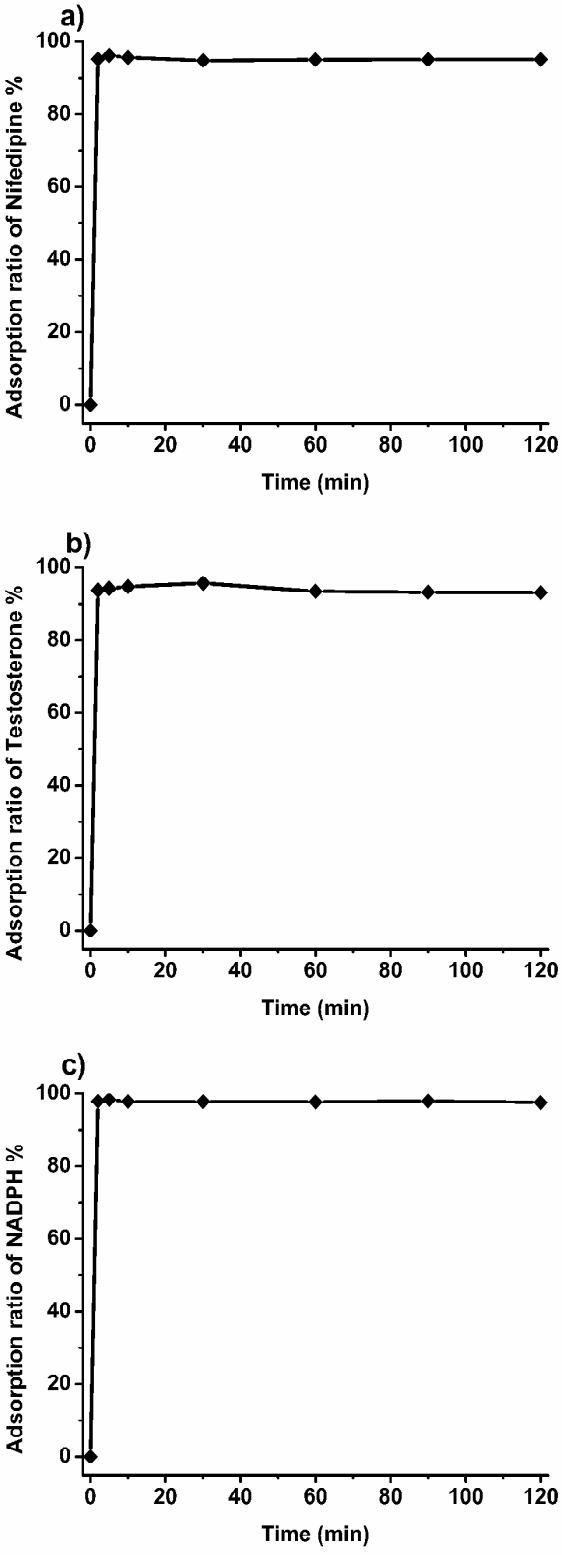

Figure S1. Adsorption ratio of a) nifedipine, b) testosterone and c) NADPH by NH_2-PMO as a function of time. The experiment conditions are the same as the metabolic reactions.

