Table S1. Primer sequences for gene expression analysis by qPCR.

| Gene       | Primer sequence         |
|------------|-------------------------|
| Gria 1     | Fwd: TCCCCAACAAATATCCAGATAGGG, Rev: AAGCCGCATGGTTCTGATGATT |
| Gria 2     | Fwd: TTCTCCTGTTTATGGGAACCTGA, Rev: CTACCCGAAATGCACGTATTTCATG |
| Gria 3     | Fwd: ACCATCAGCAGATGGACTTT, Rev: ACGTGGTAGTTCAAATGGGAAGG |
| Gria 4     | Fwd: GTTTTCTGGATTTGGGAACCTGA, Rev: AAGAGACCACCTATTTGAACGC |
| Frrs1l Exon 1-2 | Fwd: CCAGCGAGTTCTACGACCTG, Rev: TCCCGTATCTGAAGCATCCC |
| Frrs1l Exon 2-3 | Fwd: GTGGACCCATTCGCAAAAT, Rev: CGCCTATCATCCGTTAGCTA |
| Frrs1l Exon 4-5 | Fwd: TGTTCCAGGGATGAACGA, Rev: AAGCCGGTGAGAGTCTATG |
**Fig. S1.** *Frrs1l*^-/-* mice have no expression of Frrs1l in both P0 pups and adults brain (A and B). No changes in Gria expression are seen at P0 in *Frrs1l*^-/-* mice compared to wild-type controls.
Fig. S2. Frrsl1−/− mice show changes in some but not all anxiety related parameters in open field.
Fig. S3. *Frrs1*<sup>−/−</sup> P0 brains show alterations in levels of AMPA receptor proteins. *Frrs1*<sup>−/−</sup> P0 brains have significantly less GLUA1 (p<0.01), whilst GLUA2 and GLUA4 total levels are unchanged between *Frrs1*<sup>−/−</sup> and wild-types. However two distinct bands are present in wild-type GLUA2 with the upper band significantly reduced in *Frrs1*<sup>−/−</sup> (p<0.001). Levels of other synaptic proteins PSD95, SNAP25 and CAMKII are the same in both *Frrs1*<sup>−/−</sup> and wild types. Data analysed using t-test (n=5 *Frrs1*<sup>−/−</sup>, n=5 *Frrs1*<sup>+/+</sup>) for all except GLUA2 (n=3 *Frrs1*<sup>−/−</sup>, n=4 *Frrs1*<sup>−/−</sup>) and GLUA4 (n=4 *Frrs1*<sup>−/−</sup>, n=4 *Frrs1*<sup>+/+</sup>).
*Fig. S4.* No differences were found in excitatory synapse number in the hippocampus of Frrs1l⁻/⁻ mice compared to C57BL/6NTac controls.