SUPPORTING INFORMATION

Targeted Cleavage of HIV RRE RNA by Rev-Coupled Transition Metal Chelates

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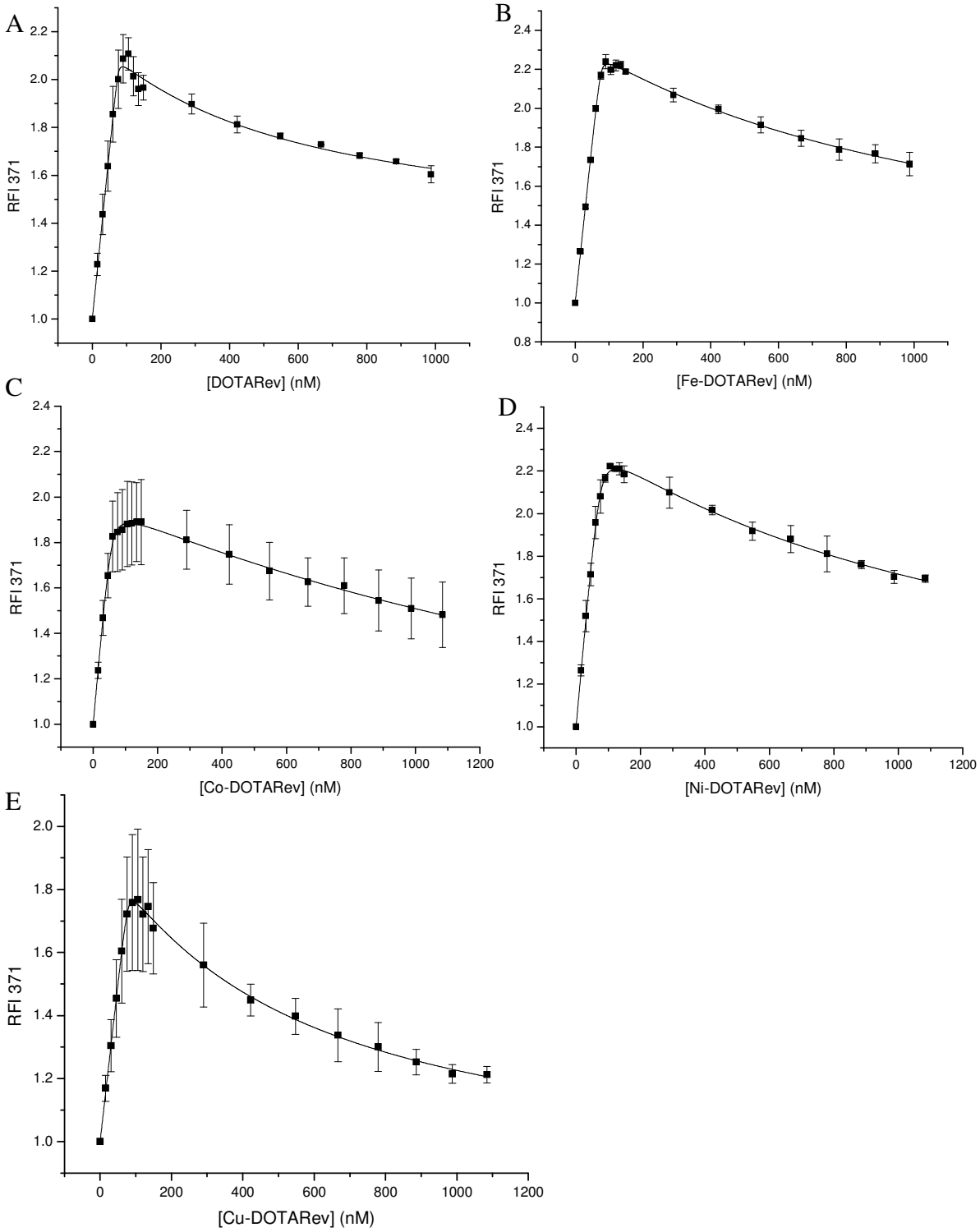

Figure SM1. Titration fluorescence response curves for binding of (A) DOTA-Rev, (B) Fe-DOTA-Rev, (C) Co-DOTA-Rev, (D) Ni-DOTA-Rev, and (E) Cu-DOTA-Rev to AP-RRE.

