# Second research

**Title**

Apoptotic susceptibility of pancreatic alpha cells to environmentally relevant dose levels of bisphenol- A versus dibutyl phthalate is mediated by HSP60/caspase- 3 expression in male albino rats.

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**ABSTRACT**

Unfortunately, humanity is exposed to mixed plasticizers such as bisphenol- A (BPA) and dibutyl phthalate (DBP) that are leached from the daily used plastic products. Previous studies have demonstrated their potential in pancreatic beta cell injury and diabetes induction. The study hypothesized that both compounds would affect the pancreatic alpha cells in albino rats when administered at environmentally relevant doses. Heat shock protein 60 (HSP60) and caspase- 3 protein expression was also investigated as potential mechanisms. Thirty- six male Wistar albino rats were separated into four equal groups: control, BPA alone, DBP alone, and BPA + DBP combined groups. BPA and DBP were given in drinking water for 45 days in a dose of 4.5 and 0.8 μg/L, respectively. Fasting blood glucose, serum insulin, pancreatic tissue levels of malondialdehyde, and superoxide dismutase were measured. Pancreatic sections were subjected to hematoxylin & eosin (H & E) staining, glucagon, HSP60, and caspase- 3 immunohistochemistry. Although all three experimental groups showed diffuse islet cell HSP60 immunoreactivity, rats exposed to BPA alone showed α- cell- only apoptosis, indicated by H & E changes and caspase- 3 immunoreactivity, associated with reduced glucagon immunoreaction. However, rats exposed to DBP alone showed no changes in either α or β- cells. Both combined- exposed animals displayed α and β apoptotic changes

associated with islet atrophy and reduced glucagon expression. In conclusion, the study suggested HSP60/caspase- 3 interaction, caspase-3 activation, and initiation of apoptosis in α- cell only for BPA- alone exposure group, meanwhile DBP alone did not progress to apoptosis. Interestingly, both α/β cell effect was observed in the mixed group implying synergetic/additive action of both chemicals when combined.
**Keywords:** Environmental sciences, histological and biochemical study, immunohistochemistry, pancreas, rats, α- cells apoptosis