Table S1. Data from Figure 1 a - Fe

time	simultaneously		1 day lag time		2 days lag time		DMA-only		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	9.9	0.4	5.0	0.2	4.4	0.1	3.1	0.4	0.2	0.1
0.5	13.3	0.2	6.8	0.1	6.0	0.0	4.2	0.1		
1	15.6	0.2	9.7	0.2	8.6	0.0	5.9	0.1	0.1	0.1
2	15.5	0.1	12.0	0.0	11.0	0.0	8.5	0.2		
4	13.1	0.4	13.1	0.1	13.3	0.1	12.4	0.2		
8	10.2	0.1	12.5	0.1	13.8	0.1	16.3	0.3	0.0	0.2
24	6.0	0.2	7.5	0.2	9.7	0.0	20.0	0.2	0.0	0.0
48	3.9	0.0	4.9	0.1	5.9	0.6	18.6	0.2		
96	2.2	0.1	2.8	0.1	4.2	0.3	14.8	0.2		
168	1.8	0.5	1.5	0.8	3.2	0.2	10.9	0.2	0.0	0.1

Data from Figure 1b - Ni

Time	simultaneously		1 day lag time		2 days lag time		DMA-only		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	4.4	0.0	2.3	0.0	1.9	0.1	0.6	0.0	0.2	0.1
0.5	5.4	0.0	3.2	0.0	2.7	0.1	0.8	0.1		
1	6.6	0.1	4.2	0.0	3.6	0.1	1.0	0.1	0.2	0
2	7.7	0.1	5.2	0.0	4.6	0.1	1.5	0.0		
4	8.9	0.1	6.5	0.1	5.6	0.0	1.9	0.0		
8	9.9	0.0	7.9	0.0	6.9	0.0	2.4	0.1	0.1	0
24	11.7	0.1	10.3	0.1	9.4	0.1	3.5	0.1	0.1	0
48	12.9	0.1	11.7	0.1	10.8	0.0	4.4	0.1		
96	13.7	0.1	12.9	0.1	11.9	0.1	5.5	0.1		
168	14.7	0.1	13.4	0.1	13.1	0.1	6.9	0.1	0.2	0

Data from Figure 1c - Co

time	simultaneously		1 day lag time		2 days lag time		DMA-only		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	9.8	0.1	4.9	0.0	3.9	0.1	0.2	0.0	0.1	0
0.5	10.6	0.2	5.7	0.1	4.6	0.0	0.2	0.0		
1	11.4	0.1	6.6	0.1	5.4	0.1	0.3	0.0	0.2	0
2	12.0	0.1	7.5	0.1	6.2	0.1	0.4	0.0		
4	12.6	0.1	8.4	0.1	6.8	0.0	0.5	0.1		
8	12.8	0.0	9.6	0.1	7.9	0.1	0.6	0.0	0.1	0
24	13.6	0.1	11.8	0.1	10.5	0.2	1.4	0.0	0.1	0
48	14.8	0.1	13.3	0.2	12.1	0.0	2.3	0.0		
96	16.4	0.1	15.6	0.2	14.0	0.2	4.2	0.1		
168	18.3	0.9	16.0	1.0	15.7	0.1	6.8	0.0	0.1	0

Data from Figure 1d - Mn

time	simultaneously		1 day lag time		2 days lag time		DMA-only		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	39.9	0.2	32.1	0.3	24.7	0.2	1.2	0.1	29.2	0.3
0.5	38.5	0.1	31.3	0.4	24.8	0.1	1.2	0.0		
1	36.9	0.6	29.0	0.3	23.4	0.2	1.1	0.0	31.9	0.3
2	34.7	0.3	26.9	0.1	22.6	0.1	1.1	0.1		
4	32.2	0.3	24.7	0.2	19.4	0.1	0.9	0.0		
8	28.7	0.2	23.0	0.1	18.1	0.1	0.7	0.0	26.5	0.3
24	24.4	0.4	21.6	0.1	18.1	0.3	0.6	0.1	23.3	0.4
48	22.2	0.1	20.2	0.2	17.6	0.3	0.8	0.1		
96	18.5	0.1	17.5	0.1	15.4	0.3	-0.2	0.1		
168	19.6	2.0	17.9	0.5	17.1	0.1	0.7	0.1	17.5	0.6

