Supplementary Figure Legends

**Figure S1. FXGs are recognized by multiple anti-FMRP antibodies.** FMRP immunoreactivity was detected in FXGs using the 7G1-1 antibody (A), or the 1C3 antibody (B). Examples from the frontal cortex (A) and olfactory bulb (B) are shown. Equivalent immunostaining was observed in all brain regions examined with both these antibodies as well as with mAb 2F5-1. Scale bar = 25 µm; 8 µm in insets.

**Figure S2. FMRP is expressed in axons.** Immunogold electron microscopy of olfactory nerve layer (A) and hippocampal area CA3 (B). FMRP immunoreactivity was detected in OSN axons (arrows, A) and olfactory ensheathing glia (arrowheads, A). FMRP localization in a myelinated axon in stratum oriens (arrow, B). Scale bar = 400 nm in A; 100 nm in B.

**Figure S3. FMRP at the postsynaptic apparatus.** FMRP immunoreactivity was observed at postsynaptic sites in electron micrographs of olfactory glomeruli (arrowhead in A) and CA3 of hippocampus (arrowhead in B). Scale bar = 100 nm.

**Figure S4. FXGs in CA3 stratum oriens and cerebral cortex.** FMRP immunostaining in P15 hippocampus and cerebral cortex. Somatodendritic labeling was seen throughout all regions (arrowheads, A-D). FXGs within stratum oriens (arrows, A). FXGs were detected in all regions of the neocortex (B-D), but
were more abundant in frontal (B) as compared to motor (C) and visual (D) cortex. See Fig. 5 for quantification of FXG expression. Scale bar = 20 µm.

**Figure S5. FMRP localizes to somatic, dendritic, and axonal compartments.**
Quantification of immunogold particles in CA3 stratum pyramidale wildtype and knockout mice. In two wildtype mice, gold particles were detected within the somatic (3.48 and 3.29 particles per 100 µm²), dendritic (2.75 and 5.00 particles per 100 µm²), and axonal (3.62 and 3.43 particles per 100 µm²) compartments. The knockout mouse exhibited only background levels of 0.100 somatic and 0.151 axonal particles per 100 µm². No dendritic particles were observed in the knockout.

**Figure S6. FXG expression in the developing cerebellum.** At P15 (A,D), FXGs were observed along the boundary between the EGL and molecular layer (ML) (arrows in D). At P30 (B,E), after granule cell migration has completed, no FXGs were observed. Mature P60 cerebellum (C,F), exhibited no detectable FXGs. D-F are magnified views of the boxed regions in A-C. Scale bar in F = 20 µm in A-C, 10 µm in D-F.

**Figure S7. Cerebellar FXGs are apposed to Purkinje cell dendrites.**
Immunostaining for FMRP (green; A,B) and calbindin (red; B,C), which labeled the Purkinje cells, showed that FXGs were apposed to Purkinje cell dendrites
(arrows). A second population of FXGs was also detected in the external granule cell layer (arrowhead). Scale bar = 10 µm.

**Figure S8. CPEB3, GW182, and CYFIP1 are not detected in FXGs.** P15 CA3 was double-labelled for FMRP and either CPEB3, GW182 or CYFIP1 as indicated. While CPEB3, GW182 and CYFIP1 are all expressed in neurons, they are not localized in FXGs (arrows). GW182 was present in distinct granules in the somatodendritic compartment (arrowheads; E). Scale bar = 10 µm.