

BIOACTIVITY OF N-OLEOYL-DOPAMINE

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N-oleoyl-dopamine (OLDA) belongs to a novel class of *N*-acylated derivatives of dopamine whose structure encompasses both dopamine and a free fatty acid chain. The possibility of the compound's *in vivo* synthesis was proposed on theoretical ground by Pokorski and Matysiak (*Med Hypoth* 50: 131-133, 1998) and recently confirmed in mammalian brain. The physiological role of the compound is not full well known. This communication addresses basic biological characteristics of OLDA recently studied in our laboratory in the rat model, such as the ability of OLDA to penetrate biological barriers, its stability in the brain and influence on locomotor activity and hypoxic respiration; the latter two having to do appreciably with dopaminergic transmission. Using thin-layered-chromatography, we found that OLDA was recovered from brain tissue homogenates after systemic administration (20 mg/kg) and stays there as an integral compound for up to 24 h. Furthermore, OLDA was strikingly resistant to oxidative conditions, compared with dopamine proper, in rat brain membranes. In *in vivo* tests OLDA stimulated locomotor activity in freely moving rats. The distance traveled by a rat increased, on average, from 403 ± 89 cm to 1213 ± 196 cm after 10 mg/kg OLDA during the 2-h test ($P < 0.05$). The effect was expressed the most during the first hour after intraperitoneal administration of 20 mg/kg OLDA and was dose-dependently antagonized by haloperidol, a dopamine receptor blocker. In the same dose OLDA also clearly influences respiration in the dopamine-like manner. It inhibited the hypoxic respiratory response, as assessed from the phrenic neurogram in anesthetized paralyzed rats in which the end-tidal CO₂ level was kept constant. The peak minute respiratory neural output decreased by a mean of 23% during 11% hypoxia. The effect was abolished by haloperidol pretreatment, which again points to the involvement of a dopamine pathway. We conclude that OLDA is a bioactive compound capable of regulating a number of neural functions. OLDA holds the promise of integrating lipid signals into the dopaminergic transmission, a property that cannot be exercised by dopamine proper.