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EHT

Judging Dept.

Alexey Goncharov

Student

EHT | 2 | David O Carpenter

Dept or Program | Years in program | Mentor

Association between serum polychlorinated biphenyls, pesticides and testosterone levels in a Native American Population

Author (s)

Alexey Goncharov

Background: Polychlorinated biphenyls (PCBs) and chlorinated pesticides are endocrine disruptors, that alter both thyroid and estrogen functions. Less is known of their action on androgenic system.
Objectives: We have conducted a study of the relationship, between serum levels of testosterone in relation to levels of total PCBs, individual PCB congeners, various PCB congener groups, and three chlorinated pesticides, HCB, DDE and mirex, in an adult Mohawk population.
Methods: Fasting serum samples were obtained from 703 adult Mohawks, 18-95 years old, and analyzed for 101 serum PCB congeners, HCB, DDE, mirex, as well as, for testosterone, cholesterol and triglycerides. The relations between testosterone and tertiles of serum organochlorine levels were determined using a logistic regression model while controlling for age and other analytes. Males and females were considered separately.
Results: Testosterone levels were inversely related with total PCB concentrations in both males and females, whether wet weight or lipid adjusted values were used. In males, the odds ratio (OR) of having a decreased level of testosterone with total wet weight PCBs (highest vs. lowest tertile) was 0.31 (95% CI=0.13-0.68). After adjustment for other analytes. the OR was 0.16 (95% CI=0.04-0.58). The ORs for HCB, PCB 74, 153, and 170 were also significantly lower, as were those for mono-ortho and tri- plus tetra-ortho groups of congeners in males. Lipid-based mirex, after controlling for other analytes, showed a positive OR 2.82 (95% CI = 1.01-7.86). Testosterone levels in females were much lower than in males, but there was still a significant reduction in testosterone levels in relation to both wet weight and lipid adjusted total PCB levels, whether or not adjustment was made for other analytes. None of the pesticides showed significant relationships with testosterone levels in women.
Conclusions: Elevation in serum PCB levels is associated with a reduction in serum testosterone in both men and women.