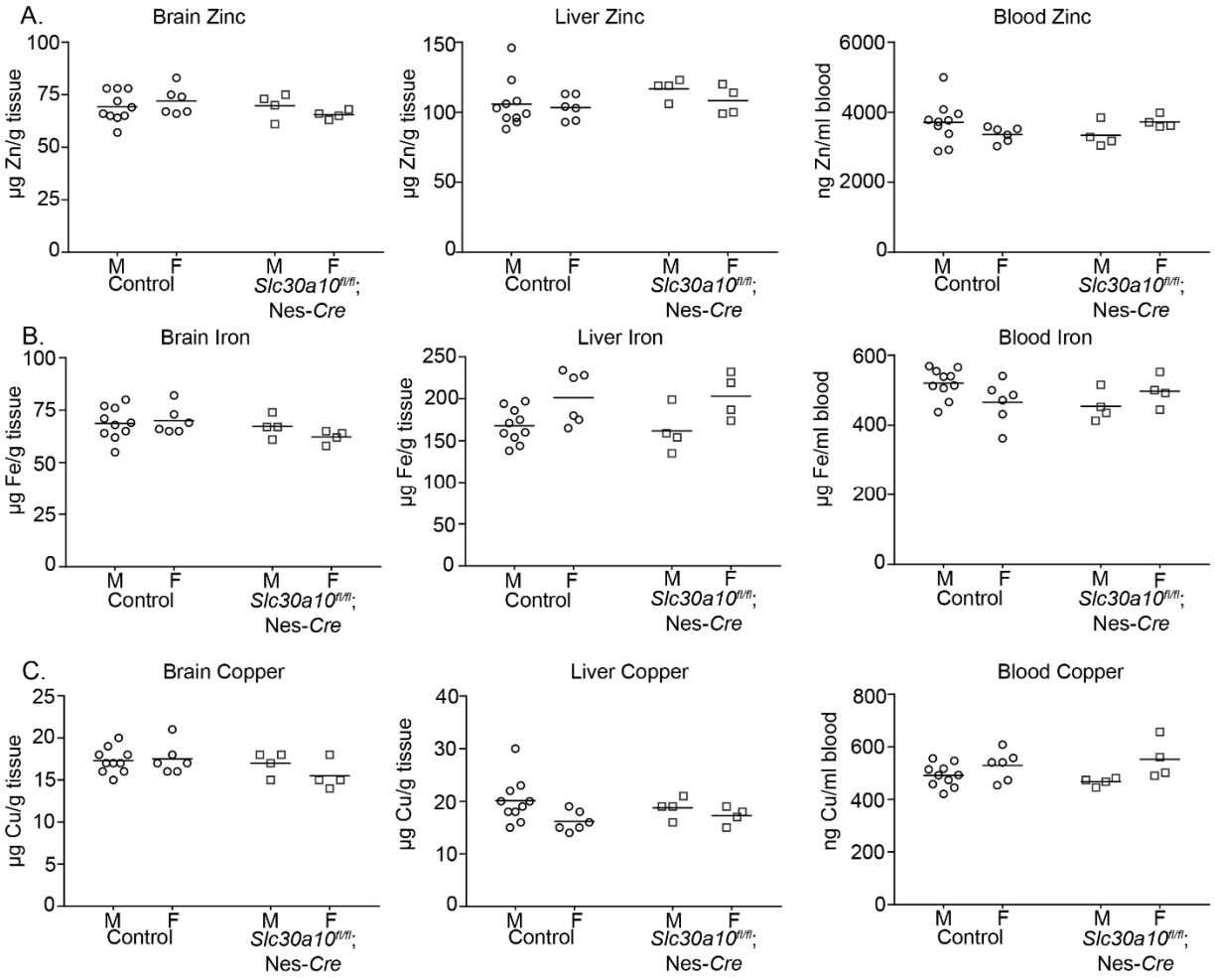

Figure S1. Analyses of zinc, iron, and copper levels in control or pan-neuronal/glial knockouts used in **Fig.2**. Animal numbers are identical to **Fig.2**. There were no differences between genotypes compared in a sex-specific manner by two-way ANOVA and Sidak's *post hoc* test.

