

Are endocrine disrupting compounds a health risk in drinking water?

1: Int J Environ Res Public Health. 2006 Jun;3(2):180-4.

- Falconer IR.

Department of Clinical and Experimental Pharmacology, University of Adelaide Medical School and Cooperative Research Centre for Water Quality and Treatment, Adelaide, South Australia 5005.

ian.falconer@adelaide.edu.au

There has been a great deal of international discussion on the nature and relevance of endocrine disrupting compounds in the environment. Changes in reproductive organs of fish and mollusks have been demonstrated in rivers downstream of sewage discharges in Europe and in North America, which have been attributed to estrogenic compounds in the effluent. The anatomical and physiological changes in the fauna are illustrated by feminization of male gonads. The compounds of greatest hormonal activity in sewage effluent are the natural estrogens 17Beta-estradiol, estrone, estriol and the synthetic estrogen ethinylestradiol. Androgens are also widely present in wastewaters. Investigations of anthropogenic chemical contaminants in freshwaters and wastewaters have shown a wide variety of organic compounds, many of which have low levels of estrogenic activity. In many highly populated countries the drinking water is sourced from the same rivers and lakes that are the recipients of sewage and industrial discharge. The River Thames, which flows through London, England, has overall passed through drinking water and sewage discharge 5 times from source to mouth of the river. Under these types of circumstance, any accumulation of endocrine disrupting compounds from sewage or industry potentially affects the quality of drinking water. Neither basic wastewater treatment nor basic drinking water treatment will eliminate the estrogens, androgens or detergent breakdown products from water, due to the chemical stability of the structures. Hence a potential risk to health exists; however present data indicate that estrogenic contamination of drinking water is very unlikely to result in physiologically detectable effects in consumers. Pesticide, detergent and industrial contamination remain issues of concern. As a result of this concern, increased attention is being given to enhanced wastewater treatment in locations where the effluent is directly or indirectly in use for drinking water. In some places at which heavy anthropogenic

contamination of drinking water sources occurs, advanced drinking water treatment is increasingly being implemented. This treatment employs particle removal, ozone oxidation of organic material and activated charcoal adsorption of the oxidation products. Such processes will remove industrial organic chemicals, pesticides, detergents, pharmaceutical products and hormones. **Populations for which only basic wastewater and drinking water treatment are available remain vulnerable.**