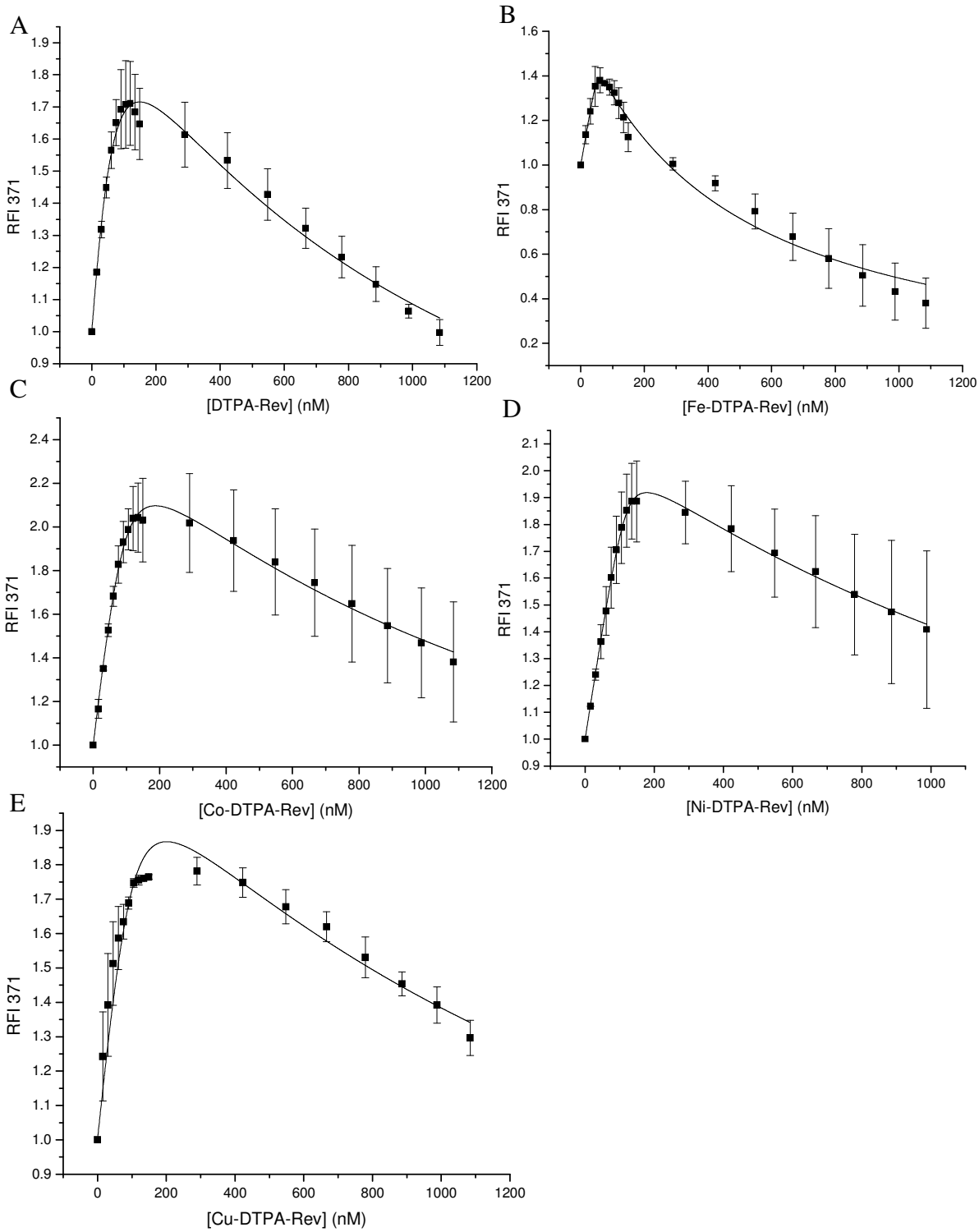

Figure SM2. Titration fluorescence response curves for binding of (A) DTPA-Rev, (B) Fe-DTPA-Rev, (C) Co-DTPA-Rev, (D) Ni-DTPA-Rev, and (E) Cu-DTPA-Rev to AP-RRE.

