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Effects of bisphenol A on metabolism and evidences of a mode of action mediated through endocrine disruption

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TITLE[1]

Effects of Bisphenol A on metabolism and evidences of a mode of action mediated through endocrine disruption

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KEYWORDS

Bisphenol A, BPA, endocrine disruption, obesity, type 2 diabetes, insulin

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HIGHLIGHT

- BPA decreases insulin synthesis and secretion, after prenatal or adult exposure
- BPA decreases insulin action, after prenatal, perinatal and adult exposure
- There is good evidence of BPA toxicity on pancreatic β -cells
- Estrogen receptor mechanism (β/α or GPR30 types) may be involved
- Epigenetic mechanisms are also suggested

[1] BAT: brown adipose tissue; BMI: body mass index; bw: body weight; DES: diethylstilbestrol; DM: Diabete mellitus; ED: endocrine disruptor; eGFR: estimated glomerular filtration ; ERR: estrogen related receptor; ERRγ or ERRgamma: Estrogen-related receptor gamma; Erα or; ERalpha: estrogen receptor α ; ERβ or ERbeta: estrogen receptor beta ; FABP4: fatty acid binding protein 4; GD: gestation day; GLUT4: Glucose transporter type 4; GPER or GPR30: G protein-coupled estrogen receptor or G protein-coupled receptor 30, the membranous form of estrogen receptor; GR: glucocorticoid receptor (NR3C1); GSH:Glutathione ; GSIS: Glucose-Stimulated Insulin Secretion ; GTT: glucose tolerance test; HFD: High Fat Diet; IAPP: Islet Amyloid PolyPeptide ; ipGTT: intraperitoneal glucose tolerance tests; ipITT: intraperitoneal insulin tolerance tests; IR: insulin receptor; IRS-1: insulin receptor substrate 1; IS: insulin sensitivity; MDI: induction medium containing methylisobutylxanthine, dexamethasone, insulin; used in protocols to induce differentiation of 3T3-L1 cells into adipocyte-like cells; MoA: mode of action; MSCs: Mesenchymal Stromal Cells; NEFA: Non-Esterified Fatty Acids ; NHANES: US National Health and Nutrition Examination Survey; NHS: nurses' health study; NHSII: nurses' health study II; PI3K: phosphoinositide 3-kinase; PND: postnatal day; PPARγ: Peroxisome Proliferator Activated Receptor gamma ; PPRE: PPARγ; Response Element ; ROSI: Rosiglitazone; SOD: superoxide dismutase; TBT: Tributyltin ; TD2M: Type-2 diabetes mellitus ; TDI: tolerable daily intake; TG: triglyceride; TO: T0070907, used as a PPARγ antagonist; WAT: White Adipose Tissue; WB: Western blott