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Acute effect of advanced glycation end products in insulin secretion process

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Advanced glycation end products (AGE) are formed and accumulated by endogenous and exogenous mechanisms. Methylglyoxal (MG), a highly reactive metabolite of glucose, is a strong precursor for a number of known advanced glycation end products (AGE) implicated in the insulin resistance and diabetes. Recent studies also suggest a role for MG in β-cell dysfunction and diabetes complications. Therefore, to study the effect of AGE on insulin production and secretion, islets of Langerhans were isolated from adult rats and incubated in vitro with MG (10 μM) for short-term (one hour). The results showed different patterns of AGE's effects on insulin secretion. At basal glucose secretion (5.6 mM), MG induced significant increase ($p<0.001$) of insulin secretion as compared to untreated cells. By contrast, at high glucose concentrations (8.3mM and 16.7 mM), MG inhibited insulin secretion significantly ($p<0.01$). Furthermore, in the presence of potassium, forskolin, and epinephrine, MG enhanced insulin secretion ($p<0.05$), while when it was incubated with acetylcholine and leucine, MG resulted in a decreased insulin secretion ($p<0.01$). Based on these results, MG seems to modulate the secretion activity of β-cell depending on its level of stimulation by other metabolic factors. Furthermore, MG also has an acute dual effect on pancreatic cell insulin secretion.

Biography

Ghada Elmhiri has completed her master degree at the age of 24 years from Sorbonne University in Paris. She is a Ph.D. student at Polytechnic institute LaSalle Beauvais in France. She is working on the effects of AGEs on metabolic programming and epigenetics process.

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