

## Abstract

Multiple exposures to the herbicide atrazine (ATRZ) were shown to suppress the LH surge in both cycling female rats and those **ovariectomized** (OVX) and primed with **estradiol** (E2). A single ATRZ administration was found to induce a prompt and marked increase in progesterone (P4). As exogenous P4 is known to have a differential effect on the LH surge depending on its temporal relationship with the surge, it was hypothesized that a single treatment in an OVX, E2-primed rat would augment the surge, whereas several exposures would cause a decrease. Following four daily treatments with 100mg/kg, LH surge was suppressed. In contrast, a single ATRZ exposure elevated the surge. Two treatments were without effect. The single administration caused a large increase in P4 at 30 and 60min that was likely attributable to adrenal secretion. Four exposures also elevated P4 after the final treatment, although the duration of the increase was shortened. A single treatment with 0, 10, 30, and 100mg/kg ATRZ showed similar elevations at the highest concentration in P4, the LH peak, and area under the curve (AUC), whereas four exposures reduced the AUC. An increase at 1h in the expression of Kiss1 in the anteroventral periventricular nucleus suggests that this regional kisspeptin neuronal population has a role in the ATRZ augmentation of the surge. These data support the hypothesis that ATRZ-induced changes in adrenal P4 can either augment or attenuate the surge depending on the temporal proximity of exposure to the rise in LH.