

Re: The Obesity Epidemic

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Obesity ...The emphasis of treatment should be to commit to the process of life-long healthy living including eating more wisely and increasing physical activity.

Avoiding Persistent Organic Pollutants may also be help helpful.

Polychlorinated biphenyl-77 induces adipocyte differentiation and proinflammatory adipokines and promotes obesity and atherosclerosis.

BACKGROUND: Obesity, an inflammatory condition linked to cardiovascular disease, is associated with expansion of adipose tissue. Highly prevalent coplanar polychlorinated biphenyls (PCBs) such as 3,3',4,4'-tetrachlorobiphenyl (PCB-77) accumulate in adipose tissue because of their lipophilicity and increase with obesity.

However, the effects of PCBs on adipocytes, obesity, and obesity-associated cardiovascular disease are unknown. **OBJECTIVES:** In this study we examined in vitro and in vivo effects of PCB-77 on adipocyte differentiation, proinflammatory adipokines, adipocyte morphology, body weight, serum lipids, and atherosclerosis. **METHODS:** PCB-77 or 2,2',4,4,5,5'-hexachlorobiphenyl (PCB-153) was incubated with 3T3-L1 adipocytes either during differentiation or in mature adipocytes.

Concentration-dependent effects of PCB-77 were contrasted with those of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). For in vivo studies, we treated C57BL/6 wild-type (WT) or aryl hydrocarbon receptor (AhR)(-/-) mice with vehicle or PCB-77 (49 mg/kg, by intraperitoneal injection) and examined body weight gain. In separate studies, we injected ApoE(-/-) mice with vehicle or PCB-77 over a 6-week period and examined body weight, adipocyte size, serum lipids, and atherosclerosis. **RESULTS:** Low concentrations of PCB-77 or TCDD increased adipocyte differentiation, glycerol-3-phosphate dehydrogenase activity, and expression of peroxisome proliferator-activated receptor gamma, whereas higher concentrations inhibited adipocyte differentiation. Effects of PCB-77 were abolished by the AhR antagonist alpha-naphthoflavone. PCB-77 promoted the expression and release of various proinflammatory cytokines from 3T3-L1 adipocytes. Administration of PCB-77 increased body weight gain in WT but not AhR(-/-) mice. ApoE(-/-) mice injected with PCB-77 exhibited greater body weight, adipocyte hypertrophy, serum dyslipidemia, and augmented atherosclerosis. **CONCLUSIONS:** Our findings suggest that PCB-77 may

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contribute to the development of obesity and obesity-associated atherosclerosis. PMID: 18560532

White adipose tissue: storage and effector site for environmental pollutants.

White adipose tissue (WAT) represents a reservoir of lipophilic environmental pollutants, especially of those which are resistant to biological and chemical degradation – so-called persistent organic pollutants (POPs). Large amounts of different congeners and isomers of these compounds exhibit a variety of adverse biological effects.

Interactions among different classes of compounds, frequently with opposing effects, complicate hazard evaluation and risk assessment.

WAT is the key organ for energy homeostasis and it also releases metabolites into the circulation and adipokines with systemic effects on insulin sensitivity and fuel partitioning in muscles and other tissues. Its beneficial role is lost in obesity when excessive accumulation of WAT contributes to severe diseases, such as diabetes.

POPs may crossroad or modulate the effect of endogenous ligands of nuclear transcription factors, participating in differentiation, metabolism and the secretory function of adipocytes. These mechanisms include, most importantly: i) endocrine disrupting potency of POPs mixtures on androgen, estrogen or thyroid hormone metabolism/functions in WAT, ii) interference of dioxin-like chemicals with retinoic acid homeostasis, where impact on retinoid receptors is expected, and iii) interaction with transcriptional activity of peroxisome proliferator-activated receptors is likely. Thus, the accumulation and action of POPs in WAT represents a unitary mechanism explaining, at least in part, the effects of POPs in the whole organism. By modulating WAT differentiation, metabolism and function, the POPs could affect not only the physiological role of WAT, but they may also influence the development of obesity-associated diseases. PMID: 16925464

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