Aroclor 1242 alters aromatase activity during embryogenesis in the red-eared slider turtle, a species with temperature-dependent sex determination

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Sex development in the red-eared slider turtle is dependent on incubation temperature rather than specific sex chromosomes. Natural estrogens have the ability to direct sex development to the female pathway at a normally male-producing temperature in this species. Female development occurs via a pathway that involves the estrogen receptor and the steroidogenic enzyme aromatase. Studies indicate that the temperature signal for sexual development may be transduced in the brain of this turtle. In female development, this signal transduction may manifest as aromatase activity and production of estrogens. Previously, we examined the organismal effects of xenobiotic compounds suspected of mimicking estrogens on the red-eared slider turtle during development. Three compounds—the PCB mixture Aroclor 1242, trans-Nonachlor, and chlordane—all altered sex ratio outcomes in this species when applied to eggshells during embryogenesis. In the current study, Aroclor 1242 and chlordane were examined for their effects on aromatase activity levels in the brain and adrenal-kidney-gonad (AKG) complexes during embryogenesis and compared to the activity of a temperature control at the same stages of development. Neither compound affected aromatase activity in the AKG. Chlordane, a suspected anti-androgen in this species, did not affect aromatase activity in the brain either; however, Aroclor 1242 significantly altered aromatase activity levels in the red-eared slider turtle brain during a crucial developmental period.