

## **Misconception 8—Pesticides and other synthetic chemicals are disrupting hormones**

Synthetic hormone mimics such as organochlorine pesticides have become an environmental issue (Colborn & al. 1996), which was recently addressed by the National Academy of Sciences (National Research Council 1999). We discussed in Misconception 2 that hormonal factors are important in human cancer and that life-style factors can markedly change the levels of endogenous hormones. The trace exposures to estrogenic organochlorine residues are tiny compared to the normal dietary intake of naturally occurring endocrine-active chemicals in fruits and vegetables (Safe 1995; Safe 1997; Safe 2000). These low levels of human exposure seem toxicologically implausible as a significant cause of cancer or of reproductive abnormalities (Reinli & Block 1996; Safe 1995; Safe 1997; Safe 2000). Recent *epidemiological* studies have found no association between organochlorine pesticides and breast cancer, including one in which DDT, DDE, dieldrin, and chlordane were measured in blood of women on Long Island (Gammon & al. 2002). Synthetic hormone mimics have been proposed as a cause of declining sperm counts, even though it has not been shown that sperm counts are declining (Becker & Berhane 1997; Gyllenborg & al. 1999; Kolata 1996; National Research

Council 1999; Saidi & al. 1999; Swan & al. 1997). A recent analysis for the United States examined all available data on sperm counts and found that mean sperm concentrations were higher in New York than all other American cities (Saidi & al. 1999). When this geographic difference was taken into account, there was no significant change in sperm counts for the past 50 years (Saidi & al. 1999). Even if sperm counts were declining, there are many more likely causes, such as smoking and diet (**Misconception 2**, p. 7).

Some recent studies have compared estrogenic equivalents (EQ) of dietary intake of synthetic chemicals to phytoestrogens in the normal diet, by considering both the amount humans consume and estrogenic potency. Results support the idea that synthetic residues are orders of magnitude lower in EQ and are generally weaker in potency. One study used a series of in vitro assays and calculated the EQs in extracts from 200 ml of Cabernet Sauvignon wine and the EQs from average intake of organochlorine pesticides (Gaido & al. 1998). EQs for a single glass of wine ranged from 0.15 to 3.68 µg/day compared to 1.24 ng/day for organochlorine pesticides (Gaido & al. 1998); thus, the organochlorine residues are roughly 1,000 times less.

Another study (Setchell & al. 1997) compared plasma concentrations of the phytoestrogens genistein and daidzein in infants fed soy-based formula rather than cow's milk formula or human breast milk. Mean plasma levels were hundreds of times higher for the soy-fed infants than for the others. Recent studies in mice suggest that genistein injected subcutaneously for 5 days early in life is carcinogenic; uterine adenocarcinomas were induced in mice at doses about 10-fold greater (mg/kg/day) than would be received by an infant who was fed on soy formula (Newbold & al. 2001).