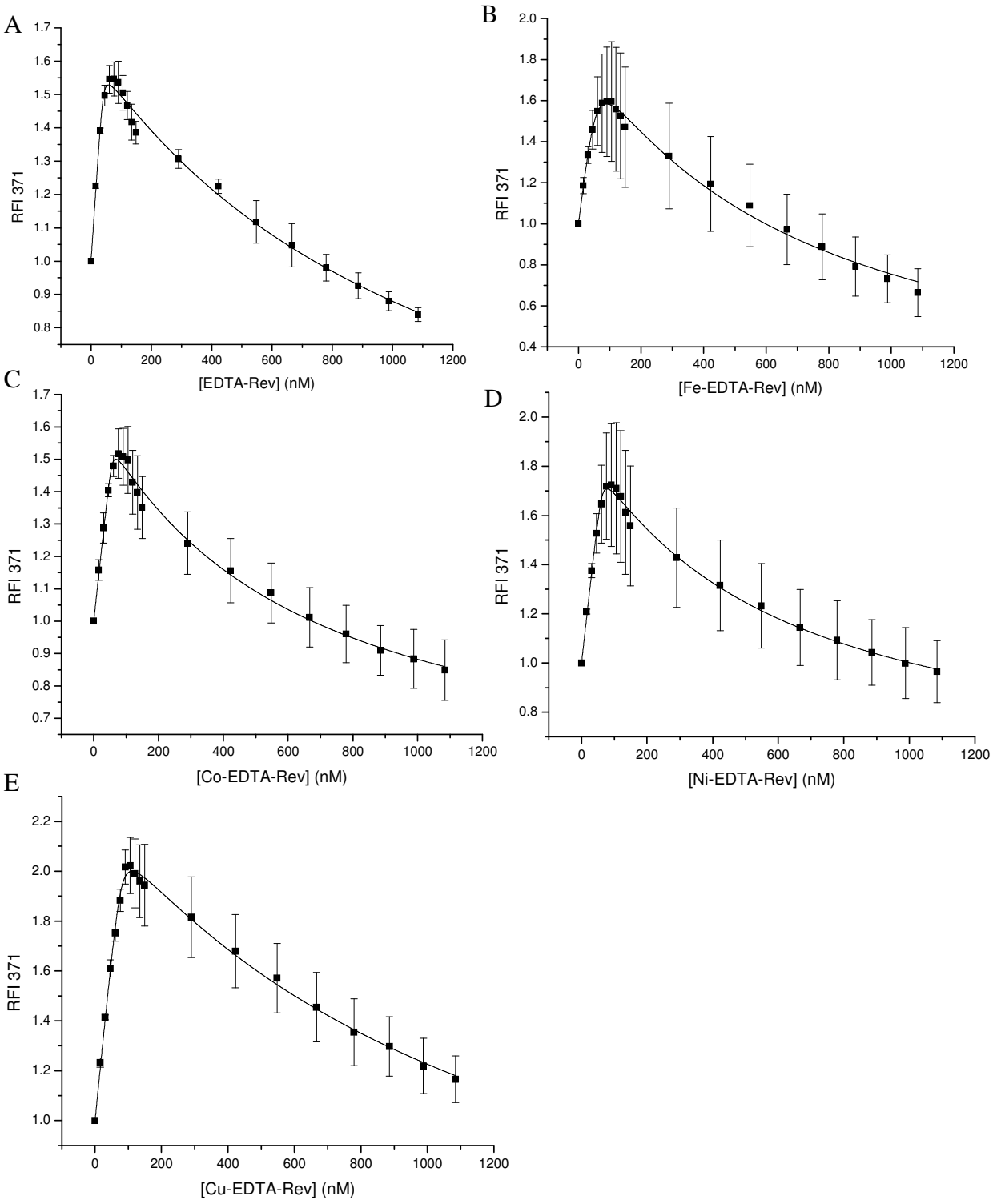

Figure SM3. Titration fluorescence response curves for binding of (A) EDTA-Rev, (B) Fe-EDTA-Rev, (C) Co-EDTA-Rev, (D) Ni-EDTA-Rev, and (E) Cu-EDTA-Rev to AP-RRE.

