Amitraz changes DA levels mediated by alterations in estradiol content in CNS of male rats.

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INTRODUCTION

Amitraz is a formamidine insecticide/acaricide that alters different neurotransmitters levels, among other neurotoxic effects. Oral amitraz exposure (20, 50 and 80 mg/kg bw, 5 days) has been reported to increase dopamine (DA) content and to decrease its metabolite and turnover rates in the male rat brain, particularly in the striatum, prefrontal cortex, and hippocampus. However, the mechanisms by which these alterations are produced are not completely understood. Amitraz alters estradiol concentrations in the brain that regulate the enzymes responsible for this neurotransmitter synthesis and metabolism. Thus, alterations in estradiol levels in the brain could mediate the observed effects.

METHODS

To test these hypothesis regarding possible mechanisms, we treated male rats with 20, 50 and 80 mg/kg bw for 5 days with or without tamoxifen (TMX, 1 mg/kg bw), a selective estrogen receptor antagonist, and then isolated tissue from striatum, prefrontal cortex, and hippocampus. We then measured tissue levels of DA neurotransmitter and its metabolites.

RESULTS

Amitraz produced a dose-dependent increase of the DA levels in all brain regions studied compared to the control group. Moreover, amitraz induced a dose-dependent decrease of of DOPAC and HVA metabolites content and turnover rate (DOPAC+HVA/DA) in all brain regions studied compared to the control group. TMX co-treatment with amitraz partially reversed the change in DA neurotransmitter and its metabolite levels as well as the turnover rates induced by amitraz alone in all brain regions studied.

CONCLUSIONS

Our present results provide new understanding of the mechanisms contributing to the harmful effects of amitraz.