

Aquatic Contaminants and Reproductive Health: Lessons Learned from Wildlife

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For over a century, wildlife and other animals have been used to predict the potential detrimental or beneficial human health effects of various environmental factors. These factors range from dietary and pharmaceutical effects to exposures to toxic chemicals. As the molecular, cellular and physiological mechanisms underlying the biology of reproduction in vertebrates are clarified, we are able to determine with better assurance, which endpoints are important indicators of compromised reproductive potential. Studies examining the reproductive biology of an wide array of vertebrate species, from fish to non-primate mammals, indicated that exposure to various common environmental contaminants have the potential to disrupt the development and functioning of the reproductive, endocrine and neuroendocrine systems. Effects can occur at ecologically relevant concentrations. Specifically, studies of fish, amphibians, reptiles, birds and non-primate mammals indicate that developmental exposure to compounds such as various pesticides, plasticizers, industrial waste products, chemical stabilizers, pharmaceuticals, plant secondary compounds (phytoestrogens) and flame retardants, in aquatic ecosystems can alter the development of the ovary or testis, for example, leading to compromises in reproductive potential. Alterations in gene expression, correlated with changes in organ physiology and anatomy will be examined for several common Florida wetland species, such as the American alligator and the mosquitofish. A growing literature demonstrates the common relationships in the biology of reproduction among vertebrates. Fertility and thus infertility, is an integrated response to the functioning of many complicated systems at many levels of organization. Although each species has its unique attributes, significant conservation exists in the underlying molecular, cellular and physiological systems associated with vertebrate reproduction, allowing us, with a reasonable degree of caution, to use data from wildlife and other animal species to assess potential environmental influences on the process of reproduction in a wide array of species, including humans.