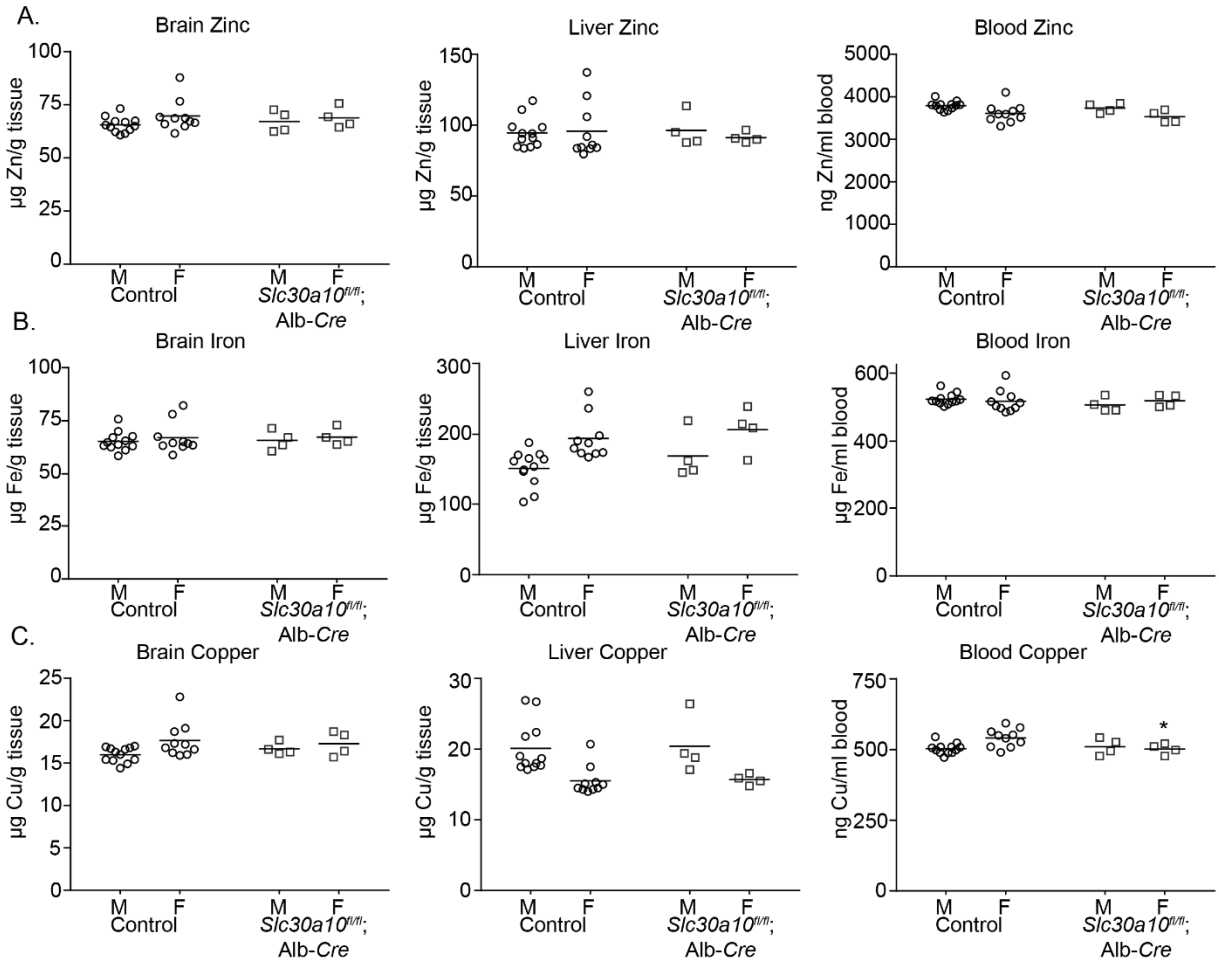

Figure S2. Analyses of zinc, iron, and copper levels in control or liver-specific knockouts used in **Fig.3**. Animal numbers are identical to **Fig.3**. *$p<0.05$ using two-way ANOVA and Sidak's *post hoc* test for differences between genotypes compared in a sex-specific manner.

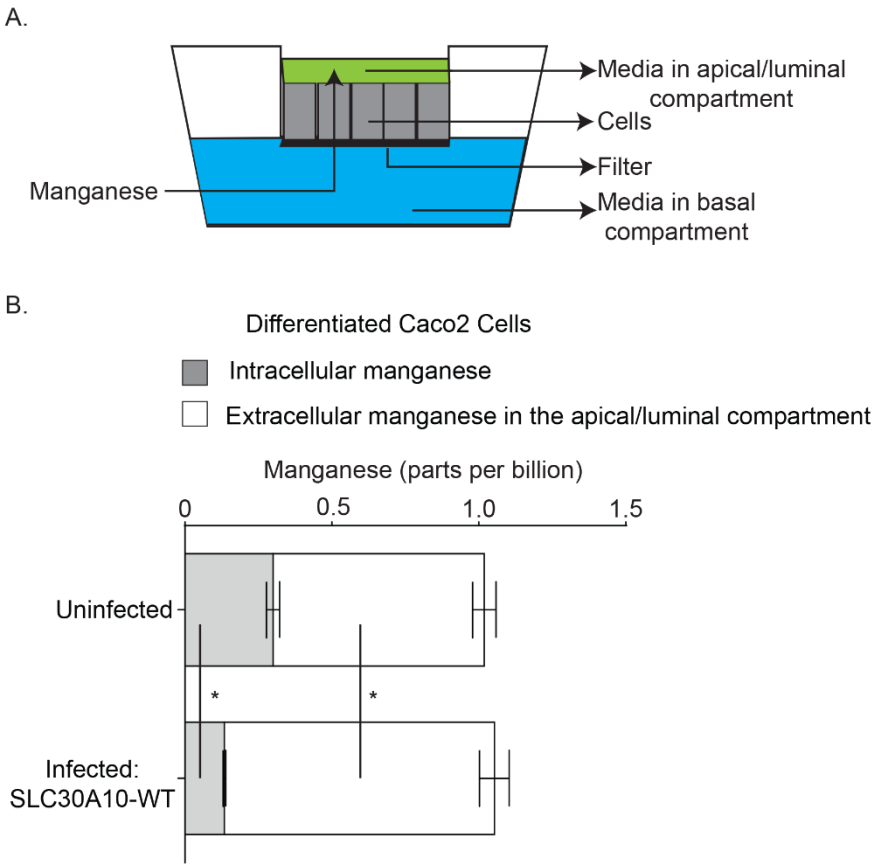

Figure S3. Manganese transport in Caco2 cells.

