

Electronic Supplementary Material

Reactions of cisplatin and oxaliplatin with penicillin G: implications for drug inactivation and biological activity

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Table S1. Penicillin G and its degradants in sample **a** detected by LTQ-MS

Species	<i>m/z</i> and relative abundance ^a	
	Condition I ^b	Condition II ^c
penicillin G	333.1 (100) 192.1 (7)	333.1 (100) 192.1 (31)
penicillonic acid		351.1 (7) 307.1 (27)
penilloic acid		307.1 (27) 229.2 (3)
penillic acid		333.1 (100) 289.1 (63)
isopenillic acid		333.1 (100) 255.2 (7)
penicilloaldehyde		176.1 (30) 145.1 (10),

^a The mass/charge ratios (*m/z*) are for deprotonated species with one negative charge observed in negative ion mode, and their abundances relative to penicillin G (set as 100) are shown in brackets.

^b In Condition I, potassium penicillin G was dissolved in deionized water, and detected by LTQ-MS immediately.

^c In Condition II, potassium penicillin G was dissolved in deionized water and incubated at 310 K for 24 h, and then detected by LTQ-MS.

Table S2. Penicillin G degradation and Pt coordination in various aqueous solutions

Aqueous solution	Penicillin G	Penicillin G and cisplatin	Penicillin G and oxaliplatin
Deionized water	100% degradants formed ($\tau_{1/2}$ =10.5 h) ^a	100% Pt- adducts formed ($\tau_{1/2}$ =4 h) ^a	18% Pt adducts formed ^b
PB	13% degradants formed ^a	74% Pt adducts formed ^a	43% Pt adducts formed ^b
PBS	11% degradants formed ^a	57% Pt adducts formed ^a	82% Pt adducts formed ^b

^a Sample incubated at 310 K for 72 h and monitored by UV-vis spectroscopy.

^b Sample incubated at 310 K for 24 h and monitored by ¹H NMR spectroscopy.

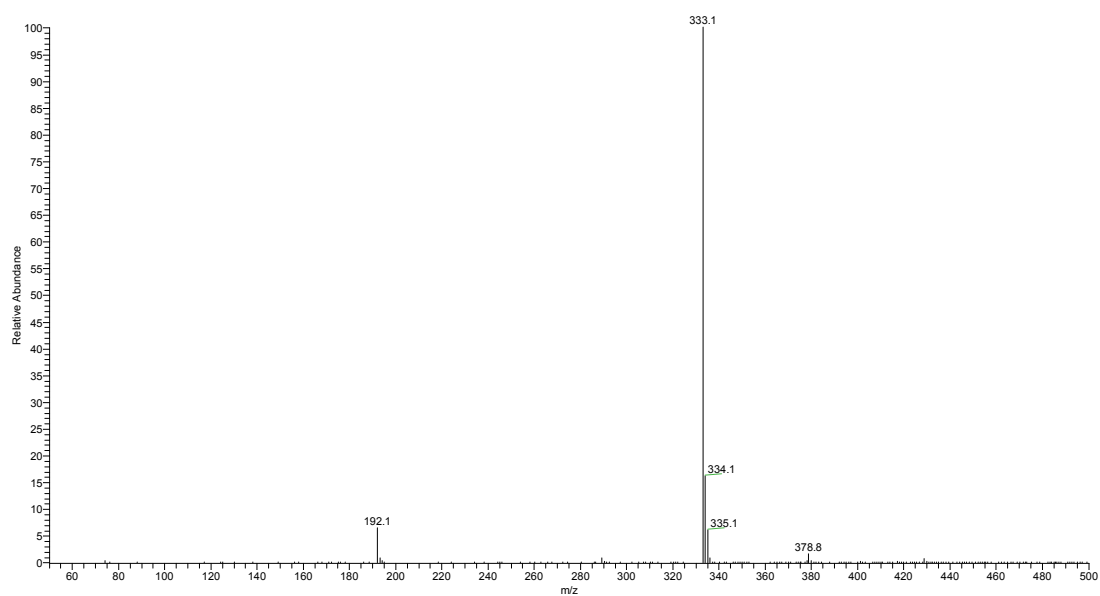


Figure S1. ESI-MS spectrum of potassium penicillin G in negative ion mode. The major ion (m/z 333.1) is $[M-K^+]$. Penicillin G potassium was dissolved in deionized water and then the spectrum recorded immediately by LTQ ESI-MS in negative-ion mode.