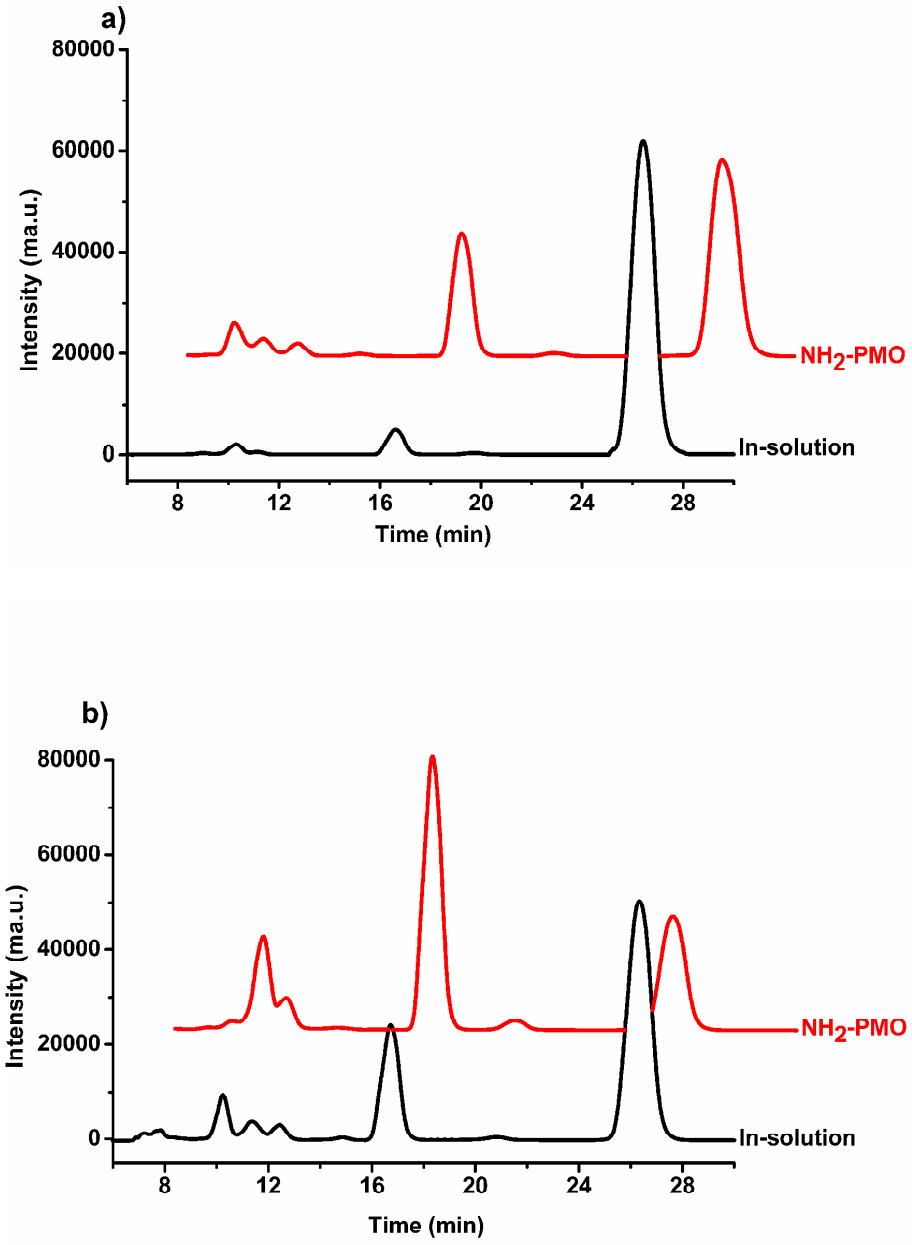

Figure S2. UV-HPLC chromatograms of nifedipine sustained-release tablets oxidation by human liver CYP3A4 microsomes with and without the assistance of NH_2-PMO nanoreactor monitored at 254 nm at a) 2 min and b) 10 min. The nifedipine was observed at $t_R \approx 27$ min. The metabolite of nifedipine was observed at $t_R \approx 16$ min.

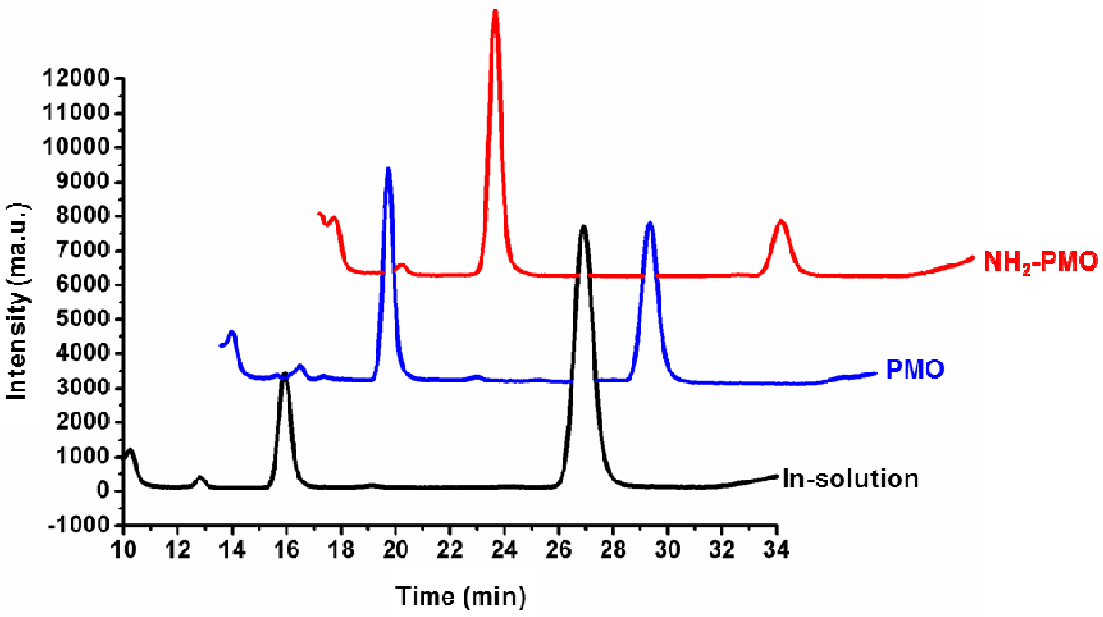

Figure S3. UV-HPLC chromatograms of PMO-assisted drug metabolism at 30 min. The nifedipine substrate was observed at $t_R \approx$ 27 min. The metabolite of nifeipine was observed at $t_R \approx$16 min.