A. Schematic depicting separation of the apical and basal compartments during growth of differentiated CaCo2 cells. Manganese added to the media in the basal compartment can reach the apical compartment only via transport through cells. Schematic is not drawn to scale.

B. Absolute manganese levels for cultures analyzed in **Fig.4F**. Sum of the manganese levels in the intracellular and extracellular compartments were comparable between infected and uninfected cultures. However, compared with uninfected cultures, infected cultures had lesser absolute manganese levels in the intracellular compartment, and higher absolute manganese levels in the extracellular compartment. Analyses were performed by two-way ANOVA and Sidak's *post hoc* test. *$p<0.05$.

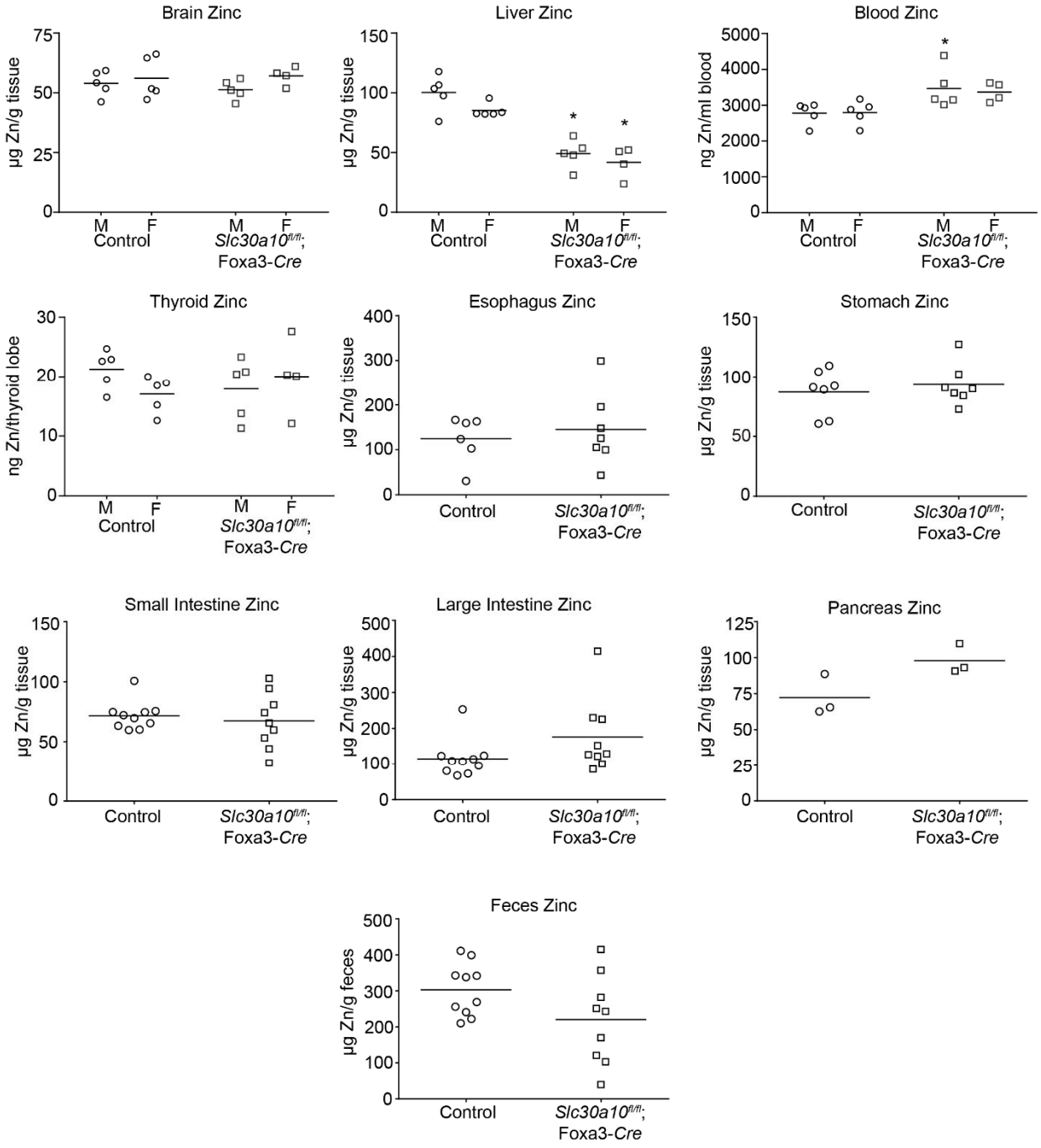

Figure S4. Analyses of zinc levels in control or endoderm-specific knockouts used in **Figs.5&6**. Animal numbers are identical to **Figs.5&6**. *$p<0.05$ using two-way ANOVA and Sidak's *post hoc* test for differences between genotypes compared in a sex-specific manner.

