A Serum iron   **B Liver iron**
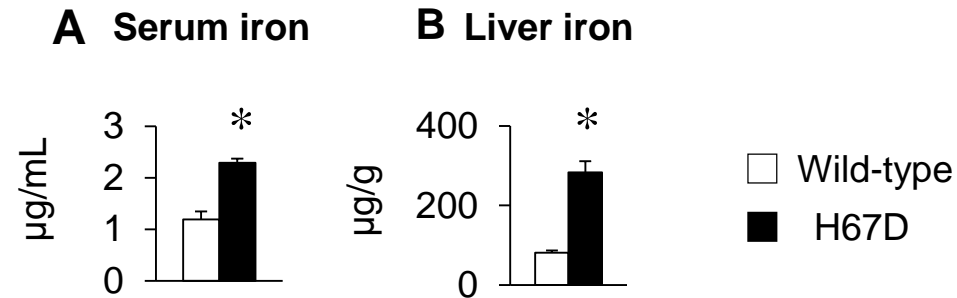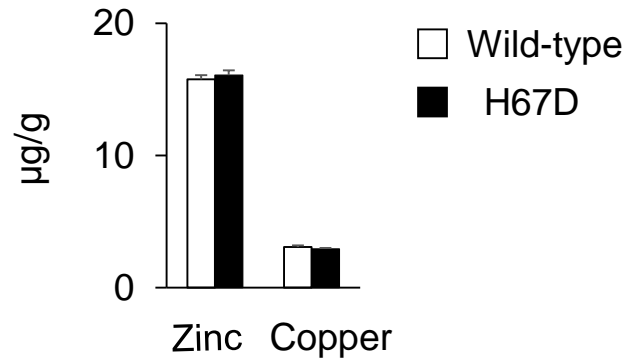
Supplementary Figure 1. H67D mutation increases iron in serum and liver. WT and H67D mutant mice were euthanized at the age of 10 weeks. Levels of non-heme iron in serum (**A**) and liver (**B**) were measured by colorimetric assay utilizing bathophenanthroline disulfate. Empty and closed bars represent WT and H67D mutant mice, respectively. Data were presented as mean $\pm$ SEM (n = 4 per group) and significant differences were analyzed using the Student's t-test. * $p < 0.05$ vs. WT.

A **Zinc and copper in the brain**

Supplementary Figure 2. H67D mutation does not alter levels of zinc or copper in the brain. WT and H67D mutant mice were euthanized at the age of 10 weeks. Brain tissues were collected, and right brain hemispheres were dissected into different brain regions, including olfactory bulb (OB), prefrontal cortex (PFC), hippocampus (HPC), striatum (STR), cortex (CTX) and cerebellum (CB). Zinc and copper levels in the whole brain (**A**) and different brain regions (**B and C**) were quantified by ICP-MS. Empty and closed bars represent WT and H67D mutant mice, respectively. Data were presented as mean ± SEM (n = 4-7 per group), and significant differences were analyzed using Student's *t*-test.
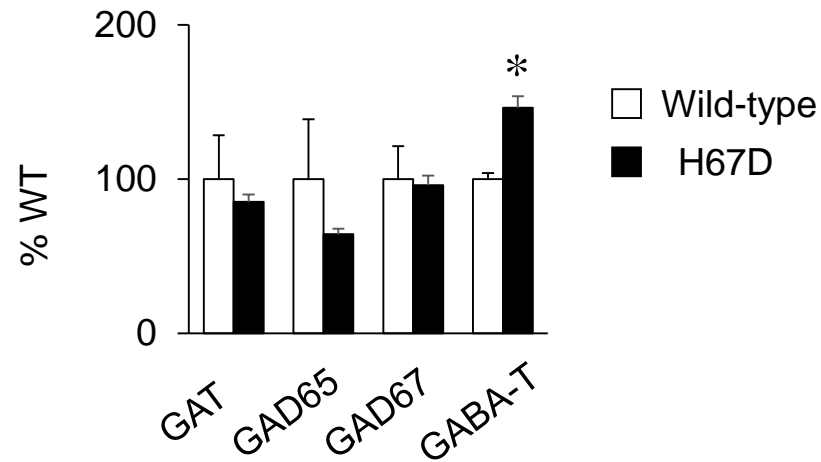
B **Distribution of zinc in the brain**
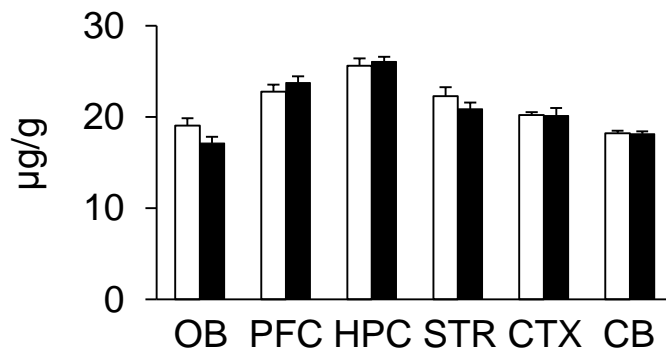
C **Distribution of copper in the brain**