Table S2. Data from Figure 2 – a) Fe

time	DMA-only		0.1 mM Ascorbate + DMA		0.3 mM Ascorbate + DMA		1.0 mM Ascorbate + DMA		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	3.1	0.4	5.0	0.1	8.7	0.2	9.9	0.4	0.2	0.1
0.5	4.2	0.1	6.4	0.1	11.7	0.1	13.3	0.2		
1	5.9	0.1	8.6	0.1	13.8	0.2	15.6	0.2	0.1	0.1
2	8.5	0.2	11.4	0.3	16.8	0.2	15.5	0.1		
4	12.4	0.2	15.3	0.1	19.5	0.2	13.1	0.4		
8	16.3	0.3	18.4	0.1	20.2	0.1	10.2	0.1	0.0	0.2
24	20.0	0.2	19.7	0.1	17.2	0.1	6.0	0.2	0.0	0.0
48	18.6	0.2	17.5	0.1	13.6	0.2	3.9	0.0		
96	14.8	0.2	13.3	0.3	9.3	0.1	2.2	0.1		
168	10.9	0.2	9.5	0.2	6.2	0.1	1.8	0.5	0.0	0.1

Data from Figure 2 – b) Ni

time	DMA-only		0.1 mM Ascorbate + DMA		0.3 mM Ascorbate + DMA		1.0 mM Ascorbate + DMA		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.6	0.0	1.0	0.0	1.9	0.0	4.4	0.0	0.2	0.1
0.5	0.8	0.1	1.3	0.0	2.4	0.0	5.4	0.0		
1	1.0	0.1	1.6	0.0	2.9	0.0	6.6	0.1	0.2	0.0
2	1.5	0.0	2.1	0.0	3.6	0.0	7.7	0.1		
4	1.9	0.0	2.6	0.0	4.3	0.1	8.9	0.1		
8	2.4	0.1	3.2	0.0	4.9	0.0	9.9	0.0	0.1	0.0
24	3.5	0.1	4.4	0.0	6.3	0.1	11.7	0.1	0.1	0.0
48	4.4	0.1	5.3	0.0	7.4	0.0	12.9	0.1		
96	5.5	0.1	6.5	0.0	8.5	0.1	13.7	0.1		
168	6.9	0.1	7.8	0.1	9.6	0.1	14.7	0.1	0.2	0.0

Data from Figure 2 – c) Co

time	DMA-only		0.1 mM Ascorbate + DMA		0.3 mM Ascorbate + DMA		1.0 mM Ascorbate + DMA		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.2	0.0	1.2	0.1	3.4	0.0	9.8	0.1	0.1	0.0
0.5	0.2	0.0	1.4	0.1	3.8	0.0	10.6	0.2		
1	0.3	0.0	1.5	0.0	4.3	0.1	11.4	0.1	0.2	0.0
2	0.4	0.0	1.8	0.1	4.7	0.0	12.0	0.1		
4	0.5	0.1	2.1	0.0	5.2	0.1	12.6	0.1		
8	0.6	0.0	2.5	0.0	5.8	0.1	12.8	0.0	0.1	0.0
24	1.4	0.0	3.8	0.1	7.5	0.1	13.6	0.1	0.1	0.0
48	2.3	0.0	5.2	0.1	9.5	0.0	14.8	0.1		
96	4.2	0.1	7.6	0.0	12.3	0.1	16.4	0.1		
168	6.8	0.0	10.1	0.1	14.9	0.0	18.3	0.9	0.1	0.0

Data from Figure 2 – d) Mn

time	DMA-only		0.1 mM Ascorbate + DMA		0.3 mM Ascorbate + DMA		1.0 mM Ascorbate + DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	1.2	0.1	4.2	0.1	12.6	0.1	39.9	0.2
0.5	1.2	0.0	4.3	0.2	12.1	0.0	38.5	0.1
1	1.1	0.0	4.1	0.1	11.8	0.1	36.9	0.6
2	1.1	0.1	3.9	0.1	10.9	0.1	34.7	0.3
4	0.9	0.0	3.5	0.0	10.0	0.2	32.2	0.3
8	0.7	0.0	3.1	0.1	8.7	0.1	28.7	0.2
24	0.6	0.1	2.6	0.1	7.4	0.2	24.4	0.4
48	0.8	0.1	2.7	0.1	7.1	0.1	22.2	0.1
96	-0.2	0.1	1.5	0.1	5.6	0.1	18.5	0.1
168	0.7	0.1	2.5	0.1	6.2	0.1	19.6	2.0