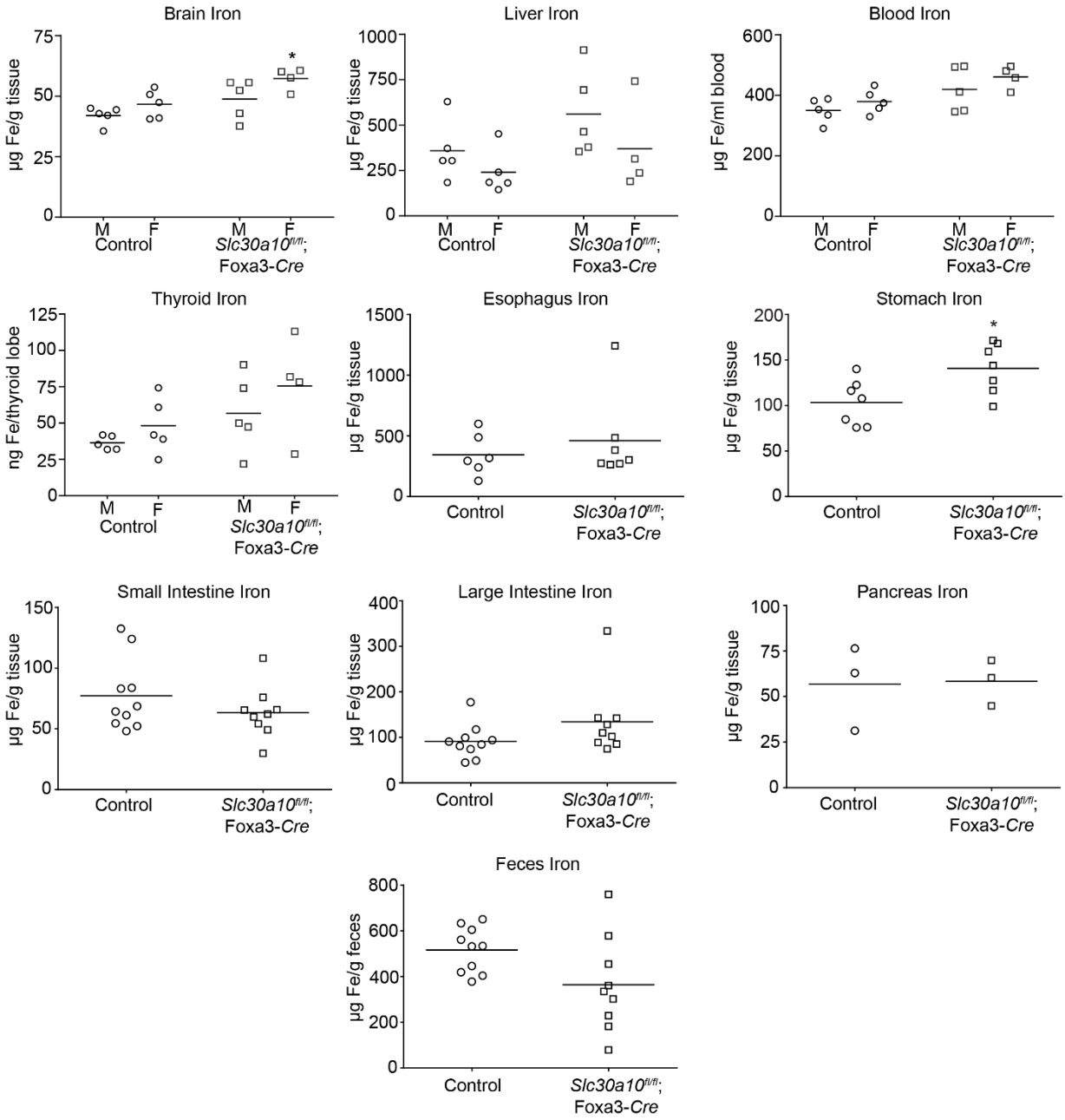

Figure S5. Analyses of iron levels in control or endoderm-specific knockouts used in **Figs.5&6**. Animal numbers are identical to **Figs.5&6**. *$p<0.05$ using two-way ANOVA and Sidak's *post hoc* test for differences between genotypes compared in a sex-specific manner for brain, and using *t*-test for stomach.