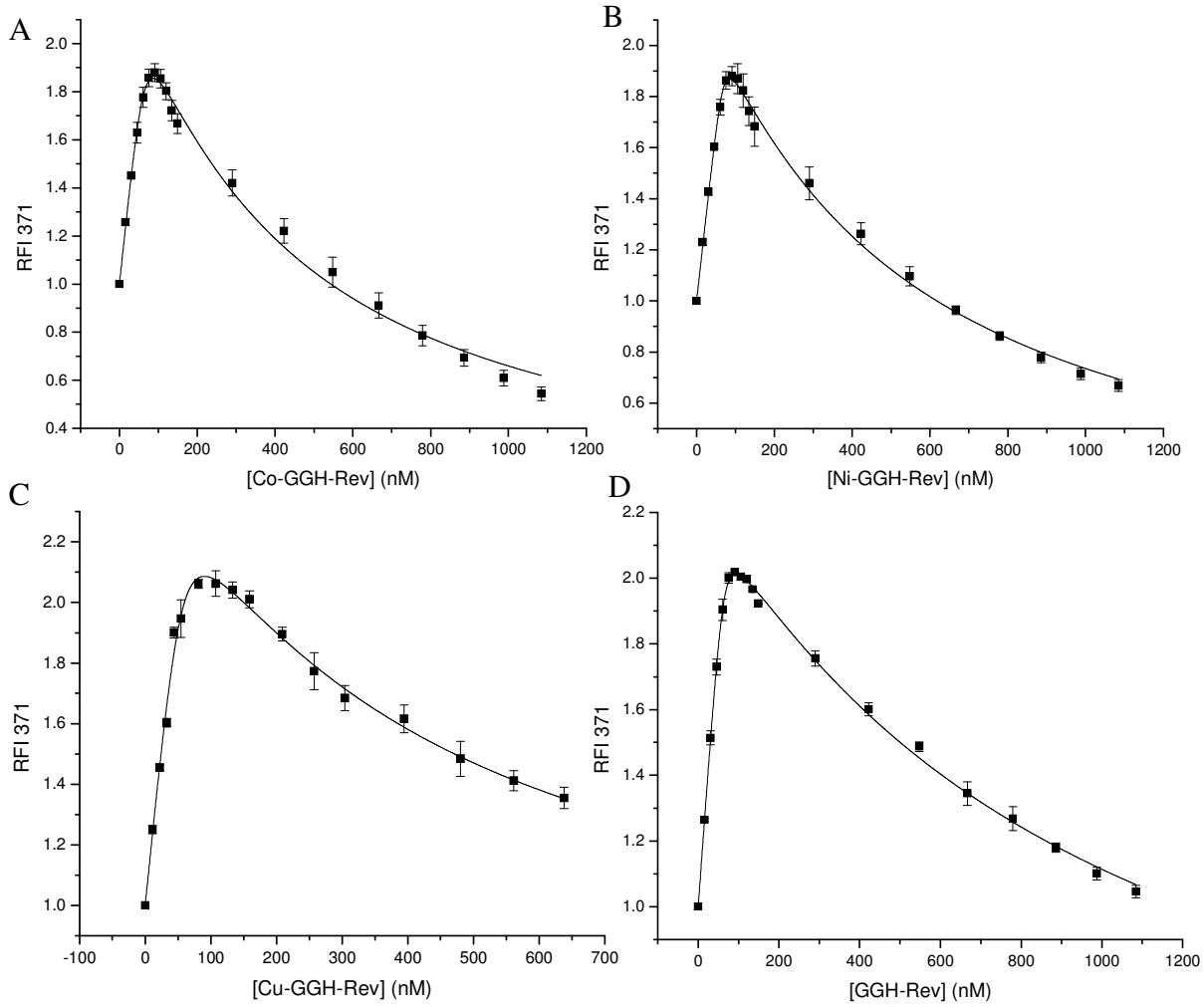

Figure SM4. Titration fluorescence response curves for binding of (A) Co-GGH-Rev, (B) Ni-GGH-Rev, (C) Cu-GGH-Rev and (D) GGH-Rev to the AP-RRE.