time	0.1 mM Ascorbate		0.3 mM Ascorbate		1.0 mM Ascorbate	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	2.2	0.1	7.90	0.10	29.2	0.3
1	2.1	0.1	7.9	0.1	31.9	0.3
8	1.9	0.1	7.1	0.1	26.5	0.3
24	1.9	0.1	6.3	0.3	23.3	0.4
168	1.7	0.1	5.4	0.3	17.5	0.6

Table S3. Data Figure 3 - Metal mobilization rates

Ascorbate concentration	**Rate Mn total**		**Rate Mn ascorbate**		**Rate Fe**		**Rate Co**		**Rate Ni**	
µM	average nM s^{-1}	stan.dev. nM s^{-1}	average nM s^{-1}	stan.dev. nM s^{-1}	average nM s^{-1}	stan.dev. nM s^{-1}	average nM s^{-1}	stan.dev. nM s^{-1}	average nM s^{-1}	stan.dev. nM s^{-1}
0.0	1.4	0.1	0.0	0.1	3.5	0.5	0.2	0.0	0.7	0.0
0.1	4.6	0.1	2.4	0.1	5.5	0.1	1.3	0.1	1.1	0.0
0.3	14.0	0.1	8.8	0.1	9.7	0.2	3.8	0.0	2.1	0.0
1.0	44.3	0.3	32.5	0.3	11.0	0.5	10.9	0.1	4.9	0.0

Table S4. Data from Figure 4: Fe

time	DMA-only		0.1 mM Ascorbate + DMA		0.3 mM Ascorbate + DMA		1.0 mM Ascorbate + DMA		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	3.1	0.1	4.7	0.2	8.8	0.1	11.5	0.1	0.2	0.1
0.5	4.3	0.3	6.2	0.1	11.0	0.1	15.8	0.4		
1	6.2	0.1	8.6	0.1	13.8	0.1	18.6	0.2	0.1	0.1
2	8.8	0.1	11.3	0.1	17.3	0.2	18.7	0.4		
4	12.2	0.1	15.1	0.1	20.1	0.1	15.8	0.2		
8	15.9	0.2	17.0	0.4	19.4	0.1	10.7	0.3	0.2	0.2
24	0.2	0.0	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1

Table S5. Data from Figure 5 – a) Fe

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.35	0.14	0.6	0.1	9.9	0.4	0.2	0.1
0.5	0.1	0.1	0.7	0.1	13.3	0.2		
1	0.2	0.1	0.6	0.1	15.6	0.2	0.1	0.1
2	0.1	0.2	0.7	0.1	15.5	0.1		
4	0.1	0.2	0.5	0.1	13.1	0.4		
8	0.1	0.1	0.4	0.1	10.2	0.1	0.0	0.2
24	0.1	0.0	0.4	0.0	6.0	0.2	0.0	0.0
48	0.1	0.0	0.2	0.1	3.9	0.0		
96	0.0	0.1	0.1	0.1	2.2	0.1		
168	0.1	0.1	0.1	0.1	1.8	0.5	0.0	0.1

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	1.4	0.0	2.6	0.2	3.1	0.4
0.5	1.7	0.2	3.3	0.1	4.2	0.1
1	1.9	0.0	4.5	0.3	5.9	0.1
2	1.5	0.0	5.3	0.1	8.5	0.2
4	1.0	0.0	4.8	0.1	12.4	0.2
8	0.4	0.0	4.0	0.1	16.3	0.3
24	0.1	0.0	1.9	0.1	20.0	0.2
48	0.1	0.0	0.7	0.1	18.6	0.2
96	0.0	0.0	0.5	0.4	14.8	0.2
168	0.0	0.0	0.2	0.1	10.9	0.2