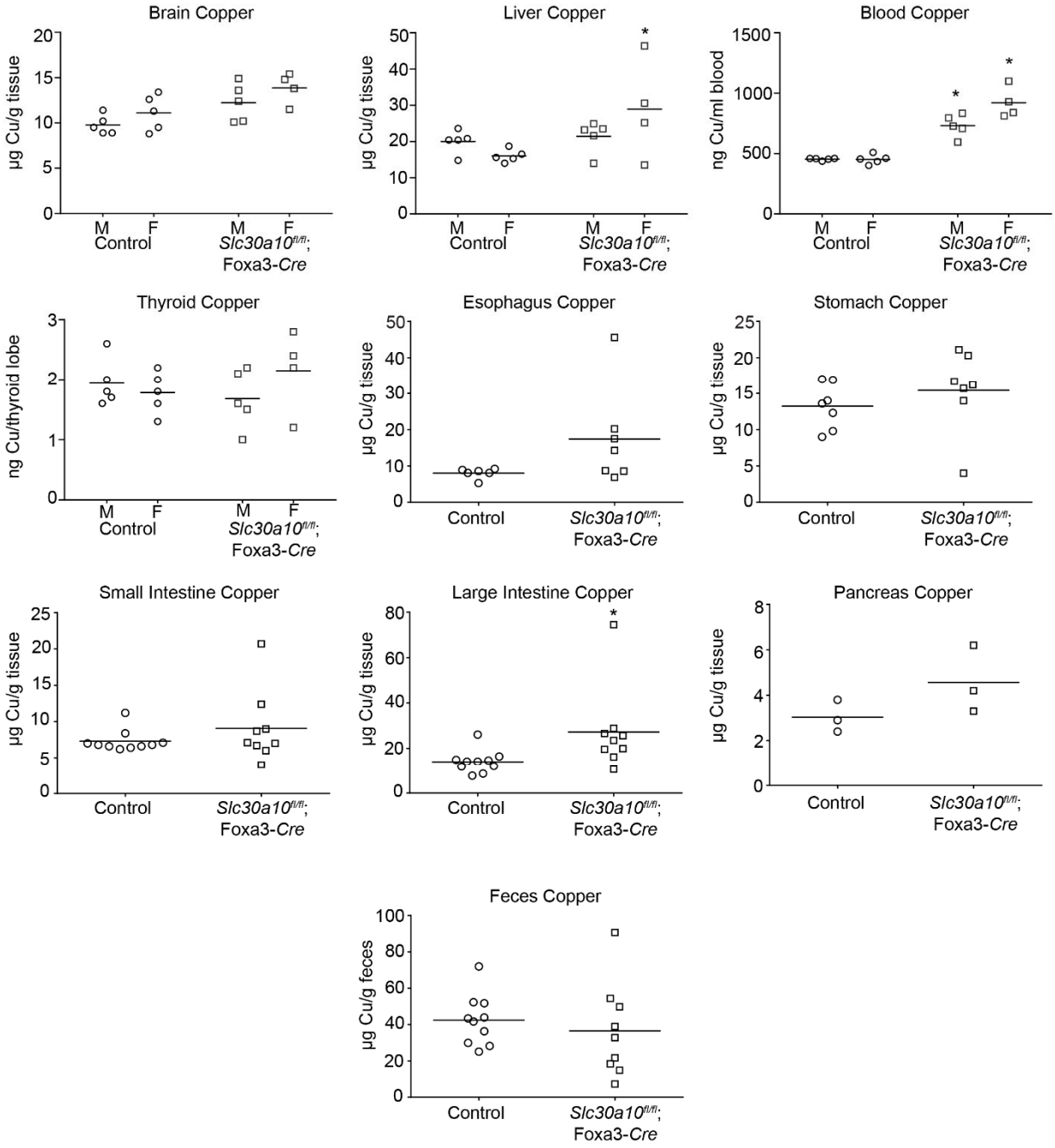

Figure S6. Analyses of copper levels in control or endoderm-specific knockouts used in **Figs.5&6**. Animal numbers are identical to **Figs.5&6**. *p<0.05 using two-way ANOVA and Sidak's *post hoc* test for differences between genotypes compared in a sex-specific manner for liver and blood, and using *t*-test for large intestine.

