

Patuxent Wildlife Research Center

Contaminants with Endocrine Activity: what are the effects on wildlife?

Many chemicals found in the environment have hormonal activity in laboratory animals. How such chemicals affect normal function in exposed wild animals is largely unknown. For instance, does exposure to common pollutants act through this mechanism? What aspects of life history are altered? Are taxonomic groups of animals, or animals living in different habitats, affected differentially through this mechanism?

Through the USGS Endocrine Disruptor Initiative, research projects at Patuxent are designed to address information needs such as these.

RESULTS OF RECENT PROJECTS AT PATUXENT:

1. Gonadal development and reproductive morphology in American kestrel chicks exposed to PCB (which is estrogenic in mice) was no different than in control chicks, and their siblings grew up to breed normally in captivity.
2. Reproductive behavior in male Japanese quail develops abnormally, when PCBs are injected into the eggs from which they hatch; the mechanism may be impaired hormonal control of the developing brain in hatchlings.
3. The gender of Maryland terrapin embryos can be changed with topical exposure of terrapin eggs to estrogens and to certain PCBs, at quite low levels.
4. Metamorphosis in leopard frogs, controlled largely by thyroid hormone, is impaired by chemicals such as perchlorate and PCBs. Amphibians, therefore are potentially excellent models for thyroid disruption.



CRUCIAL GOALS FOR FUTURE RESEARCH INCLUDE:

- Identify indicators of endocrine disruption, such as easily measured external traits that would be useful in field studies;
- Develop methods to screen endocrine active chemicals for their potential to alter development, metamorphosis, reproduction, or other vital processes;
- Define the consequences, for individual life history, for population dynamics, and for community structure, of exposure to endocrine-active chemicals



These important questions about endocrine disruption are of great concern to state and Federal resource managers, and are a focus of research at the Patuxent Wildlife Research Center.