Differential amplification of intron containing transcripts reveals LTP-associated upregulation of specific Pde10A phosphodiesterase splice variants

O'Connor V, Genin A, Davis S, Karishma KK, Doyère V, De Zeeuw CI, Sanger G, Hunt SP, Richter-Levin G, Mallet J, Laroche S, Bliss TVP, *French PJ*
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We employed differential display of expressed mRNAs to identify genes upregulated after LTP induction in the hippocampus of awake adult rats. *In situ* hybridisation confirmed the differential expression of five independently amplified clones representing two distinct transcripts, cl13/19/90 and cl95/96. Neither cl13/19/90 nor cl95/96 showed significant sequence homology to known transcripts (mRNA or EST) or to the mouse or human genome. However, comparison to the rat genome revealed that they are localised to a predicted intron of the phosphodiesterase Pde10A gene. cl13/19/90 and cl95/96 are likely to be part of the Pde10A primary transcript as, using RT-PCR, we could specifically amplify distinct introns of the Pde10A primary transcript, and, *in situ* hybridisation demonstrated that a subset of Pde10A splice variants are also upregulated after LTP induction. These results indicate that amplification of a primary transcript can faithfully report gene activity and that differential display can be used to identify differential expression of RNA species other than mRNA. In transiently transfected Cos7 cells, Pde10A3 reduces the Atrial Natriuretic Peptide-induced elevation in cGMP levels without affecting basal cGMP levels. This cellular function of LTP-associated Pde10A transcripts argues for a role of the cGMP/cGMP-dependent kinase pathway in long-term synaptic plasticity.

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