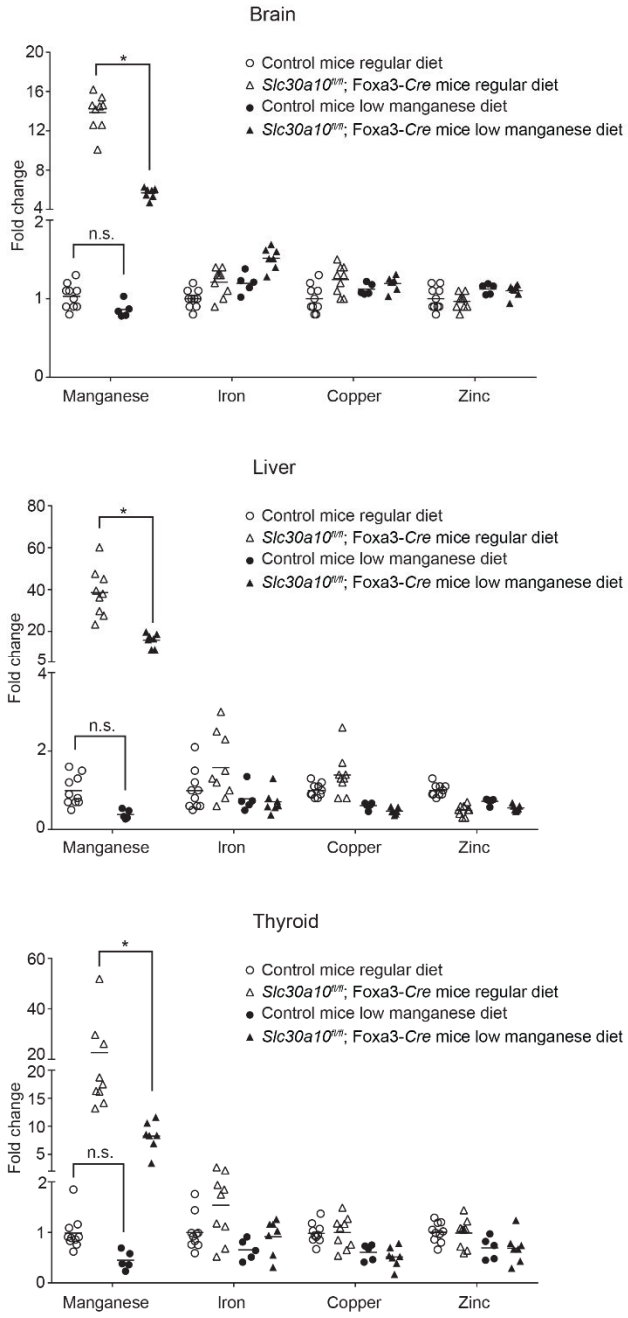

Figure S7. Comparison of the fold change in tissue metal levels of endoderm-specific knockouts or littermate controls fed the reduced manganese diet in **Fig.7** relative to mice fed regular rodent chow in **Fig.5, S4-S6**. For mice on the reduced manganese diet, levels of zinc, iron, and copper were assayed using samples utilized for manganese measurements in **Fig.7**. For each tissue and metal, mean levels of controls fed regular chow were normalized to 1. Line indicates mean. Analyses were performed using two-way ANOVA and Tukey Kramer *post hoc* test. For manganese in each tissue, levels in knockouts fed the reduced manganese diet were lower than knockouts fed regular rodent chow (*$p<0.05$), but there was no effect of diet in littermate controls (n.s. – not significant). There was no effect of diet on levels of other metals in either genotype.

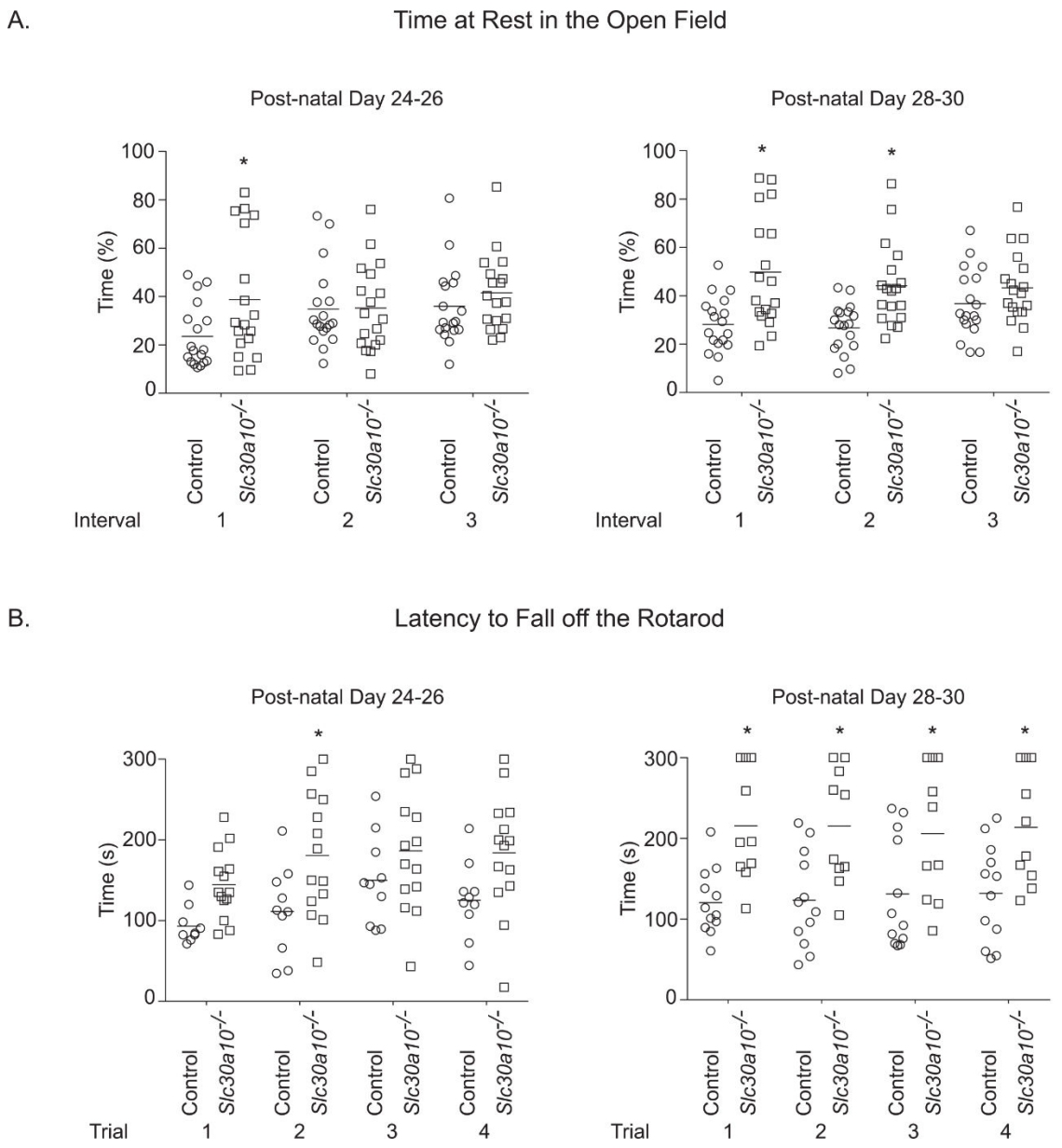

Figure S8. Assessment of neuromotor function of full-body *Slc30a10* knockouts or littermate controls fed regular rodent chow at two additional time-points.