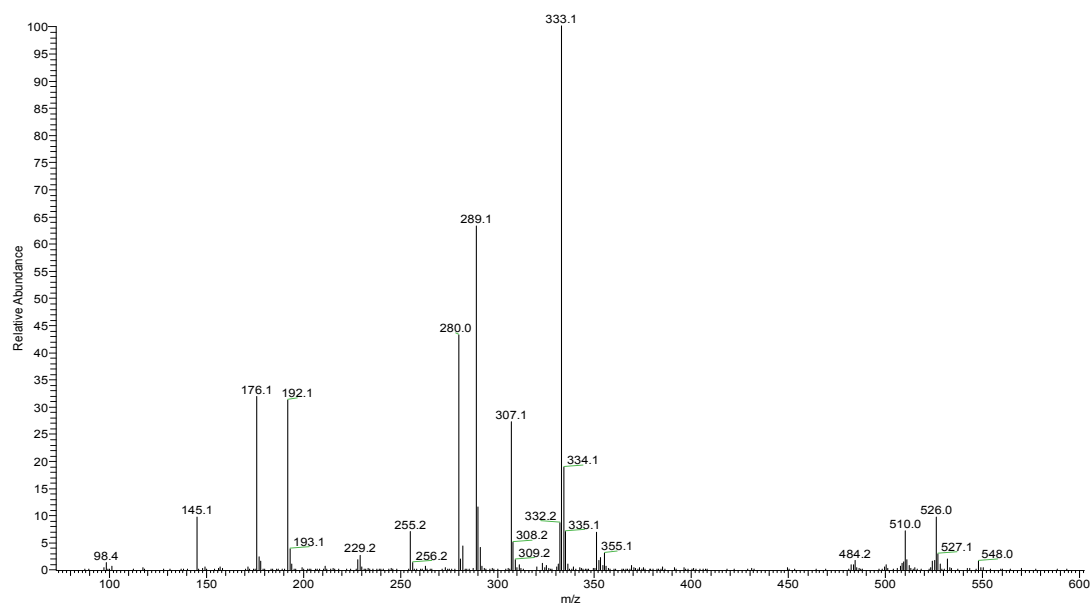


Figure S2. ESI-MS spectrum showing degradation of penicillin G in water. Penicillin G was dissolved in deionized water to 1 mM, and then incubated at 310 K for 24 h. Sample was diluted by 100-fold before LTQ ESI-MS in negative-ion mode was recorded.

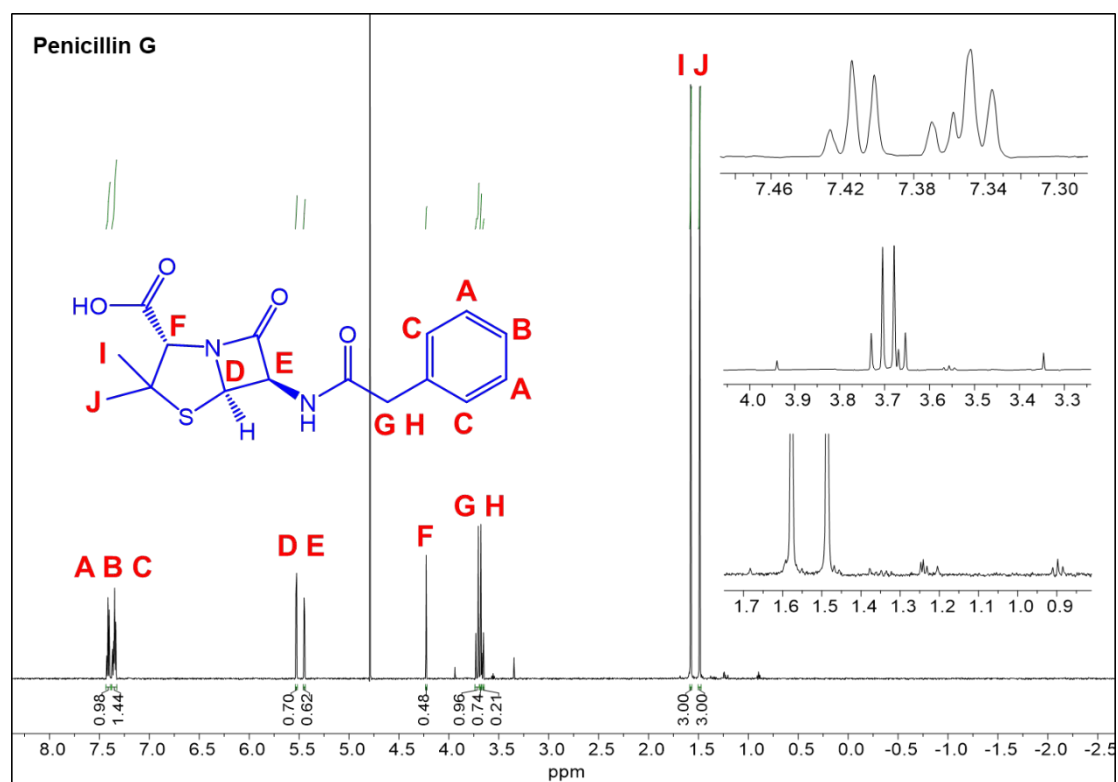


Figure S3. The ^1H NMR spectrum of penicillin G in 90% H_2O /10% D_2O (v/v).