Data from Figure 5 – b) Ni

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.3	0.0	1.0	0.0	4.4	0.0	0.2	0.1
0.5	0.3	0.0	1.0	0.0	5.4	0.0		
1	0.4	0.1	1.2	0.0	6.6	0.1	0.2	0.0
2	0.4	0.0	1.5	0.1	7.7	0.1		
4	0.4	0.0	1.6	0.1	8.9	0.1		
8	0.5	0.0	2.1	0.0	9.9	0.0	0.1	0.0
24	0.8	0.0	3.2	0.1	11.7	0.1	0.1	0.0
48	0.90	0.0	3.8	0.1	12.9	0.1		
96	1.04	0.0	4.3	0.0	13.7	0.1		
168	1.31	0.1	4.9	0.0	14.7	0.1	0.2	0.0

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	0.08	0.04	0.32	0.0	0.59	0.0
0.5	0.1	0.05	0.5	0.0	0.8	0.1
1	0.2	0.05	0.7	0.0	1.0	0.1
2	0.2	0.04	1.0	0.0	1.5	0.0
4	0.4	0.02	1.3	0.1	1.9	0.0
8	0.5	0.03	1.6	0.1	2.4	0.1
24	0.5	0.0	2.3	0.0	3.5	0.1
48	0.6	0.0	2.8	0.0	4.4	0.1
96	0.6	0.0	3.4	0.0	5.5	0.1
168	0.9	0.0	3.6	0.1	6.9	0.1

Data from Figure 5 – c) Co

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	2.5	0.0	7.0	0.1	9.8	0.1	0.1	0.0
0.5	2.4	0.0	6.9	0.0	10.6	0.2		
1	2.3	0.0	6.8	0.1	11.4	0.1	0.2	0.0
2	2.2	0.1	6.4	0.1	12.0	0.1		
4	1.9	0.0	5.8	0.1	12.6	0.1		
8	1.4	0.0	5.2	0.1	12.8	0.0	0.1	0.0
24	0.91	0.0	3.9	0.02	13.6	0.1	0.1	0.0
48	0.80	0.02	3.33	0.02	14.8	0.1		
96	0.89	0.05	3.25	0.11	16.4	0.1		
168	0.96	0.03	3.56	0.16	18.3	0.9	0.1	0.0

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	0.1	0.0	0.33	0.1	0.2	0
0.5	0.1	0.0	0.4	0.0	0.2	0
1	0.1	0.0	0.4	0.1	0.3	0
2	0.2	0.0	0.6	0.1	0.4	0
4	0.2	0.0	0.7	0.1	0.5	0.1
8	0.1	0.0	0.8	0.1	0.6	0
24	0.2	0.0	1.3	0.0	1.4	0
48	0.2	0.0	1.6	0.1	2.3	0
96	0.2	0.1	2.2	0.0	4.2	0.1
168	0.3	0.0	2.6	0.1	6.8	0

Data from Figure 5 –d) Mn

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	27.6	0.1	28.0	0.1	39.9	0.2	29.2	0.3
0.5	28.9	0.2	29.0	0.4	38.5	0.1		
1	29.8	0.3	30.3	0.1	36.9	0.6	31.9	0.3
2	30.3	0.9	30.7	0.4	34.7	0.3		
4	28.0	0.1	28.8	0.2	32.2	0.3		
8	26.2	0.4	26.4	0.1	28.7	0.2	26.5	0.3
24	22.7	0.4	22.9	0.1	24.4	0.4	23.3	0.4
48	20.5	0.3	20.8	0.3	22.2	0.1		
96	17.7	0.1	17.8	0.2	18.5	0.1		
168	17.4	0.1	17.4	0.1	19.6	2.0	17.5	0.6

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	0.06	0.1	0.1	0.1	1.2	0.1
0.5	0.06	0.1	0.1	0.1	1.2	0.0
1	0.04	0.1	0.1	0.1	1.1	0.0
2	0.07	0.1	0.2	0.2	1.1	0.1
4	0.00	0.0	0.0	0.1	0.9	0.0
8	0.00	0.0	0.0	0.1	0.7	0.0
24	0.00	0.0	-0.3	0.3	0.6	0.1
48	0.13	0.0	0.2	0.2	0.8	0.1
96	0.06	0.0	-0.8	0.3	-0.2	0.1
168	0.14	0.3	-0.1	0.4	0.7	0.1