A. Depiction of the percent of time spent by animals at rest in the open field test. At both time-points, n = 9 male and 9 female controls, and 10 male and 8 female knockouts. Sexes were combined for analyses to increase statistical power and because robust sex-specific differences were not observed. Line indicates mean. *p<0.05 by repeated measures two-way ANOVA and Sidak's *post hoc* test.

B. Assessment of the time taken to fall off the rod in the Rotarod test. At post-natal day 24-26, n = 5 male and 5 female controls, and 8 male and 6 female knockouts. At post-natal day 28-30, n = 6 male and 6 female controls, and 5 male and 5 female knockouts. Sexes were combined for reasons described above. Line indicates mean. *p<0.05 by repeated measures two-way ANOVA and Sidak's *post hoc* test.

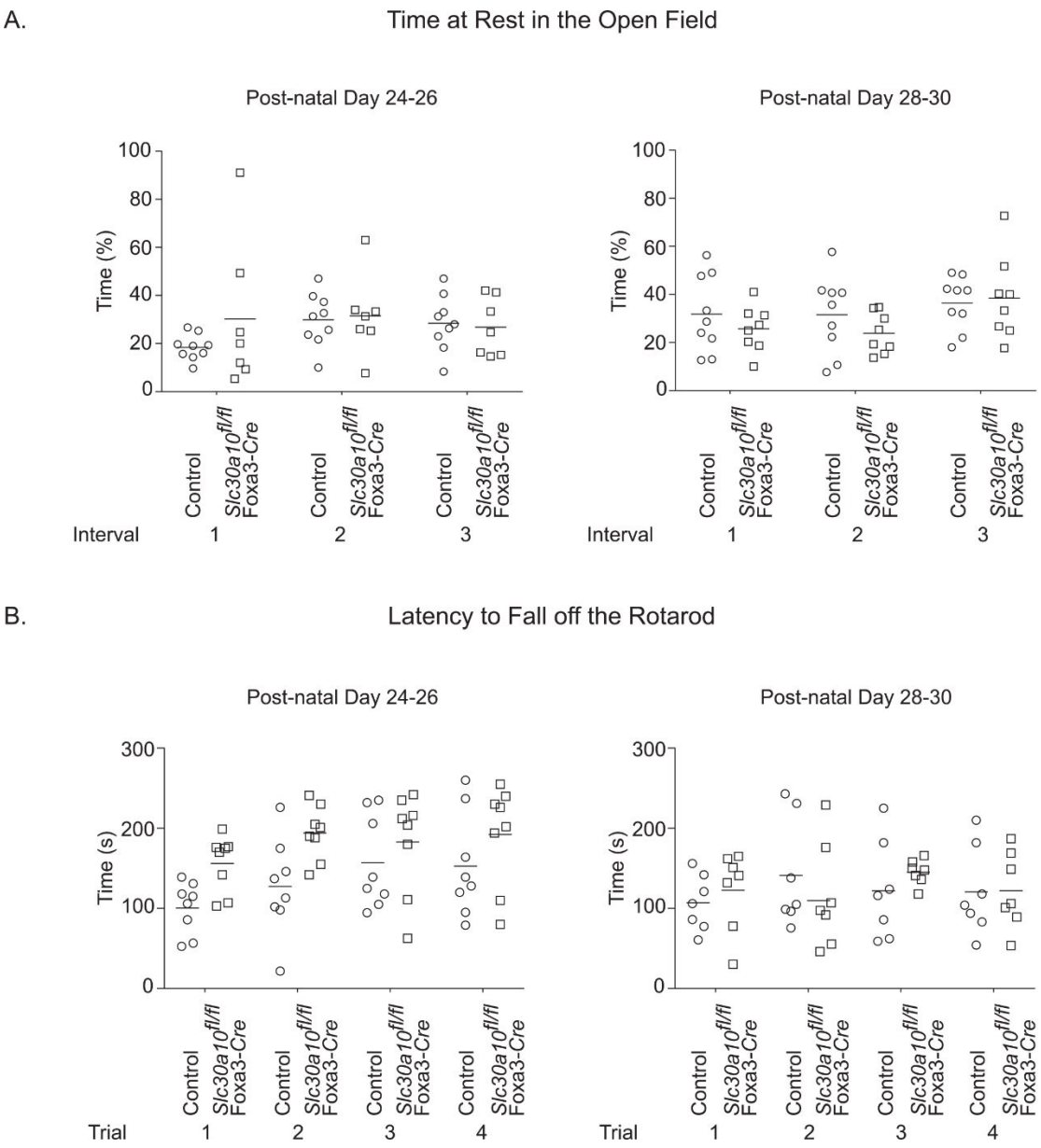

Figure S9. Assessment of neuromotor function of endoderm-specific *Slc30a10* knockouts or littermate controls fed regular rodent chow at earlier time-points.