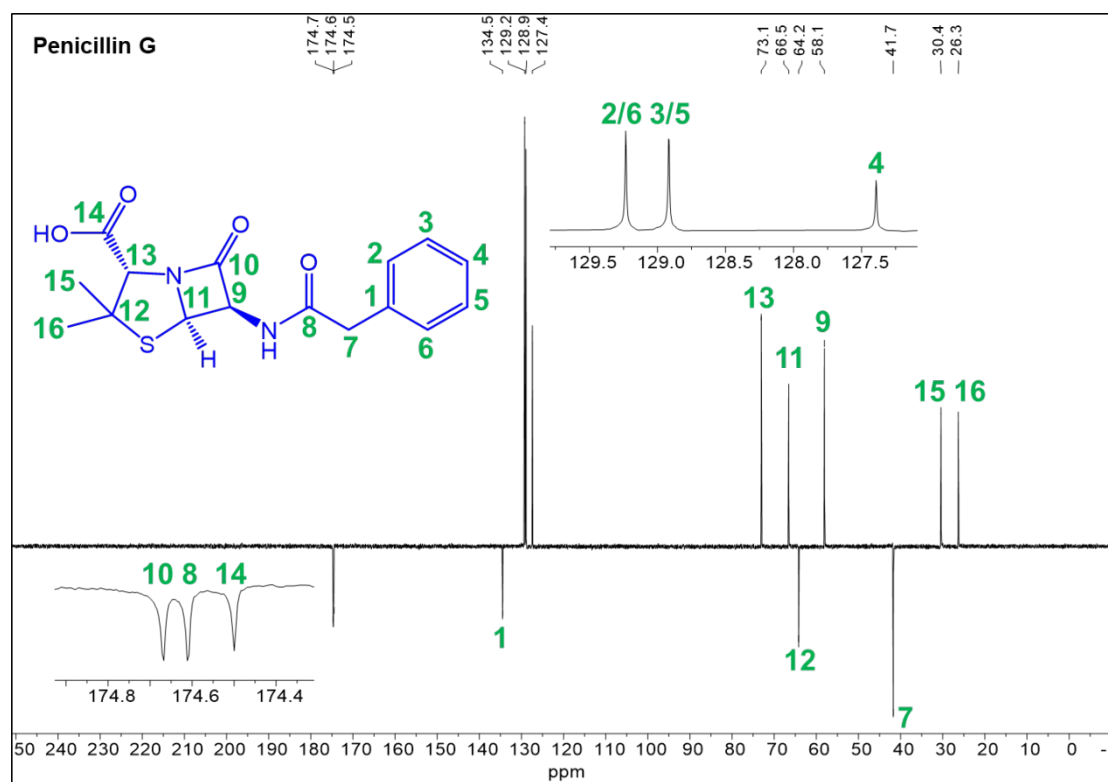


Figure S4. The ^{13}C J-modulated spin-echo NMR spectrum of penicillin G in 90% $\text{H}_2\text{O}/10\%$ D_2O (v/v).