Data from Figure 5 –e) Cu

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.7	0.1	1.6	0.1	2.6	0.0	0.0	0.1
0.5	0.9	0.1	1.9	0.1	3.2	0.1		
1	1.1	0.1	2.5	0.1	4.0	0.1	0.1	0.1
2	1.4	0.1	3.1	0.2	4.9	0.0		
4	2.0	0.1	3.9	0.1	6.2	0.1		
8	2.8	0.0	5.0	0.1	7.7	0.0	0.0	0.1
24	3.8	0.1	7.0	0.1	10.6	0.1	0.1	0.0
48	3.9	0.1	7.9	0.1	12.9	0.1		
96	3.7	0.0	7.8	0.0	15.1	0.0		
168	3.3	0.0	7.2	0.0	16.6	0.4	0.0	0.0

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	1.4	0.0	1.9	0.0	2.2	0.1
0.5	1.8	0.0	2.5	0.0	2.9	0.1
1	2.3	0.1	3.2	0.0	3.6	0.0
2	2.8	0.1	4.2	0.0	4.7	0.1
4	3.8	0.1	5.5	0.1	6.1	0.0
8	4.7	0.1	7.1	0.0	7.6	0.0
24	5.1	0.1	9.0	0.2	10.9	0.1
48	5.2	0.1	10.3	0.1	13.4	0.2
96	4.8	0.0	10.2	0.0	16.5	0.2
168	4.6	0.1	9.5	0.1	18.7	0.2

Data from Figure 5 –f) Zn

time	10 µM DMA + asc		30 µM DMA + asc		100 µM DMA + asc		Ascorbate-only	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM
0.25	0.09	0.0	0.6	0.0	1.8	0.1	0.1	0.0
0.5	0.10	0.0	0.5	0.0	2.1	0.1		
1	0.11	0.0	0.4	0.0	2.1	0.0	0.0	0.0
2	0.10	0.0	0.4	0.0	2.3	0.0		
4	0.11	0.0	0.3	0.0	2.6	0.1		
8	0.07	0.0	0.3	0.0	2.5	0.1	0.0	0.0
24	0.04	0.0	0.2	0.0	2.3	0.0	0.0	0.0
48	0.03	0.0	0.1	0.0	1.8	0.1		
96	0.01	0.0	0.0	0.0	1.3	0.0		
168	0.01	0.0	0.0	0.0	0.7	0.1	0.0	0.0

time	10 µM DMA		30 µM DMA		100 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM
0.25	0.7	0.1	1.2	0.0	1.4	0.2
0.5	0.6	0.1	1.3	0.0	1.5	0.0
1	0.4	0.1	1.4	0.0	1.6	0.0
2	0.3	0.0	1.3	0.0	1.9	0.1
4	0.2	0.0	1.1	0.0	2.2	0.1
8	0.1	0.0	0.9	0.0	2.5	0.0
24	0.0	0.0	0.5	0.1	2.7	0.0
48	0.0	0.0	0.2	0.0	2.7	0.0
96	0.0	0.0	0.1	0.0	2.4	0.1
168	0.0	0.0	0.1	0.0	2.3	0.0

Table S6. Data from Figure 6 – a) Fe

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0	0.06	0.04	1.2	0.0	1.7	0.1	1.9	0.0	2.3	0.0
50	0.00	n.d.	1.3	0.0	2.2	n.d.	2.3	0.1	3.0	0.2
100	0.01	0.02	1.5	n.d.	2.8	0.1	3.1	0.0	4.0	0.2
200	0.00	0.01	1.4	0.0	3.40	0.01	4.3	0.1	5.6	0.0
300	0.00	0.02	0.9	0.1	3.26	0.02	4.7	0.1	7.0	0.1

Data from Figure 6 – b) Ni

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	3.1	0.4	µM	µM
0	0.1	0.0	0.2	0.0	0.3	0.0	0.4	0.0	0.5	0.0
50	0.1	0.0	0.2	0.0	0.4	n.d.	0.4	0.0	0.6	0.0
100	0.1	0.0	0.3	0.0	0.4	0.0	0.5	0.0	0.7	0.0
200	0.1	0.0	0.3	0.0	0.6	0.0	0.8	0.0	1.1	0.0
300	0.1	0.0	0.3	0.0	0.6	0.0	0.9	0.0	1.3	0.0

