Sex differentiation as a target of endocrine disrupting compounds in early life stage fathead minnows (*Pimephales promelas*)

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The occurrence of endocrine disrupting chemicals (EDCs) in concentrated animal feed operation (CAFO) waste, and the potential effects of these chemicals on aquatic ecosystems have been of recent concern. There is evidence that exposure to EDCs during enhanced windows of sensitivity can lead to alterations in fish sex differentiation. Fathead minnows (*Pimephales promelas*) are commonly used as a model fish species in endocrine disruption studies, however limited knowledge exists on molecular pathways associated with sex differentiation in early life stages of this species. A method has been developed to determine genetic sex in early life stage fathead minnows by use of a sex-linked DNA marker. Changes in the expression of genes important in sex differentiation (*cyp19a, sox9, dmrt1*) could be used as a way to evaluate effects of EDCs on gonadal development and sex differentiation. For example, *cyp19a* expression doubles in females from 10 to 15 days post hatch (dph) and is 6 fold higher by 20 dph, but does not significantly change in males during this time. This period in development has also been found to be a sensitive window for fathead minnows exposed to EDCs. We hypothesize that the expression of *cyp19a* and other genes involved in sex differentiation and gonad development will be altered in a sex specific manner when fathead minnows are exposed to androgens, estrogens, or mixtures of EDCs during sex differentiation. Preliminary data from our lab show that fathead minnow embryos exposed to trenbolone (a potent synthetic androgen) respond with significant alterations in expression of such genes. Evaluation of these molecular markers in combination with this new method of sex identification is being used for developing efficient tools to evaluate sex specific responses of EDCs on early life stage fish. These tools will help us gain knowledge of the molecular pathways controlling sex differentiation in fathead minnows and how EDCs may alter these processes. *This abstract does not necessarily reflect US EPA policy.*