Synthesis and Biological Evaluation of Piperazine Derivatives as DPP-IV Inhibitors

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Abstract

Diabetes mellitus (DM) is a chronic disease characterized by hyperglycemia mainly because of the absolute or relative deficiency of insulin hormone. The dipeptidyl peptidase-IV (DPP-IV) inhibitors represent a class of glucose-lowering agents potentiating the action of the incretin hormones (GLP-1) and (GIP), they are secreted from the intestinal endocrine cells in response to food ingestion to stimulate insulin secretion from pancreatic beta cells.

In this study, synthesis of seven piperazine derivatives **3a-3g** was carried out. The synthesized molecules were fully characterized using ^{1}H-NMR, ^{13}C-NMR and IR. *In vitro* biological evaluation tests showed comparable inhibitory activity for the targeted compounds ranging from 16%-30% at 100 µM concentration. Furthermore, the *in vivo* hypoglycemic activity of **3d** was evaluated using streptozotocin-induced diabetic mice. It was found that **3d** significantly decreased blood glucose level compared to saxaglibtin.

In conclusion, piperazine derivatives were found to be successful new scaffold as potential DPP-IV inhibitors.