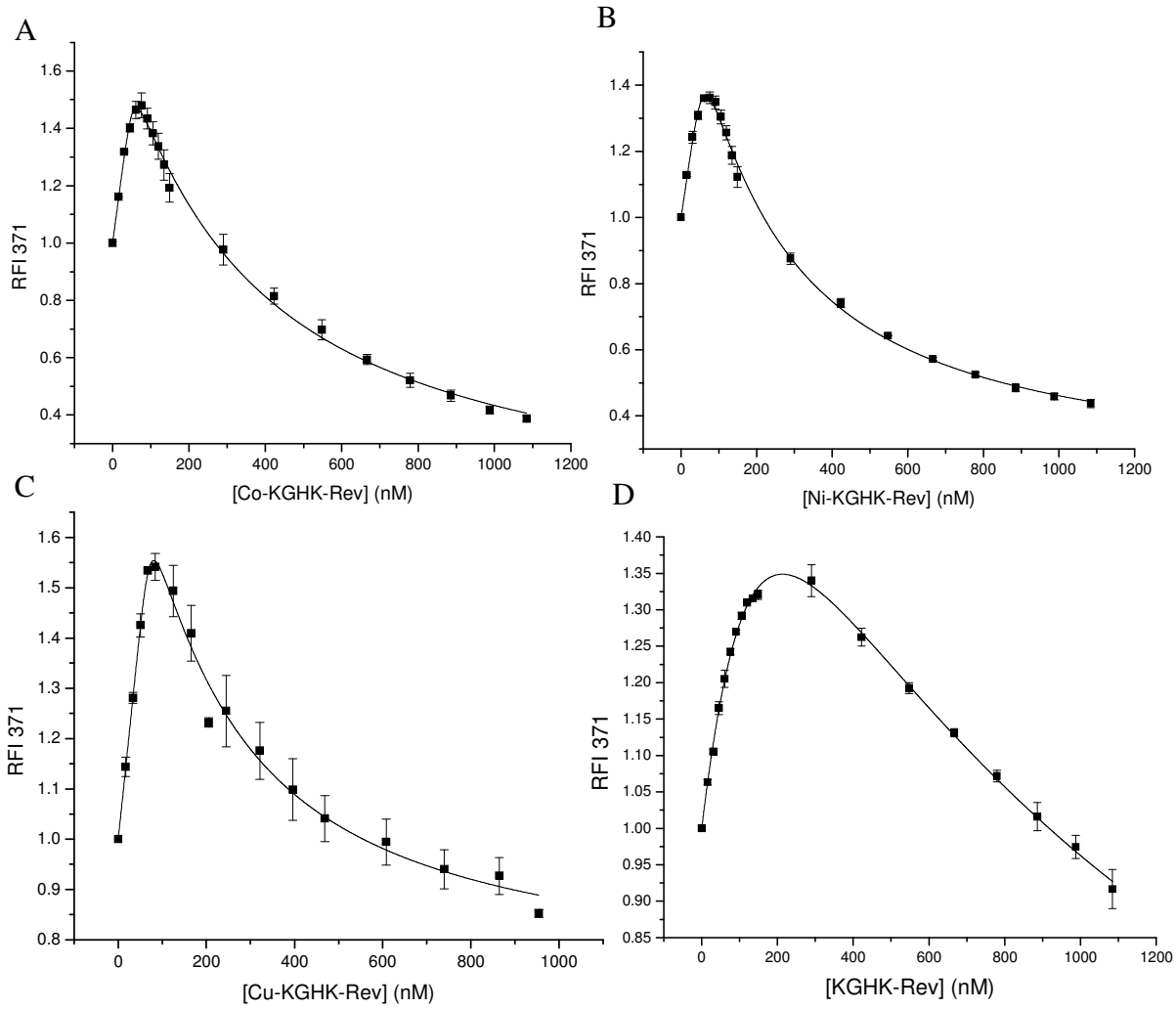

Figure SM5. Titration fluorescence response curves for binding of (A) Co-KGHK-Rev, (B) Ni-KGHK-Rev, (C) Cu-KGHK-Rev and (D) KGHK-Rev to the AP-RRE.