Data from Figure 6 – c) Co

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	3.1	0.4	µM	µM
0	0.05	0.02	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
50	0.05	0.04	0.3	0.0	0.5	n.d.	0.4	0.0	0.4	0.0
100	0.10	0.01	0.7	0.0	0.8	0.0	0.8	0.0	0.9	0.1
200	0.11	0.01	1.3	0.0	1.7	0.1	1.8	0.0	1.8	0.1
300	0.14	0.01	1.9	0.1	2.6	0.0	2.7	0.1	2.8	0.0

Table S7. Data from Figure 7 –a) Fe

Ascorbate	**0 µM ascorbate**		**50 µM ascorbate**		**100 µM ascorbate**		**200 µM ascorbate**		**300 µM ascrobate**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.06	0.04	0.00	n.d.	0.01	0.03	-0.02	0.01	-0.02	0.02
10	1.37	0.00	1.46	0.04	1.63	n.d.	1.57	0.03	1.01	0.10
20	1.93	0.09	2.48	0.00	3.14	0.08	3.77	0.01	3.63	0.02
30	2.10	0.04	2.56	0.10	3.42	0.04	4.80	0.16	5.17	0.09
50	2.56	0.05	3.36	0.26	4.45	0.17	6.20	0.01	7.73	0.16

Fitted predictions

[DMA]	**0 µM ascorbate**	**50 µM ascorbate**	**100 µM ascorbate**	**200 µM ascorbate**	**300 µM ascrobate**
(µM)	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
10	1.41	n.d.	n.d.	n.d.	n.d.
20	1.82	2.35	n.d.	n.d.	n.d.
30	2.11	2.78	3.44	4.80	n.d.
50	2.55	3.43	4.31	6.20	7.73

Data from Figure 7 – b) Ni

Ascorbate	**0 µM ascorbate**		**50 µM ascorbate**		**100 µM ascorbate**		**200 µM ascorbate**		**300 µM ascrobate**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.11	0.00	0.11	0.01	0.10	0.00	0.13	0.00	0.14	0.01
10	0.20	0.01	0.22	0.01	0.32	0.03	0.29	0.02	0.34	0.00
20	0.35	0.01	0.43	0.00	0.49	0.01	0.62	0.05	0.71	0.04
30	0.44	0.01	0.49	0.04	0.61	0.05	0.87	0.01	0.97	0.03
50	0.51	0.01	0.69	0.03	0.83	0.01	1.21	0.01	1.47	0.02

Fitted predictions

[DMA]	**0 µM ascorbate**	**50 µM ascorbate**	**100 µM ascorbate**	**200 µM ascorbate**	**300 µM ascrobate**
(µM)	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
10	0.21	n.d.	n.d.	n.d.	n.d.
20	0.30	0.41	n.d.	n.d.	n.d.
30	0.39	0.51	0.62	0.89	n.d.
50	0.56	0.70	0.84	1.16	1.45

Data from Figure 7 – c) Co

Ascorbate	0 µM ascorbate		50 µM ascorbate		100 µM ascorbate		200 µM ascorbate		300 µM ascrobate	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.05	0.02	0.06	0.04	0.11	0.01	0.12	0.01	0.16	0.01
10	0.13	0.01	0.39	0.01	0.80	0.05	1.44	0.02	2.07	0.06
20	0.07	0.03	0.57	0.00	0.92	0.01	1.94	0.08	2.89	0.01
30	0.09	0.02	0.41	0.02	0.92	0.04	2.01	0.01	2.95	0.13
50	0.06	0.01	0.44	0.01	1.03	0.08	2.01	0.07	3.07	0.05

Fitted predictions

[DMA]	0 µM ascorbate	50 µM ascorbate	100 µM ascorbate	200 µM ascorbate	300 µM ascrobate
(µM)	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
10	0.00	n.d.	n.d.	n.d.	n.d.
20	0.00	0.44	n.d.	n.d.	n.d.
30	0.00	0.47	0.93	1.86	n.d.
50	0.00	0.51	1.01	2.02	3.03

Data from Figure 7 – d) Mn

Ascorbate	0 µM ascorbate		50 µM ascorbate		100 µM ascorbate		200 µM ascorbate		300 µM ascrobate	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.11	0.00	0.56	0.00	1.58	0.05	4.44	0.02	7.83	0.18
10	0.14	0.01	0.54	0.05	1.68	0.05	4.25	0.03	7.58	0.17
20	0.18	0.01	0.73	0.00	1.71	0.02	4.57	0.14	7.95	0.01
30	0.23	0.00	0.66	0.02	1.78	0.02	4.75	0.05	7.87	0.18
50	0.34	0.02	0.92	0.05	2.21	0.02	5.18	0.02	8.49	0.20

