

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Representative time-lapse movie of an 11 DIV hippocampal neuron after overnight expression of GFP-DDX6. Boxed region magnified in right panel. Green arrowheads indicate fusing, red arrowheads indicate splitting events of GFP-DDX6 granules. Timestamp indicates hours:minutes. Scale bar 10 μm . *Related to Figure 1.*

File Name: Supplementary Movie 2

Description: Representative time-lapse maximum intensity projection movie of a 16 DIV hippocampal neuron expressing GFP-DDX6 during incubation with 100 μM NMDA or subsequent wash-off. Green arrowhead indicates disassembly of an individual granule, red arrowheads indicates assembly of an individual granule. Timestamp indicates minutes:seconds. Boxed regions indicate area of magnified insets displayed below. Scale bars 10 μm . *Related to Figure 2.*

File Name: Supplementary Movie 3

Description: Representative time-lapse movie of shNTC or shDDX6 transduced 15 DIV hippocampal neurons after overnight expression of GCaMP6s for Ca^{2+} imaging. Timestamp indicates minutes:seconds. Scale bar 10 μm . *Related to Figure 5.*