



Figure 1

Calcium-activated signaling pathways that regulate gene transcription. In neurons, neurotransmitter reception and membrane depolarization lead to the opening of ligand- and voltage-gated calcium channels. Subsequent calcium influx across the plasma membrane drives the activation of a number of signaling molecules, including the calcium-sensitive adenylate cyclase, calcium/calmodulin-activated kinases, and Ras. *Each of these molecules activates a cascade of signaling proteins that amplifies the calcium signal and carries it to the nucleus.* Dashed lines represent the components of each pathway that are proposed to translocate into the nucleus. Nuclear kinases including protein kinase A, CaMK-IV, and members of the Rsk family phosphorylate CREB at Ser-133, rendering it competent to mediate transcription of genes such as *BDNF*. [Reproduced with permission from ref. 60 (Copyright 1999, Annual Reviews, <http://AnnualReviews.org>).]

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