A. Comparison of the percent of time spent by animals at rest in the open field test. For controls, n = 4 males and 5 females at both time-points. For knockouts, n = 4 males and 3 females at post-natal days 24-26, and 4 males and 4 females at post-natal days 28-30. Sexes were combined for reasons described in other behavioral figures. Line indicates mean. There were no genotype-specific differences using repeated measures two-way ANOVA and Sidak's *post hoc* test.

B. Analyses of the latency to fall off the rod in the Rotarod test. At post-natal days 24-26, n = 4 males and 4 females for both controls and knockouts. At post-natal days 28-30, n = 4 males and 3 females for controls and knockouts. Sexes were again combined for reasons described in other related figures. Line indicates mean. There were no genotype-specific differences using repeated measures two-way ANOVA and Sidak's *post hoc* test.

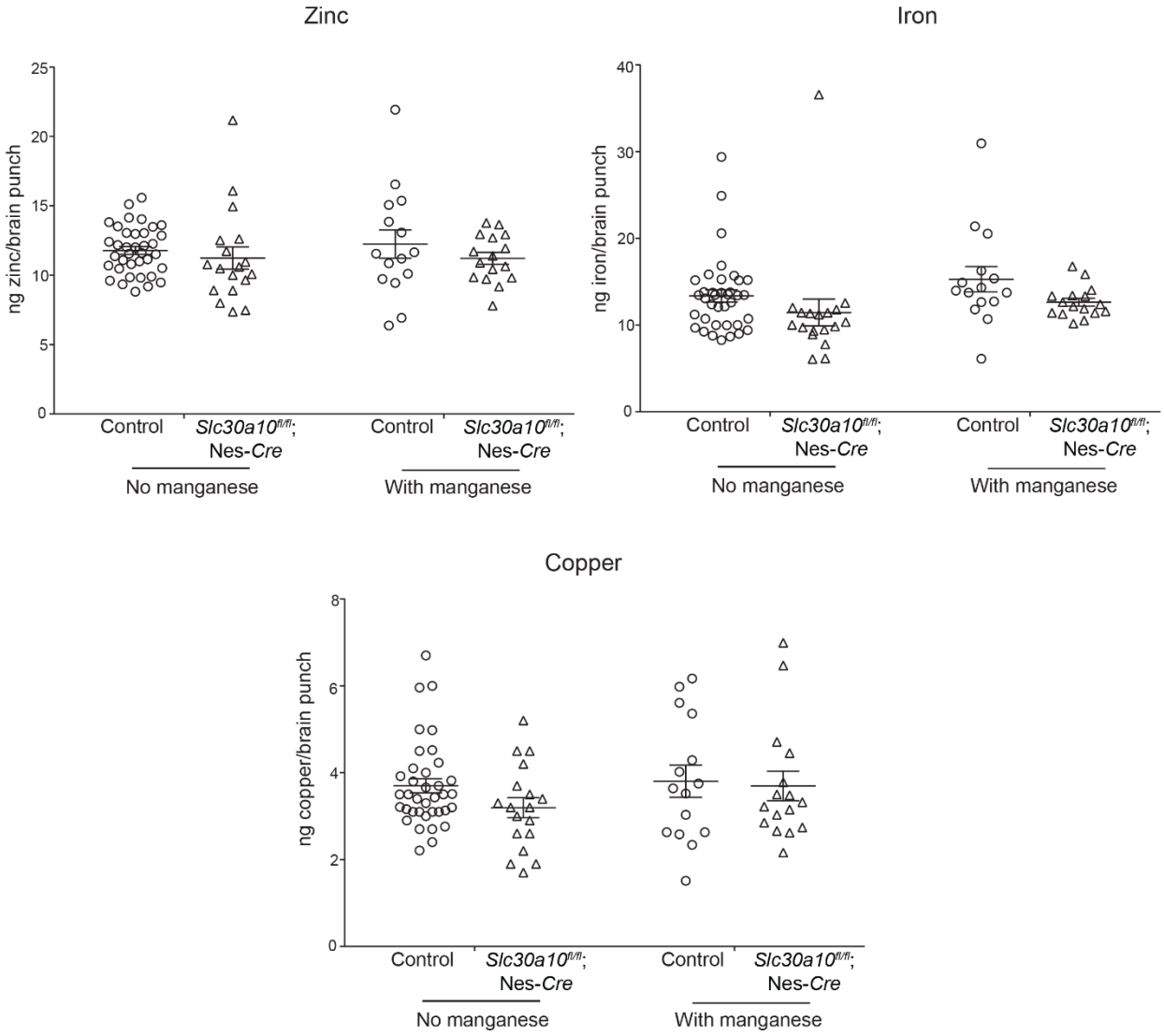

Figure S10. Analyses of zinc, iron, and copper levels in samples used in **Fig.9C**. There were no differences between groups for any metal using two-way ANOVA and Tukey Kramer *post hoc* test.