Differential effects of environmental chemicals and food contaminants on adipogenesis, biomarker release and PPARγ activation

Eleven environmental relevant chemicals were investigated for their ability to affect adipogenesis in vitro, biomarker release from adipocytes and PPARα and γ activation. We found that butylparaben stimulated adipogenesis in 3T3-L1 adipocytes and increased release of leptin, adiponectin and resistin from the cells. Butylparaben activated PPARγ as well, which may be a mediator of the adipogenic effect. Polychlorinated biphenyl (PCB)153 also stimulate adipogenesis and biomarker release, but did not affect PPARs. The data indicates that PPARγ activating chemicals often stimulate adipocyte differentiation although PPARγ activation is neither a requirement nor a guarantee for stimulation. Four out of the eleven chemicals (bisphenol A, mono-ethylhexyl phthalate, butylparaben, PCB 153) caused increased adipogenesis. The release of adipocyte-secreted hormones was sometimes but not always correlated with the effect on adipocyte differentiation. Eight chemicals were able to cause increased leptin release. These findings strengthen the hypothesis that chemicals can interfere with pathways related to obesity development.