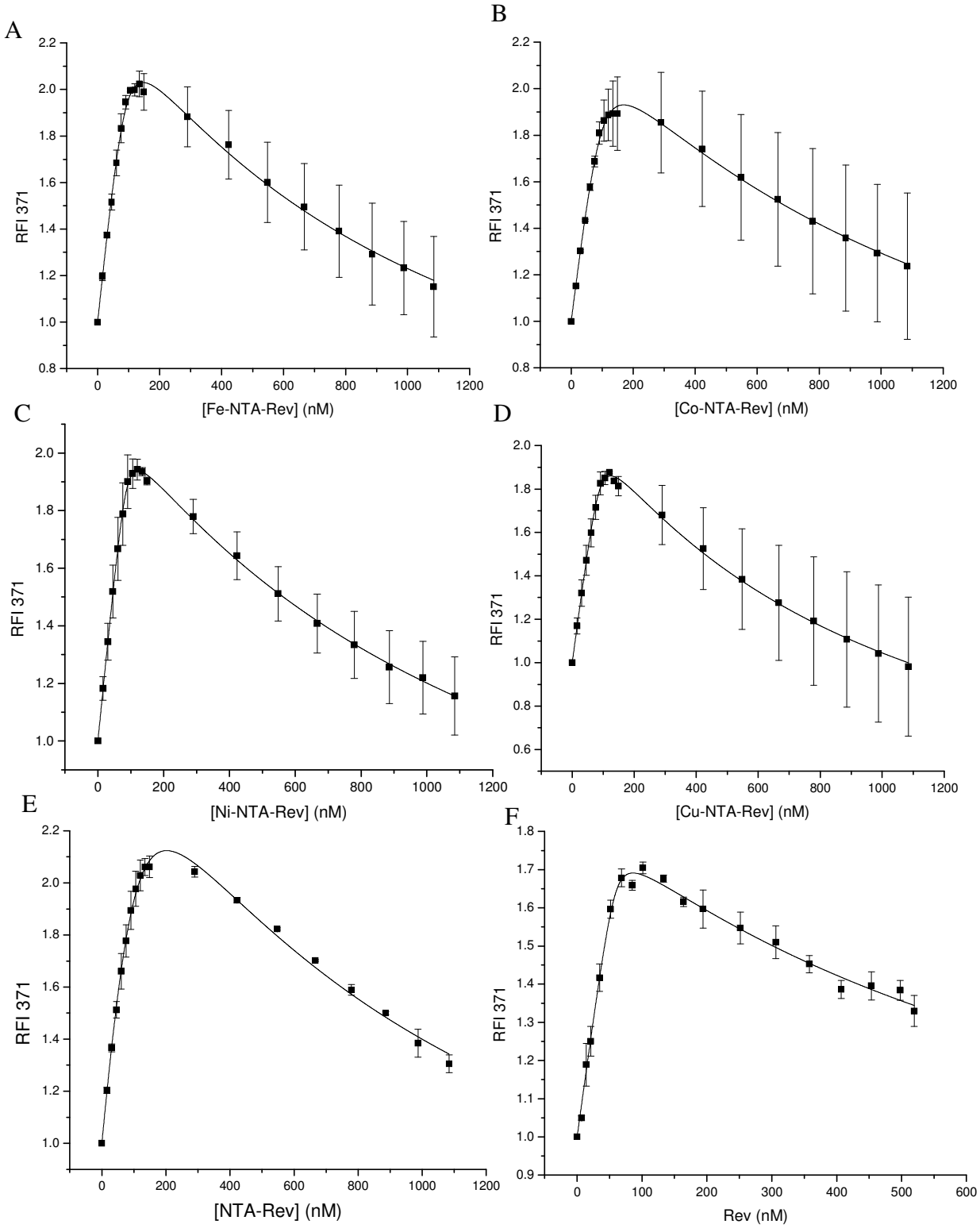

Figure SM6. Titration fluorescence response curves for binding of (A) Fe-NTA-Rev, (B) Co-NTA-Rev, (C) Ni-NTA-Rev, (D) Cu-NTA-Rev, (E) NTA-Rev, and (F) Rev peptide to the AP-RRE.

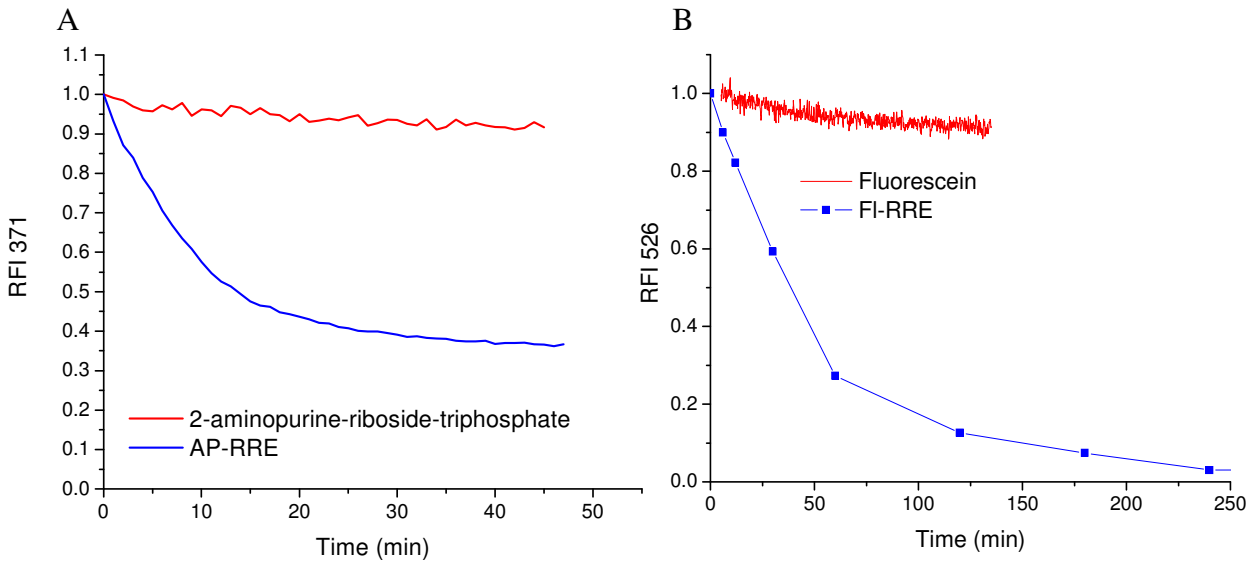

Figure SM7. Sample curves for reactions monitored by AP-RRE and Fl-RRE. This experiment demonstrates that the observed signal changes upon reaction of AP-RRE or Fl-RRE with M-chelate are indeed due to reaction with RNA, and not a result direct fluorophor quenching. The signal changes were only observed for RNA species. (A) Reactions contained 1 μM $CuCl_2$, 1 mM H_2O_2, and 500 nM of either AP-RRE or 2-aminopurine-riboside-triphosphate (AP-TP). (B) Reactions contained 1 μM $CuCl_2$, 1 mM H_2O_2, and 100 nM of either fluorescein (monitored via intrinsic fluorescein fluorescence in cuvette) or Fl-RRE (monitored by PAGE).