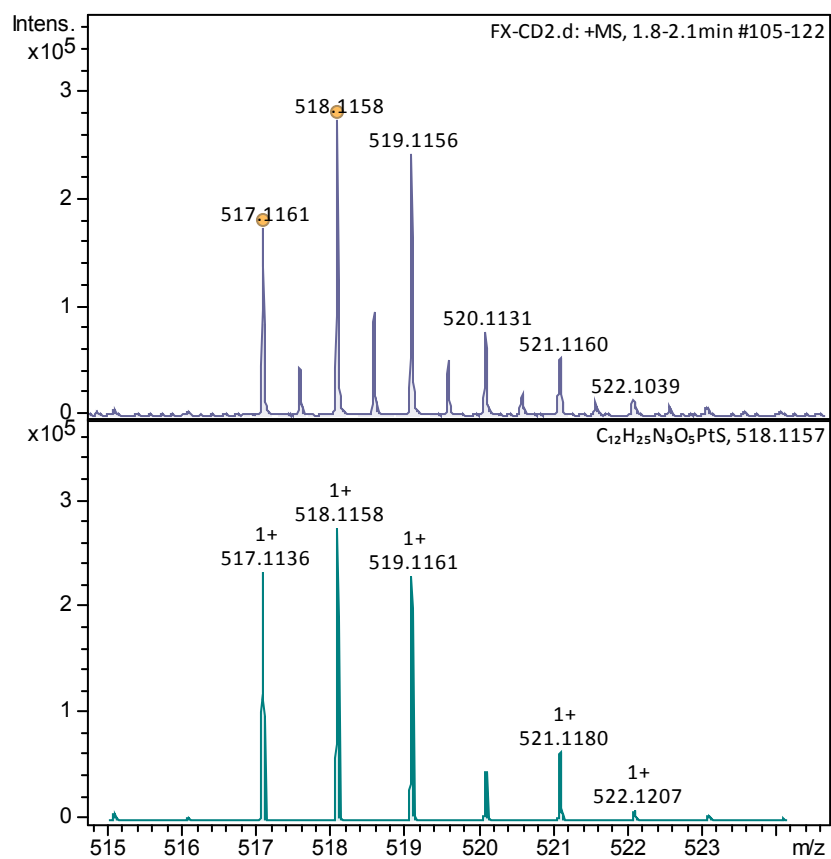


Figure S5. The mass spectrum of sample **d** after incubation at 310 K for 24 h. Top: observed mass spectrum. Bottom: simulated mass spectrum.

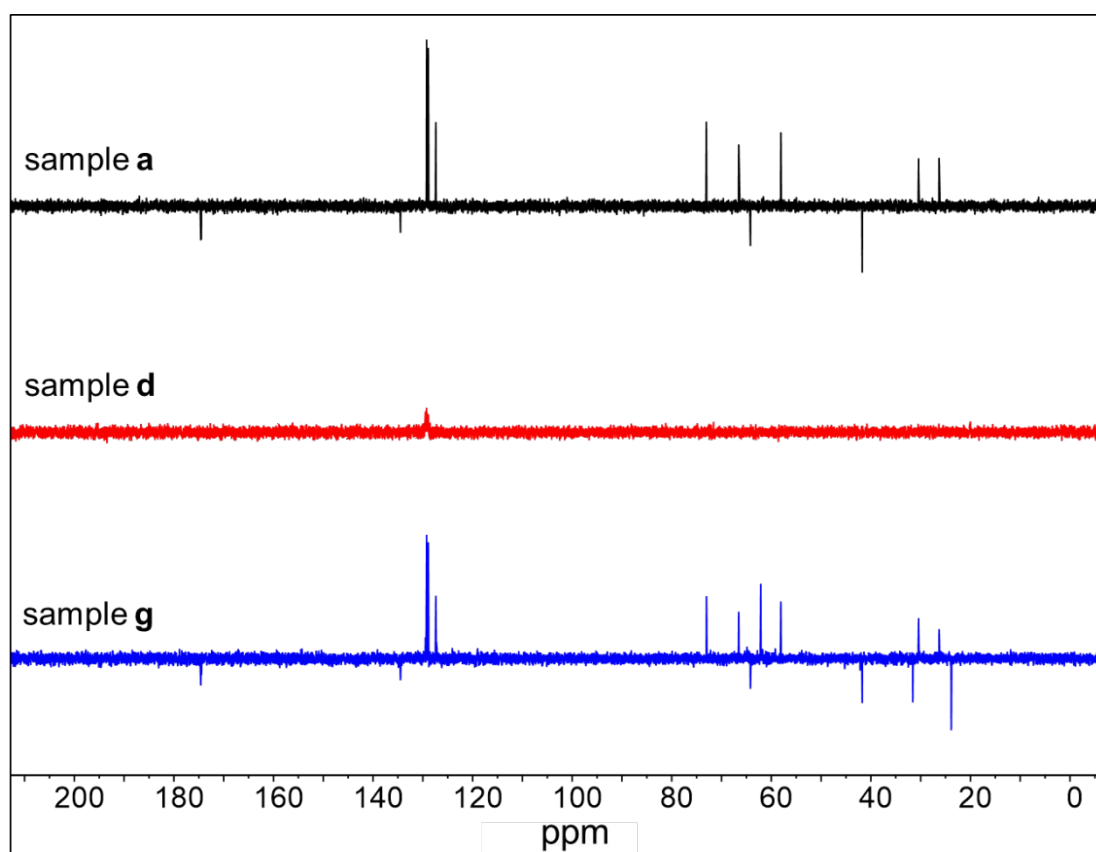


Figure S6. The ^{13}C J-modulated spin-echo spectra of sample **a** (1 mM penicillin G), sample **d** (1 mM cisplatin and 1 mM penicillin G), and sample **g** (1 mM oxaliplatin and 1 mM penicillin G) in 90% H_2O /10% D_2O (v/v). Samples were incubated at 310 K for 24 h before ^{13}C NMR spectra were recorded.

