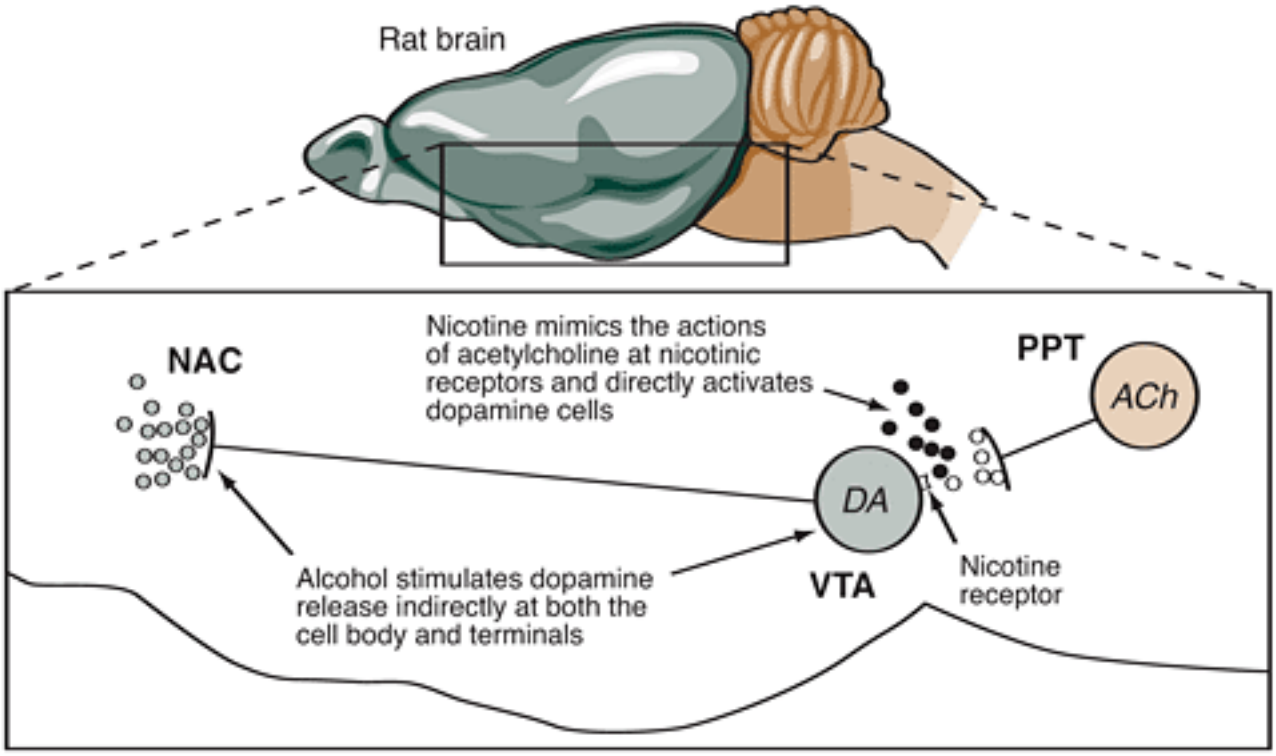
Interactive effects of alcohol and nicotine on dopamine release in the rat brain



Under normal conditions, neurons from the pedunculopontine tegmental nucleus (PPT) that release the neurotransmitter acetylcholine (ACh) extend to the ventral tegmental area (VTA). Released ACh (open circles) stimulate nicotinic receptors on neurons that in turn release the neurotransmitter dopamine (DA) in several brain regions, including the nucleus accumbens (NAC). When nicotine (black circles) enters the brain from the circulation, it acts on the nicotinic receptors on the dopamine-containing neurons in the VTA, resulting in increased dopamine release (shaded circles) in the NAC. Alcohol also causes dopamine release in the VTA and NAC through an unknown, but likely indirect, mechanism. The combined effects of alcohol and nicotine can enhance dopamine release in the NAC.

Prepared: December 2008