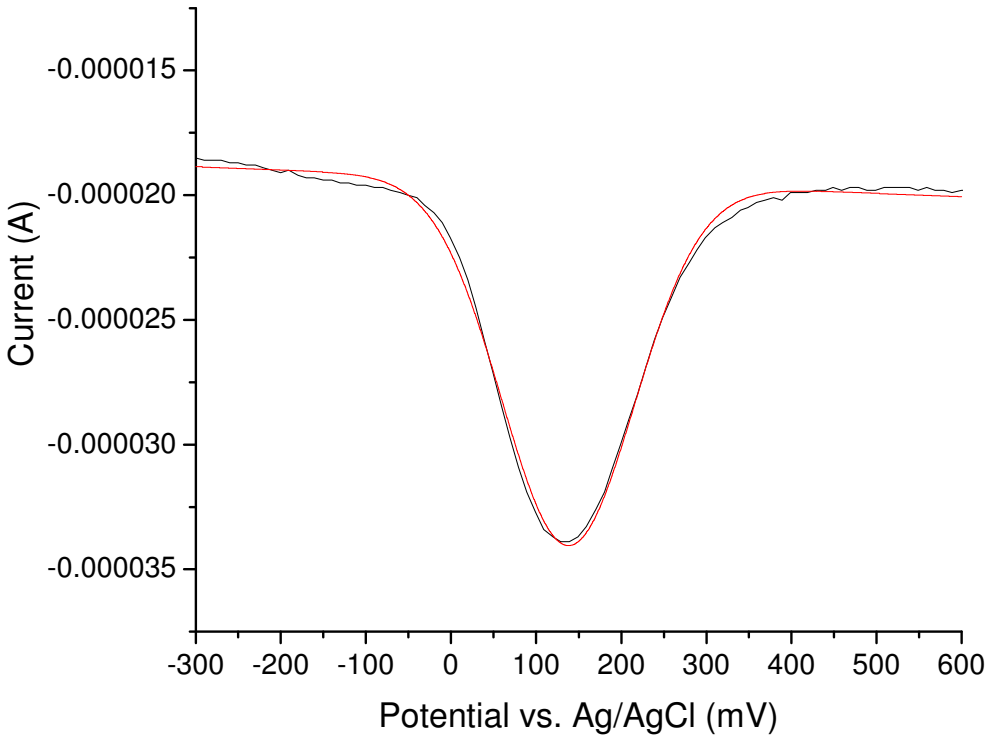

Figure SM8. Representative voltammogram for square wave voltammetry experiments, by which reduction potentials of M-chelates (Fe-DOTA shown here) were determined. Each reduction potential was later converted from potential vs. Ag/AgCl to potential vs. NHE.

Complex	ε_1 ($M^{-1}cm^{-1}$)	λ_1 (nm)	ε_2 ($M^{-1}cm^{-1}$)	λ_2 (nm)	log (β) of M^{2+}-chelate
Cu-DOTA	3700 ± 20	270	99 ± 5	720	22.3[a]
Ni-DOTA	4610 ± 20	240			20[a]
Co-DOTA	1858 ± 8	240			20.2[a]
Fe-DOTA	164 ± 6	400			20.22[b]
Cu-DTPA	4830 ± 80	290	100 ± 10	700	21.5[a]
Ni-DTPA	4400 ± 200	235			20.1[a]
Co-DTPA	1100 ± 40	240			19.3[a]
Fe-DTPA	8100 ± 300	260			16[a]
Cu-EDTA	3300 ± 100	270	100 ± 10	730	18.8[c]
Ni-EDTA	330 ± 30	240			18.56[c]
Co-EDTA	700 ± 60	240			16.03[d]
Fe-EDTA	8900 ± 300	250			14.3[c]
Cu-GGH	4180 ± 60	250	108 ± 5	525	15.9[e]
Ni-GGH	10900 ± 300	245	170 ± 40	430	16[f]
Co-GGH	2500 ± 50	250			> 7[g]
Cu-KGHK	3930 ± 50	250	116 ± 4	525	16[e]
Ni-KGHK	12900 ± 200	245	150 ± 30	430	16[f]
Co-KGHK	6020 ± 70	240			> 6[g]
Cu-NTA	2790 ± 80	250	50 ± 2	700	12.68[c]
Ni-NTA	200 ± 100	232			11.26[c]
Co-NTA	440 ± 40	240	30 ± 2	520	10.6[c]
Fe-NTA	6700 ± 100	250			8.84[c]

