ATRAZINE: A TALE OF TWO SPECIES. Lesley Mills (mills.lesley@epa.gov), Ruth Gutjahr-Gobell, Saro Jayaraman, & Gerald Zaroogian, U.S.EPA, Atlantic Ecology Division, Narragansett, RI 02882; and Susan Laws, U.S.EPA, Reproductive Toxicology Division, Durham, NSC 27711.

Atrazine, one of the most commonly used herbicides in the United States, is applied to multiple crops such as corn, sorghum, sugarcane, cotton and landscape vegetation. The herbicide enters the aquatic environment due to run-off after agricultural application, especially in the spring. Atrazine has been shownuggested to disrupt normal reproductive processes in rats, fish and frogs. Current evidence suggests that atrazine may interfere with aromatase, the rate-limiting enzyme complex catalyzing the conversion of androgens (androstenedione and testosterone) to estrogens (estrone and estradiol) during steroidogenesis in a wide range of animals. The goal of our research was to determine if effects from exposure to atrazine in one species could predict the risks of atrazine exposure in another species. To accomplish this goal, we examined reproductive endpoints and aromatase activity in the brains and gonads of a rat (a model of human health) and a fish (an ecological model) species. Laboratory atrazine exposures resulted in significant effects on reproductive endpoints in both species. Results also indicated that, not only do the two species show differences in their sensitivity to aromatase modulation by atrazine, but atrazine exposure can affect aromatase activity in tissues of the same species differently. In these studies, no differences were observed in rat aromatase activity or aromatase mRNA in the brain, gonads or adipose tissue following exposure to atrazine, while in fish, brain aromatase activity was signficantly elevated with no effect on gonads. In addition, differences in the metabolism of atrazine between the two species were elucidated. Through this research, we have identified a number of differences between species that suggest there are significant uncertainties for atrazine risk assessments across diverse species. Research is continuing into the specific mechanisms by which atrazine or its metabolites might impact local aromatase activity and reproductive endpoints in the two species.

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