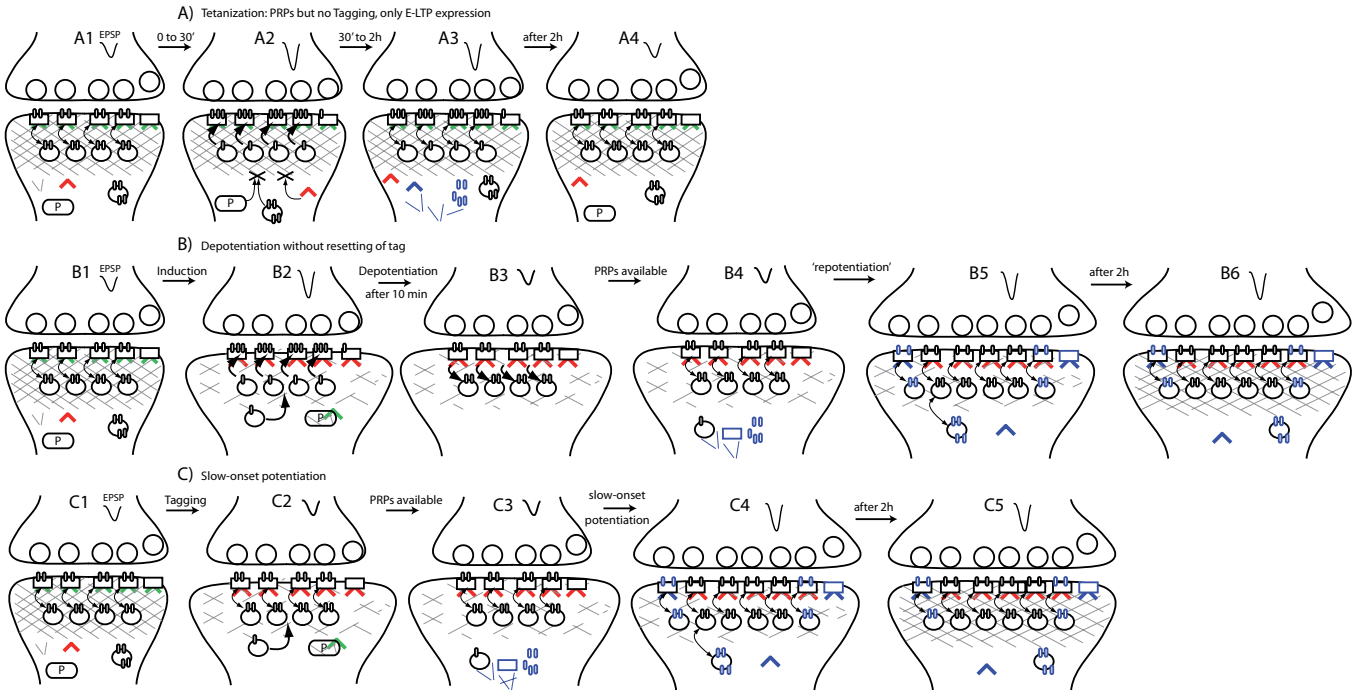
Supplementary information S3 (figure)



Three challenges to STC explained.

A, Expression without tagging: A1, Basal state for a standard synapse (symbols described in Fig. 4). **A2,** Induction of LTP in the presence of blockers of tagging (i.e. latrunculin, KN-93, …) allows the functional expression of LTP, represented by the increased number of AMPARs and presynaptic active zones, while preventing the structural expansion of the spine. **A3,** As PRPs become available they will meet a 'locked' spine where scaffolding and other structural PRPs will not find targets on which to act. **A4,** As the rates of endo- and exocytosis of glutamatergic receptors return to a pre-induction state, recorded EPSPs revert back to baseline strengths. See also Supplementary information S4 (movie).

B, Depotentiation without resetting of the tag: B1, Basal state for a standard synapse (symbols described in Fig. 4). **B2,** Induction of LTP triggers functional and structural changes. **B3,** Depotentiation protocols succeed in blocking the functional expression but if applied at or later than 10 min, tagging remains effective. **B4,** PRPs are made available through homo- or heterosynaptic stimulation. **B5,** PRPs meet a tagged, structurally expanded and therefore receptive spine and PSD. **B6,** As tagging fades, scaffolding molecules lock the actin cytoskeleton and sustain a potentiated and stable state.

C, Slow-onset plasticity: C1, Basal state for a standard synapse (symbols as in Fig. 4). **C2,** Some forms of chemical LTP as well as the pairing of place cell activity may act by altering the structure of synapses, effectively tagging them but without expressing functional plasticity. **C3,** If the induction protocol also provides PRPs they will become available to an expanded and receptive spine and PSD. **C4,** There, PRPs will stabilize the structural changes and potentiate the synaptic response. **C5,** L-LTP will be maintained in a untagged but expanded and potentiated synapse. See also Supplementary information S5 (movie).