Table S1. Summary of all metal measurements conducted in this study

			[Fe] mg/g		[Cu] mg/g		[Mn] mg/g		[Zn] mg/g	
DIET	GENOTYPE	N	VALUE	STDEV	VALUE	STDEV	VALUE	STDEV	VALUE	STDEV
Normal	*white*	16	**0.203**	0.044	**0.014**	0.005	**0.027**	0.019	**0.066**	0.012
	Mvl	17	**0.170**	0.044	**0.014**	0.004	**0.028**	0.019	**0.070**	0.021
	MCO3	9	**0.214**	0.033	**0.019**	0.007	**0.016**	0.005	**0.059**	0.011
	MCO3, Mvl	9	**0.197**	0.048	**0.014**	0.005	**0.016**	0.007	**0.062**	0.010
1mM Fe	*white*	14	**0.325**	0.095	**0.014**	0.004	**0.037**	0.037	**0.057**	0.012
	Mvl	13	**0.335**	0.119	**0.015**	0.007	**0.042**	0.036	**0.063**	0.020
	MCO3	6	**0.346**	0.055	**0.016**	0.006	**0.016**	0.007	**0.055**	0.015
	MCO3, Mvl	6	**0.318**	0.037	**0.013**	0.005	**0.015**	0.006	**0.057**	0.012
1mM Cu	*white*	13	**0.144**	0.029	**0.194**	0.048	**0.030**	0.013	**0.055**	0.014
	Mvl	13	**0.092**[a]	0.023	**0.183**	0.036	**0.029**	0.008	**0.050**	0.012
	MCO3	6	**0.132**	0.027	**0.127**[b]	0.021	**0.021**	0.009	**0.054**	0.014
	MCO3, Mvl	6	**0.120**	0.047	**0.118**[b]	0.017	**0.027**	0.012	**0.056**	0.010
1mM Mn	*white*	8	**0.209**	0.043	**0.015**	0.002	**0.128**	0.043	**0.065**	0.015
	Mvl	7	**0.152**	0.049	**0.015**	0.005	**0.133**	0.049	**0.068**	0.021
	MCO3	3	**0.214**	0.075	**0.020**	0.002	**0.153**	0.042	**0.056**	0.000
	MCO3, Mvl	3	**0.150**	0.013	**0.017**	0.000	**0.133**	0.023	**0.052**	0.001
1mM Zn	*white*	7	**0.185**	0.051	**0.017**	0.009	**0.030**	0.026	**0.210**	0.048
	Mvl	7	**0.146**[a]	0.026	**0.014**	0.002	**0.029**	0.020	**0.197**	0.019
	MCO3	3	**0.220**	0.011	**0.018**	0.001	**0.016**	0.006	**0.172**	0.037
	MCO3, Mvl	3	**0.189**	0.021	**0.016**	0.001	**0.012**	0.001	**0.186**	0.042
1mM Fe+Cu	*white*	6	**0.262**	0.031	**0.157**	0.038	**0.024**	0.010	**0.044**	0.016
	Mvl	6	**0.282**	0.062	**0.162**	0.018	**0.031**	0.008	**0.048**	0.013
	MCO3	5	**0.289**	0.069	**0.118**[b]	0.036	**0.018**	0.007	**0.059**	0.034
	MCO3, Mvl	5	**0.229**	0.038	**0.104**[b]	0.015	**0.024**	0.009	**0.054**	0.012
1mM Fe+Zn	*white*	9	**0.390**	0.101	**0.016**	0.005	**0.025**	0.016	**0.168**	0.064
	Mvl	9	**0.289**	0.071	**0.016**	0.005	**0.022**	0.009	**0.177**	0.048
	MCO3	5	**0.327**	0.067	**0.021**	0.009	**0.017**	0.007	**0.197**	0.108
	MCO3, Mvl	5	**0.349**	0.068	**0.015**	0.006	**0.016**	0.007	**0.161**	0.057
1mM Mn+Zn	*white*	3	**0.191**	0.011	**0.017**	0.003	**0.169**	0.031	**0.182**	0.028
	Mvl	3	**0.134**	0.032	**0.016**	0.002	**0.156**	0.053	**0.160**	0.043
	MCO3	3	**0.229**	0.060	**0.017**	0.001	**0.160**	0.031	**0.169**	0.038
	MCO3, Mvl	3	**0.152**	0.028	**0.018**	0.001	**0.124**	0.025	**0.139**	0.030
pooled average	*white*	-	**0.197**	0.011	**0.016**	0.001	**0.029**	0.005	**0.057**	0.009
	Mvl	-	**0.151**[c]	0.015	**0.015**	0.001	**0.030**	0.007	**0.060**	0.010
	MCO3	-	**0.219**	0.007	**0.019**[d]	0.002	**0.017**[e]	0.002	**0.057**	0.002
	MCO3, Mvl	-	**0.172**	0.024	**0.016**	0.002	**0.018**[e]	0.006	**0.056**	0.004

The number of biological replicates (*N*), average values (VALUE) and standard deviations (STDEV) are indicated for each condition. One-way ANOVA was performed for each metal in all eight treatments and for the pooled data. Superscript letters denote statistically significant results.

[a] In two (out of five non-iron supplemented) treatments Mvl^{97f} mutants show statistically significantly lower iron concentration than *w* and $MCO3^{C359}$ flies.

[b] In both treatments where copper was added to the diet, $MCO3^{C359}$ and $MCO3^{C359}$, Mvl^{97f} flies accumulated less copper than *w* and Mvl^{97f} mutants.

[c] Mvl^{97f} mutants had a statistically significantly reduction in iron concentration compared with *w* and $MCO3^{C359}$ flies but the value was not significantly different from that of the double mutant.

[d] $MCO3^{C359}$ mutants had a statistically significant higher copper concentration than *w* and Mvl^{97f} flies; Mvl^{97f} loss of function rescues this phenotype.

[e] $MCO3^{C359}$ and $MCO3^{C359}$, Mvl^{97f} flies had a statistically significant lower manganese concentration than *w* and Mvl^{97f} flies.

Different coloured text indicates the key findings:

Red: the average concentration of iron in Mvl^{97f} mutants was lower than in *w* and $MCO3^{C359}$ mutants when no iron was added to the diet.The iron concentration was the same in Mvl^{97f} and *w* mutants when the diet was supplemented with iron.

Orange: When compared with *w* or Mvl^{97f} flies, the concentration of copper in $MCO3^{C359}$ mutants was higher, provided no copper was added to the diet. Mvl^{97f} loss of function rescued the aforementioned effect (i.e. $MCO3^{C359}$, Mvl^{97f} double mutants accumulated less copper than $MCO3^{C359}$ single mutants).

Brown: $MCO3^{C359}$ and $MCO3^{C359}$, Mvl^{97f} mutants fed on copper accumulated less total copper than *w* flies.

Blue: $MCO3^{C359}$ mutants had a lower manganese concentration than *w* or Mvl^{97f} flies. Manganese concentration was comparable between all genotypes if the diet was supplemented with manganese.

Green: dietary copper reduced iron concentrations in all genotypes.

Background colours indicate that the measured metal was also supplemented in the diet.