Total iron

+ heme | + protein

Heme-iron   Bound iron   **Labile iron**
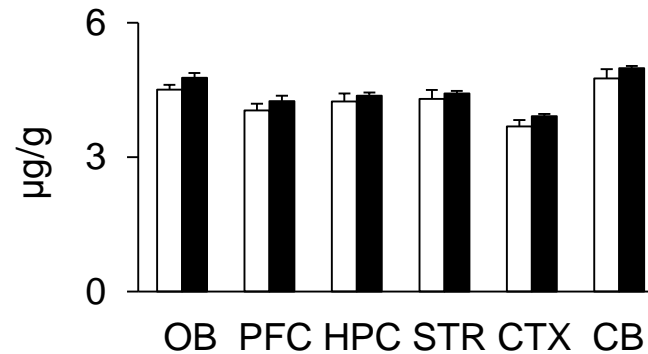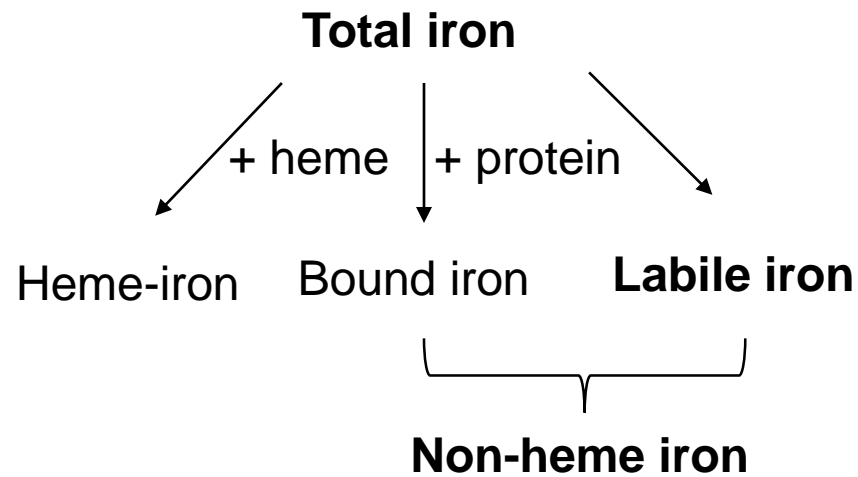
Non-heme iron

Supplementary Figure 3. Cellular iron composition. Total iron in tissues consists of heme and non-heme iron. Cellular non-heme iron includes both protein-bound and free (labile) iron, and the latter is the primary form of iron that produces free radicals and causes oxidative damage.

Supplementary Figure 4. The transcript expression of GABA transporter and metabolism enzymes is not altered in H67D brain. Right brain hemispheres were collected from WT and H67D mutant mice. The transcript expression levels of GABA transporter and key enzymes involved in glutamate and GABA turnover were quantified by qPCR. Empty and closed bars represent WT and H67D mutant mice, respectively. Data are presented as mean ± SEM (n = 4 per group), and significant differences were analyzed using the Student's *t*-test. * $p < 0.05$ vs. WT. Abbreviations used: GAT, GABA transporter; GAD, glutamate decarboxylase; GABA-T, GABA transaminase.