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## PERSISTENT ORGANIC POLLUTANTS IMPAIR INSULIN SECRETORY FUNCTION OF PANCREATIC BETA-CELLS: HUMAN AND IN VITRO EVIDENCE

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Persistent organic pollutants (POPs), especially organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs) have emerged as a new risk factor of type 2 diabetes (T2D). We evaluated whether chronic exposure to low-dose POPs affects insulin secretory function of beta-cells in humans and in vitro cells. Serum concentrations of OCPs and PCBs were measured in 200 non-diabetic adults. Mathematical-model-based insulin secretion indices were estimated using a 2-hour 7-sample oral glucose tolerance test. Insulin secretion by INS1E beta-cells was measured after 48-hour treatment with 3 OCPs or a PCB mixture. Static second-phase insulin secretion significantly decreased with increasing serum concentrations of OCPs. Adjusted means were 63.2, 39.3, 44.1, 39.3, 39.7, and 22.3 across six categories of a summary measure of OCPs (Ptrend = 0.02). Dynamic first-phase insulin secretion remarkably decreased only among insulin-sensitive individuals with increasing concentrations of OCPs (Ptrend = 0.02); the insulin levels among subjects with high OCPs were about 30% of those with low OCPs. Compared to OCPs, PCBs showed weaker associations. The decreased insulin secretion by INS1E beta-cells was observed for even 1 pM OCPs. Our data from human subjects and in vitro cell experiments suggest that chronic exposure to low-dose POPs, especially OCPs, can induce pancreatic beta-cell dysfunction

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### Biography

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