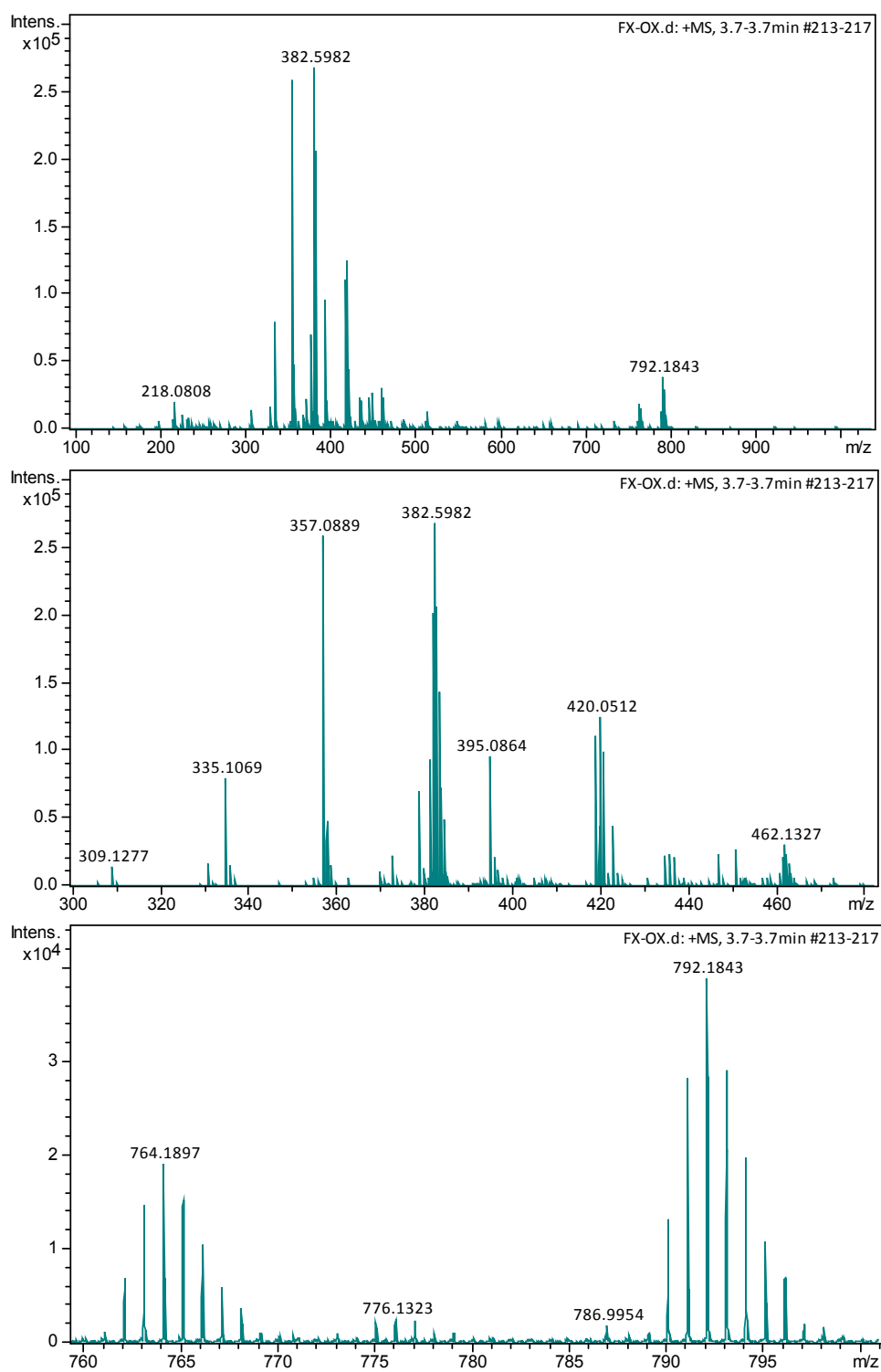


Figure S7. ESI-MS spectrum of sample g (1 mM oxaliplatin and 1 mM penicillin G) after incubation at 310 K for 24 h. Sample was diluted by 100-fold and then low resolution ESI-MS was recorded.