

Effects possibly linked to endocrine disruptors

- reproductive effects
 - decreased fertility
 - genital deformities
 - early puberty
 - endometriosis
 - low sperm count
 - breast, uterine, prostate and testicular cancers
- thyroid malfunction - lasting effects on growth and development
 - short-term memory loss
 - planning ability
 - attention deficit disorder
 - problems with metabolism and blood pressure
- neurological disorders
 - abnormalities in behavior
 - difficulty in learning
 - distorted sensory functions
- immunological disorders
 - susceptibility to disease
 - hypersensitivity
 - allergies

Vitellogenin Production in Fish

- vitellogenin is an egg yolk protein normally produced in mature female fish by estrogenic stimulation
- vitellogenin production in male or immature female fish is taken as an indicator of estrogenic exposure
- this effect has been observed in fish exposed to domestic and industrial effluents
- European study of various effluents found many induced vitellogenin production
 - in some domestic sewage most estrogenic effects were attributed to estrogenic steroids from human excretion
 - a significant portion was due to ethinylestradiol (active ingredient in birth control pills)
 - in industrial effluent there were no estrogenic steroids, but found other estrogenic species:
 - nonyl phenol and related compounds derived from industrial surfactants
 - bisphenol A (BPA) used in manufacturing of plastics and epoxy resins
 - hydroxy phenyl hexanoic acid found in effluent from chemical manufacturer
 - study found that most raw sewage influent was highly estrogenic, but effluent varied
 - some sewage treatments may be better than others at removing estrogenic compounds
 - secondary (biological) treatment and residence time found to be major factors