Fitted predictions

[DMA]	0 µM ascorbate	50 µM ascorbate	100 µM ascorbate	200 µM ascorbate	300 µM ascrobate
(µM)	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
10	0.00	n.d.	n.d.	n.d.	n.d.
20	0.00	0.74	n.d.	n.d.	n.d.
30	0.00	0.74	1.92	4.94	n.d.
50	0.00	0.74	1.92	4.94	8.60

Data from Figure 7 – e) Cu

Ascorbate	**0 µM ascorbate**		**50 µM ascorbate**		**100 µM ascorbate**		**200 µM ascorbate**		**300 µM ascrobate**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.01	0.02	0.02	0.00	0.00	0.03	0.00	0.03	0.00	0.02
10	1.26	0.03	1.26	0.04	1.19	0.04	1.09	0.04	1.06	0.00
20	1.61	0.06	1.56	0.00	1.61	0.02	1.53	0.02	1.62	0.00
30	1.73	0.00	1.74	0.09	1.78	0.09	1.74	0.05	1.70	0.03
50	2.02	0.01	1.98	0.09	2.06	0.10	2.04	0.06	2.10	0.07

Fitted predictions

	[ascorbate] (µM)				
[DMA] (µM)	0	50	100	200	300
10	1.21	n.d.	n.d.	n.d.	n.d.
20	1.52	1.52	n.d.	n.d.	n.d.
30	1.73	1.73	1.73	1.73	n.d.
50	2.03	2.03	2.03	2.03	2.03

Data from Figure 7 – f) Zn

Ascorbate	**0 µM ascorbate**		**50 µM ascorbate**		**100 µM ascorbate**		**200 µM ascorbate**		**300 µM ascrobate**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}	nM s^{-1}
0	0.08	0.01	0.08	0.01	0.09	0.04	0.08	0.01	0.10	0.06
10	0.78	0.01	0.78	0.01	0.69	0.01	0.52	0.02	0.41	0.03
20	1.11	0.04	1.10	0.00	1.20	0.09	1.07	0.01	0.98	0.03
30	1.21	0.00	1.26	0.04	1.31	0.07	1.31	0.01	1.29	0.02
50	1.38	0.03	1.38	0.06	1.44	0.11	1.50	0.06	1.56	0.09

Fitted predictions

	[ascorbate] (µM)				
[DMA] (µM)	0	50	100	200	300
10	0.83	n.d.	n.d.	n.d.	n.d.
20	1.06	1.06	n.d.	n.d.	n.d.
30	1.23	1.23	1.23	1.23	n.d.
50	1.48	1.48	1.48	1.48	1.48

Table S8. Data for Figure B1

Absorbance	**Ascorbate concentration** mM
0.5668	0
0.5634	0.015
0.5350	0.115
0.4634	0.315
0.3755	0.615
0.3340	0.915

Table S9. Data for Figure C1 – a) Cu

time	**simultaneously**		**1 day lag time**		**2 days lag time**		**DMA-only**		**Ascorbate-only**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	2.6	0.0	2.2	0.1	2.2	0.1	2.2	0.1	0.0	0.1
0.5	3.2	0.1	2.7	0.1	2.8	0.1	2.9	0.1		
1	4.0	0.1	3.6	0.1	3.7	0.1	3.6	0.0	0.1	0.1
2	4.9	0.0	4.6	0.1	4.6	0.1	4.7	0.1		
4	6.2	0.1	5.8	0.1	5.9	0.1	6.1	0.0		
8	7.7	0.0	7.4	0.1	7.5	0.1	7.6	0.0	0.0	0.1
24	10.6	0.1	10.7	0.2	10.9	0.1	10.9	0.1	0.1	0.0
48	12.9	0.1	13.0	0.1	13.2	0.1	13.4	0.2		
96	15.1	0.0	15.4	0.3	15.4	0.0	16.5	0.2		
168	16.6	0.4	16.0	0.4	16.7	0.0	18.7	0.2	0.0	0.0

