Abstract

The upper Hudson River is contaminated with polychlorinated biphenyls (PCBs) from P. Edward, NY to New York City (NYC). The abdominal tissues of mink (Mustela vison) in the upper Hudson River contain PCBs, which are toxic to ecosystems. The PCBs are accumulated in mink fat and are passed to their offspring through lactation. PCBs can cause pathology in mink as well as other mammals. We conducted a study to evaluate the health effects of feeding mink diets containing PCBs from the upper Hudson River on offspring growth and mortality through 31 weeks of age. Animals were fed diets containing 2.5% to 20% Hudson River fish, providing 0.72 to 6.2 µg ∑PCBs/g feed (5.1 µg ∑PCBs/kg diet). There were insufficient numbers of surviving kits and juveniles to assess the incidence of the jaw lesion at 6 and 31 wks of age, respectively. The conclusions and opinions presented in this paper are based on a study of the effects of PCBs on mink. The results of this study are consistent with other studies showing that PCBs can cause pathology in mink as well as other mammals.

Methods

Feed

Carp collected from Upper Hudson River

- Contained 36.0 µg ∑PCBs/g wet wt.
- Control fish was ocean herring

- Contained 0.0854 µg ∑PCBs/g wet wt.
- Fish ground, blended and incorporated into feed.

Results

Effective concentrations of ∑PCBs and TEQs in feed and liver producing jaw lesions in 20% and 50% of adult mink (EC20, EC50) were as follows:

- EC20: 2.3 µg ∑PCBs/g feed, 3.2 – 4.6 µg ∑PCBs/kg diet
- EC50: 3.9 µg ∑PCBs/g feed, 21 – 29 µg ∑PCBs/kg diet

Conclusions

- Consumption of feed containing fish from the upper Hudson River resulted in:
  - Jaw lesion of adult mink characterized as mandibular and maxillary squamous epithelial proliferation
  - Dietary EC50 = 3.9 µg ∑PCBs/g feed (20 µg TEQs/g feed); dietary EC20 = 2.3 µg ∑PCBs/g feed (10 µg TEQs/g feed)
  - Hepatic EC50 = 4.4 µg ∑PCBs/g liver (151 µg TEQs/g liver); hepatic EC20 = 2.8 µg ∑PCBs/g liver (89 µg TEQs/g liver)
  - Jaw lesion EC20 is 6-fold greater than LC20 based on kit survival and EC50 is 1.7-fold greater than LC50

References