Table SM1. Summary of the experimentally determined extinction coefficients (ε) at specific wavelengths (λ) and stability constants (β) for the metal-chelates studied. Extinction coefficients were determined from linear fits of absorbance vs. metal-chelate concentration. [a] Anderegg et al. (2005).[1] [b] Martell et al. (1996).[2] [c] Furia (1972).[3] [d] Ogino et al. (1983).[4] [e] Lau et al. (1974).[5] [f] Long et al. (1999).[6] [g] Determined by metal titration, monitored by absorbance at the specified wavelength; this technique provided a lower limit for the stability constant.

Complex	ε_1 ($M^{-1}cm^{-1}$)	λ_1 (nm)	ε_2 ($M^{-1}cm^{-1}$)	λ_2 (nm)
Cu-DOTA-Rev	3600 ± 300	270	170 ± 40	720
Ni-DOTA-Rev	3700 ± 200	240		
Co-DOTA-Rev	2000 ± 300	240		
Fe-DOTA-Rev	1000 ± 200	400		
Cu-DTPA-Rev	3810 ± 90	290	70 ± 10	700
Ni-DTPA-Rev	2900 ± 700	235		
Co-DTPA-Rev	1300 ± 300	240		
Fe-DTPA-Rev	10000 ± 1000	260		
Cu-EDTA-Rev	4200 ± 200	270	150 ± 40	730
Ni-EDTA-Rev	2100 ± 400	240		
Co-EDTA-Rev	1200 ± 200	240		
Fe-EDTA-Rev	11000 ± 2000	250		
Cu-GGH-Rev	3460 ± 80	250	134 ± 6	525
Ni-GGH-Rev	9100 ± 700	245	130 ± 20	430
Co-GGH-Rev	2800 ± 400	250		
Cu-KGHK-Rev	3720 ± 60	250	106 ± 6	525
Ni-KGHK-Rev	11200 ± 600	245	160 ± 20	430
Co-KGHK-Rev	7200 ± 900	240		
Cu-NTA-Rev	3000 ± 200	250	60 ± 2	700
Ni-NTA-Rev	100 ± 100	232		
Co-NTA-Rev	2800 ± 400	240	40 ± 10	520
Fe-NTA-Rev	4000 ± 300	250		

Table SM2. Summary of the experimentally determined extinction coefficients (ε) at specific wavelengths (λ) for the metal-chelate-Rev complexes studied. Extinction coefficients were determined from linear fits of absorbance vs. metal-chelate-Rev concentration. Absorbance by the chelate-Rev peptides (primarily due to the internal tryptophan residue and amides) was subtracted from the absorbance by the metal-chelate-Rev complexes, so that the reported extinction coefficients reflect only the metal-chelate portion of the metal-chelate-Rev complexes, allowing comparison of the extinction coefficients of the metal-chelate-Rev complexes with the respective metal-chelates lacking Rev.

	Fe(II)	Co(II)	Ni(II)	Cu(II)
DOTA	0.077 ± 0.002	0.073 ± 0.001	< 0.001	0.104 ± 0.001
DTPA	0.15 ± 0.02	0.45 ± 0.03	0.15 ± 0.01	0.2 ± 0.1
EDTA	0.123 ± 0.006	0.22 ± 0.03	0.41 ± 0.01	0.43 ± 0.01
GGH		0.07 ± 0.01	0.240 ± 0.005	0.218 ± 0.004
KGHK		0.103 ± 0.001	0.122 ± 0.002	0.315 ± 0.006
NTA	0.110 ± 0.001	0.085 ± 0.001	0.056 ± 0.001	0.39 ± 0.02

Table SM3. Summary of observed rates from the AP-fluorescence assay for RRE RNA modification (nM/min) by metal-chelates lacking Rev (also illustrated in Figure 4 of the manuscript).

SM References

(1) Anderegg, G.; Arnaud-Neu, F.; Delgado, R.; Felcman, J.; Popov, K. *Pure Appl. Chem.* **2005**, *77*, 1445.
(2) Martell, A. E.; Motekaitis, R. J.; Chen, D.; Hancock, R. D.; McManus, D. *Can. J. Chem.* **1996**, *74*, 1872.
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(6) Long, E. C. *Acc. Chem. Res.* **1999**, *32*, 827.

Reference (1) from main text

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