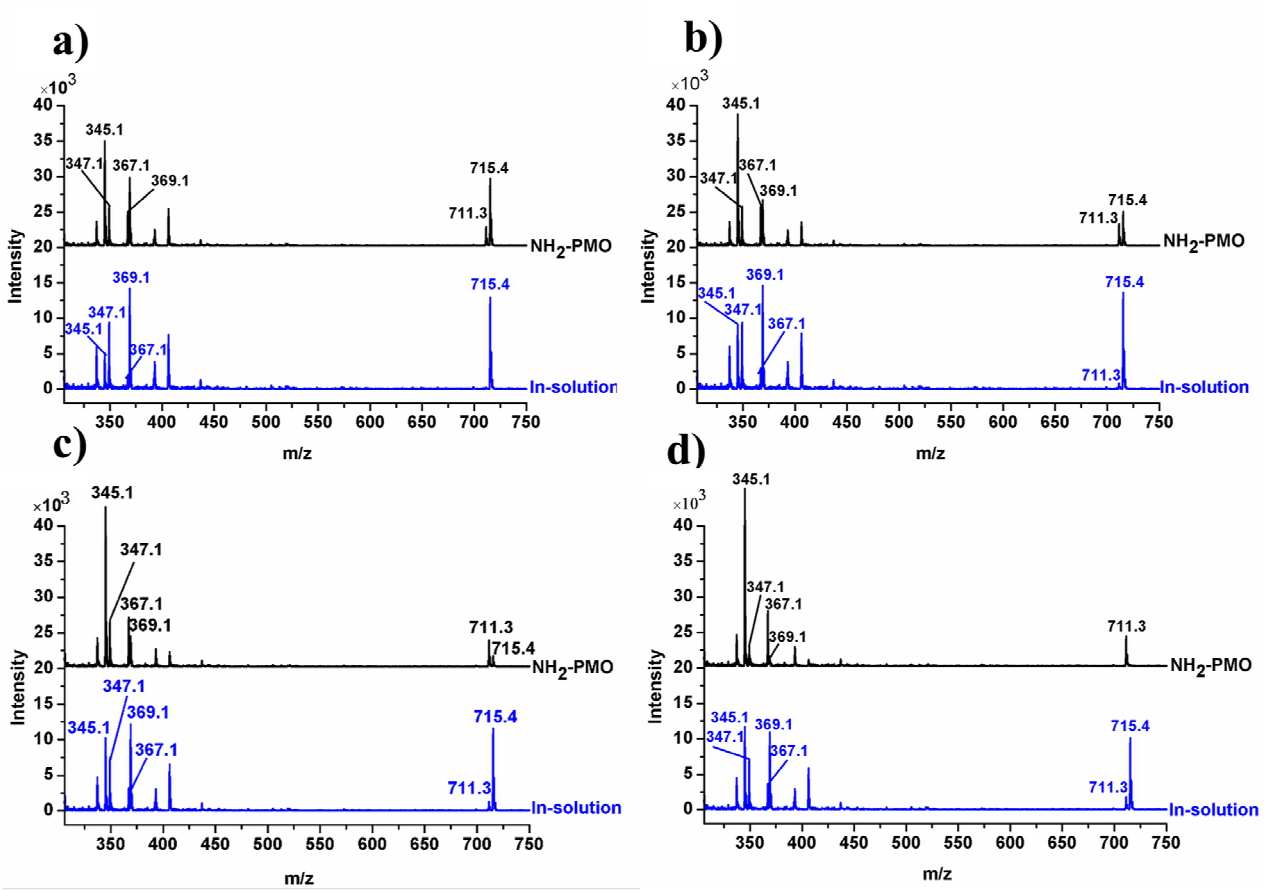

Figure S4. Mass spectra of nifedipine oxidation by human liver CYP3A4 microsomes with and without the assistance of NH_2-PMO at different time: a) 2 min, b) 10 min, c) 30 min, d) 60 min. The peaks of dehydronifedipine: *m/z* = 345.1 $[M+H]^+$, *m/z* = 367.1 $[M+Na]^+$ and *m/z* = 711.3 $[2M+Na]^+$; the peaks of nifedipine: *m/z* = 347.1 $[M+H]^+$, *m/z* = 369.1 $[M+Na]^+$ and *m/z* = 715.4 $[2M+Na]^+$.

