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Effect of the pendimethalin on rat uterine weight and gene expression of mRNAs encoding for different estrogen-regulated genes on rat uterus

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Herbicides are some of the compounds most frequently released into the environment because of their widespread use in agriculture. Despite the beneficial effects associated with the use of herbicides, many of these chemicals may pose potential hazards to humans and to nature. The widespread use of herbicides for preventing, destroying, repelling, or mitigating pests has led to anxiety about the possible hazards to public health. Dinitroaniline herbicides are inhibits of growth and cell division and selectively controls weeds. They are used to control broadleaf weeds and grassy weed species in cereals, onions, garlic, corn, rice, potatoes, tobacco, and tomatoes. Owing to their widely agricultural use, they contaminate soil and water. In addition, they are used on non-agricultural areas and on residential lawns, and ornamentals. But there is scanty and contradictory knowledge about their endocrine disruptor effects. In this study, endocrine disrupting potential of the herbicide pendimethalin was investigated *in vivo* on the uterotrophic response and on the expression of estrogen-regulated genes examined by quantitative real-time RT PCR. Receptor binding characteristics of pendimethalin were analyzed by an in silico method. Pendimethalin (150, 225, 300 and 600 mg/kg/day) was administered by oral gavage to immature female rats for 3 days, with ethinylestradiol (0.001 mg/kg/day) as positive control. Pendimethalin caused a small but significant increase in absolute uterine weight at and above 300 mg/kg/day and in relative uterine weight at 600 mg/kg/day. Estrogen receptor (ER)-alpha mRNA levels were not affected, whereas ER-beta mRNA was up-regulated at the highest dose. Progesterone receptor mRNA level was not significantly changed, while insulin-like growth factor-I mRNA was reduced, significantly at 225 mg/kg/day to 65% of control. Androgen receptor (AR) mRNA showed a marked down-regulation at doses of 225 mg/kg/day and above. The expression pattern differed from that of ethinylestradiol. *In silico* analysis revealed potential binding of pendimethalin to ER-beta and AR, but virtually no binding to ER-alpha. These data demonstrate that pendimethalin exhibits estrogenic activity also *in vivo*. However, its uterotrophic effect, which is an ER-alpha-mediated response, is very small, and it appears that *in vivo* actions should rather be sought in ER-beta-regulated functions.

Biography

U Undeger Bucurgat has completed her PhD in 2001 from Hacettepe University, Faculty of Pharmacy, Department of Pharmaceutical Toxicology (Turkey). She is currently working in the same department as Professor. She studied in Albert Szent Györgyi University, Hungary in 1998 as Researcher during her doctorate. She studied in Zurich University in 2002 and Dortmund University in 2004 as Post doctorate researcher. She has 35 article indexed in Science Citation Index and 629 citations for her publications.

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