Energy balance and pollution by organochlorines and polychlorinated biphenyls

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Article first published online: 7 FEB 2003
DOI: 10.1046/j.1467-789X.2003.00085.x

Summary

Organochlorines are fat-soluble chemical compounds resistant to degradation, so they are stored in the adipose tissue of practically every organism on the planet, including humans. Accumulation of these compounds in the body seems to be related to fat mass, obese individuals having a higher plasma organochlorine concentration than lean subjects. During body weight loss, lipid mobilization and a decrease in fat mass result in increased concentrations of organochlorines in plasma and adipose tissue. Organochlorines may have adverse health effects. For example, they have been associated with altered immune and thyroid functions and with some types of cancer. As these compounds may reach their target organs whilst in the circulation, their increase in plasma during weight loss might be associated with some physiological changes occurring during weight loss. Relationships have indeed been reported among weight loss-induced increase in plasma organochlorine concentration and decreased triiodothyronine (T3) concentration, resting metabolic rate, and skeletal muscle markers for fat oxidation. Although further studies are needed to assess the causality of these relationships, they raise concern about some potential undesirable effects of weight loss. Indeed, the effects of organochlorines on energy balance could complicate body weight loss and even favour weight regain. These notions lend support for weight-loss strategies favouring a moderate weight loss, which would reduce risks for cardiovascular diseases, diabetes and hypertension, without resulting in a substantial release of organochlorines.