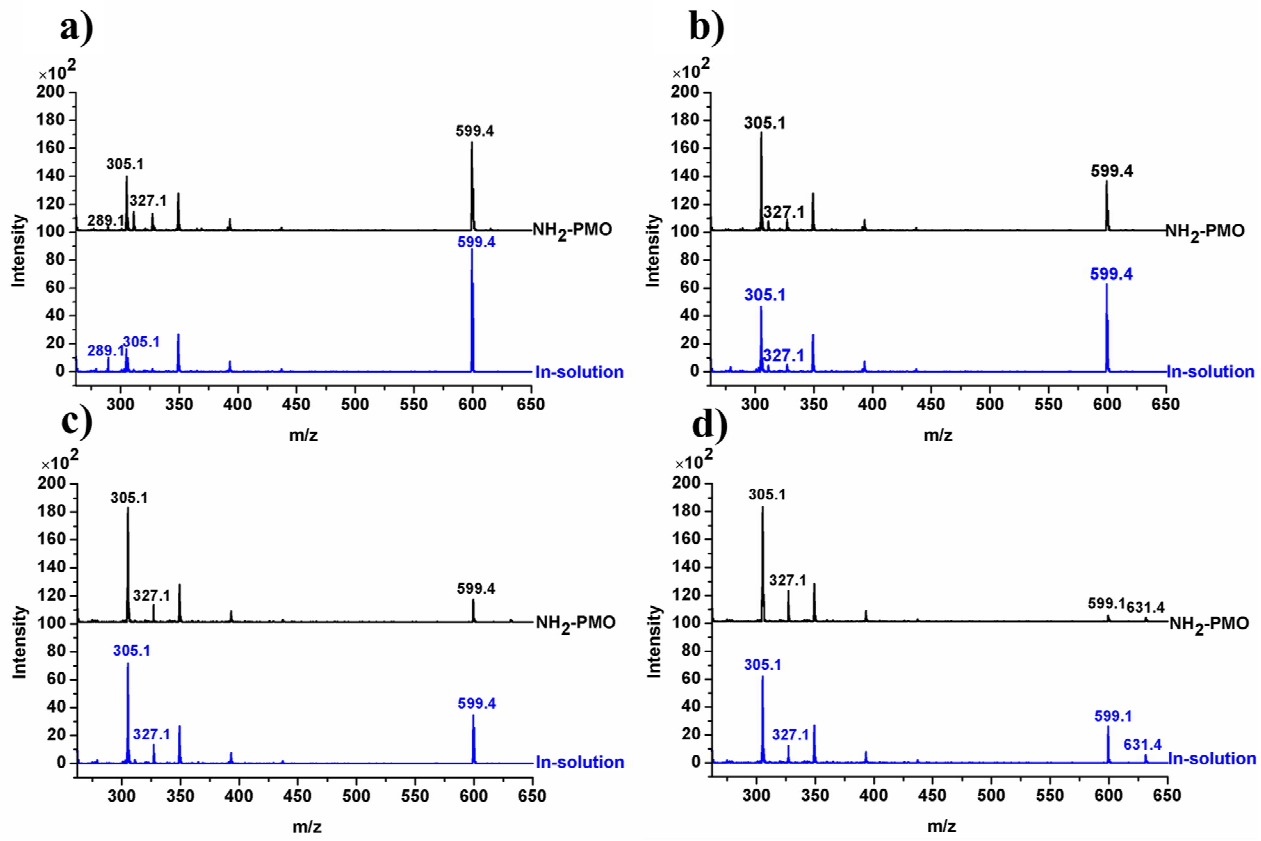

Figure S5. Mass spectra of testosterone oxidation by human liver CYP3A4 microsomes with and without the assistance of NH_2-PMO at different time: a) 2 min, b) 10 min, c) 30 min, d) 120 min. The peaks of OH-T: *m/z* = 305.1 $[M+H]^+$, *m/z* = 327.1 $[M+Na]^+$ and *m/z* = 631.4 $[2M+Na]^+$; the peaks of testosterone: *m/z* = 289.1 $[M+H]^+$ and *m/z* = 599.4 $[2M+Na]^+$.