



Permanent effects on monoaminergic neurotransmitters biosynthesis and metabolism after prenatal and postnatal exposure to chlordimeform, in female and male rat's hippocampus.

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INTRODUCTION

Chlordimeform is a pesticide from the formamidine family. Such family of pesticides have been shown to permanently alter monoaminergic neurotransmitter systems in a sex- and region-dependent way. Those effects may be related to monoamine oxidase (MAO) inhibition, although chlordimeform has been shown to be a very weak MAO inhibitor, suggesting that other mechanism should be involved. Thus, chlordimeform may alter the expression of enzymes that control synthesis and metabolism of monoaminergic neurotransmitters systems, which could mediate the observed effects.

METHODS

In order to confirm that chlordimeform produces an alteration on the enzymes that synthesize and/or metabolize monoaminergic neurotransmitters systems, thus inducing permanent alterations of the monoamine neurotransmitter systems, we evaluated, in hippocampus of male and female rats, the effect on the expression of MAO, COMT, BDH, TH, TRH, and AD enzymes at 60 days of age after maternal exposure to chlordimeform (5 mg/kg body weight).

RESULTS

MAO and BDH enzymes expression was not altered by chlordimeform treatment, but TH enzyme expression was decreased and COMT, BDH and TRH enzymes expression was increased in both males and females after treatment with chlordimeform. Besides, females showed a bigger increase in the expression of COMT [58,83% (P<0,001)], AD [46,74% (P<0,001)], TH [43,65% (P<0,001)] and TRH [37,85% (P<0,001)] enzymes.

CONCLUSIONS

The present findings indicate that after maternal exposure to formamidines, in general and chlordimeform, in particular, induces a permanent alteration of monoaminergic neurotransmitters, through alteration of the enzymes that synthesize these neurotransmitters.

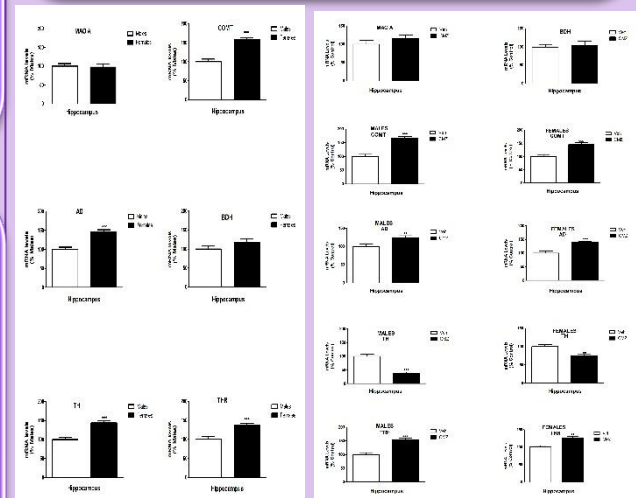


Figure 1. Gene differences results from real-time PCR targeting MAO, COMT, BDH, AD, TH, TRH genes after chlordimeform treatment in male and female rats. MAO, COMT, BDH, AD, TH, TRH gene expression was measured by real-time RT-PCR. ACTB was used as an internal control. ****p < 0.0001, **p < 0.01, significantly different from controls.

Figure 2. Results from real-time PCR targeting MAO, COMT, BDH, AD, TH, TRH genes after chlordimeform treatment in male and female rats. MAO, COMT, BDH, AD, TH, TRH gene expression was measured by real-time RT-PCR. ACTB was used as an internal control. ****p < 0.0001, **p < 0.01, significantly different from controls.