Data for Figure C1 – b) Zn

time	**simultaneously**		**1 day lag time**		**2 days lag time**		**DMA-only**		**Ascorbate-only**	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
h	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0.25	1.8	0.1	1.7	0.0	1.6	0.0	1.4	0.2	0.1	0.0
0.5	2.1	0.1	1.9	0.0	1.9	0.0	1.5	0.0		
1	2.1	0.0	2.2	0.0	2.2	0.0	1.6	0.0	0.0	0.0
2	2.3	0.0	2.4	0.0	2.4	0.0	1.9	0.1		
4	2.6	0.1	2.6	0.1	2.9	0.5	2.2	0.1		
8	2.5	0.1	2.7	0.1	2.9	0.2	2.5	0.0	0.0	0.0
24	2.3	0.0	2.8	0.5	2.7	0.0	2.7	0.0	0.0	0.0
48	1.8	0.1	2.2	0.1	2.8	0.7	2.7	0.0		
96	1.3	0.0	1.5	0.0	1.8	0.2	2.4	0.1		
168	0.7	0.1	2.5	2.4	0.9	0.0	2.3	0.0	0.0	0.0

Table S10. Data for Figure C2 – Mn

2 days lag time			1 day lag time			simultaneously			Ascorbate-only		
time (h)	average (µM)	stan.dev. (µM)	time (h)	average (µM)	stan.dev. (µM)	time (h)	average (µM)	stan.dev. (µM)	time (h)	average (µM)	stan.dev. (µM)
0.25	39.9	0.2	24.25	32.1	0.3	48.25	24.7	0.2	0.25	29.2	0.3
0.5	38.5	0.1	24.5	31.3	0.4	48.5	24.8	0.1			
1	36.9	0.6	25	29.0	0.3	49	23.4	0.2	1	31.9	0.3
2	34.7	0.3	26	26.9	0.1	50	22.6	0.1			
4	32.2	0.3	28	24.7	0.2	52	19.4	0.1			
8	28.7	0.2	32	23.0	0.1	56	18.1	0.1	8	26.5	0.3
24	24.4	0.4	48	21.6	0.1	72	18.1	0.3	24	23.3	0.4
48	22.2	0.1	72	20.2	0.2	96	17.6	0.3			
96	18.5	0.1	120	17.5	0.1	144	15.4	0.3			
168	19.6	2.0	192	17.9	0.5	216	17.1	0.1	168	17.5	0.1

Table S11. Data from Figure D1 – a) Mn

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0	0.1	0.0	0.1	0.0	0.2	0.0	0.2	0.0	0.3	0.0
50	0.5	0.0	0.5	0.0	0.7		0.6	0.0	0.8	0.0
100	1.4	0.0	1.5	0.0	1.5	0.0	1.6	0.0	2.0	0.0
200	4.0	0.0	3.8	0.0	4.1	0.1	4.3	0.0	4.7	0.0
300	7.0	0.2	6.8	0.2	7.2	0.0	7.1	0.2	7.6	0.2

Data from Figure D1 – b) Cu

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0	0.0	0.0	1.1	0.0	1.4	0.1	1.6	0.0	1.8	0.0
50	0.0	0.0	1.1	0.0	1.4		1.6	0.1	1.8	0.1
100	0.0	0.0	1.1	0.0	1.5	0.0	1.6	0.1	1.9	0.1
200	0.0	0.0	1.0	0.0	1.4	0.0	1.6	0.0	1.8	0.1
300	0.0	0.0	1.0	0.0	1.5	0.0	1.5	0.0	1.9	0.1

Data from Figure D1 – b) Zn

Ascorbate	0 µM DMA		10 µM DMA		20 µM DMA		30 µM DMA		50 µM DMA	
	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.	average	stan.dev.
µM	µM	µM	µM	µM	µM	µM	µM	µM	µM	µM
0	0.1	0.0	0.7	0.0	1.0	0.0	1.1	0.0	1.2	0.0
50	0.1	0.0	0.7	0.0	1.0		1.1	0.0	1.2	0.0
100	0.1	0.0	0.6	0.0	1.1	0.1	1.2	0.1	1.3	0.1
200	0.1	0.0	0.5	0.0	1.0	0.0	1.2	0.0	1.3	0.0
300	0.1	0.0	0.4	0.0	0.9	0.0	1.2	0.0	1.4	0.1