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The effects of glucagon-like-peptide-1 and vitamin D on the inflammatory pathways in a model of endothelial cells in a diabetic-like environment

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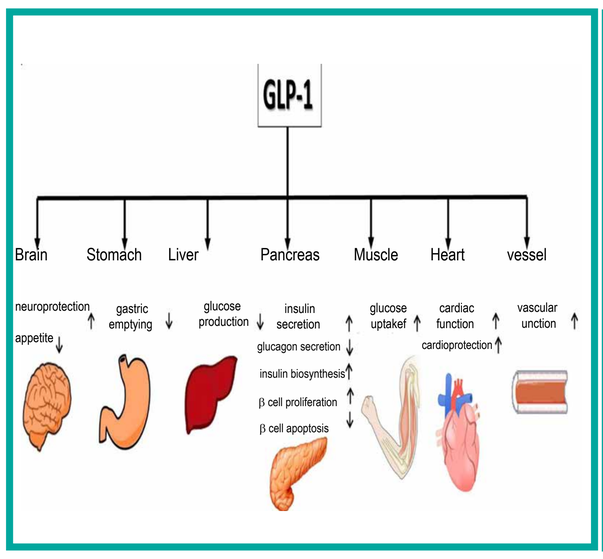
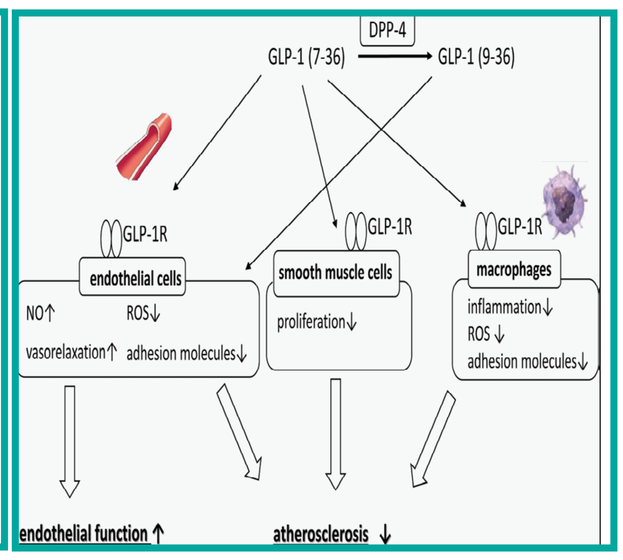
BACKGROUND

Diabetes mellitus is the rising cause worldwide of micro and macrovasculopathies. High levels of glucose and AGEs are involved in the pathogenesis of the vasculopathies. GLP-1, an incretin hormone improves glycemic control by increasing glucose-stimulated insulin release. Vitamin D deficiency is involved in insulin release and in endothelial cell dysfunction in DM.

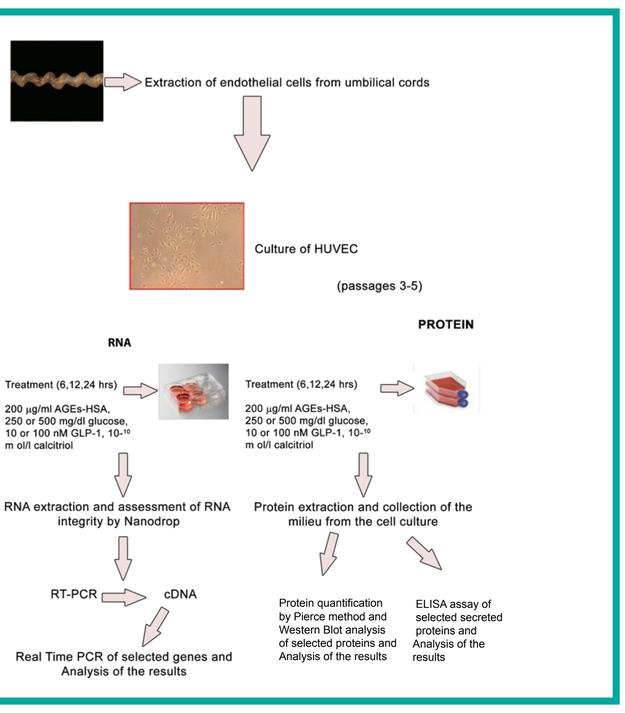




AIMS

To evaluate the effects of GLP-1 analogue (liraglitude) and calcitriol (the active form of vitamin D) on genes and protein expression involved in the inflammatory pathways in cultured HUVEC exposed to a diabetic-like environment for 6, 12 and 24 hrs.

METHODS

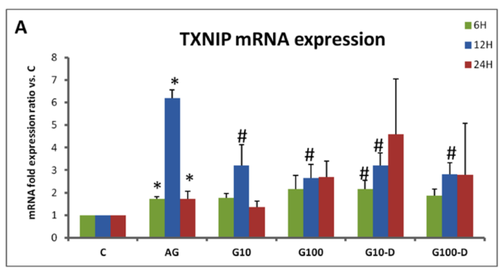


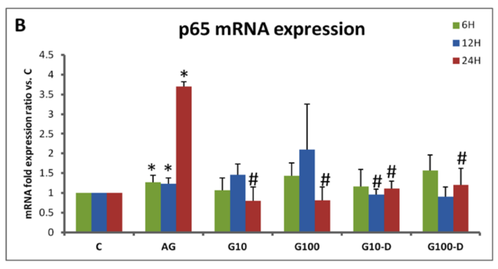
SUMMARY

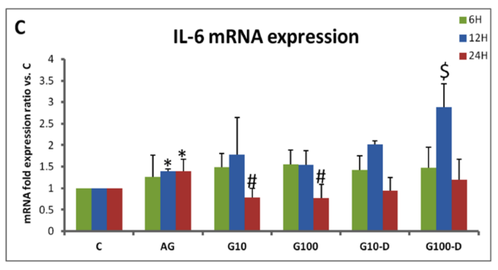
- Diabetic environment modified gene and protein expression related to apoptosis (TXNIP) and inflammation (KLF4, p65, IL-6, IL-8) particularly after 12 and 24 hrs.
- GLP-1 analogue prevented the inflammatory response observed in HUVEC exposed to a diabetic-like environment in most of the markers, in both concentrations.
- The addition of vitamin D improved the GLP-1 effects only in IL-6, p65 and KLF4 protein expression.

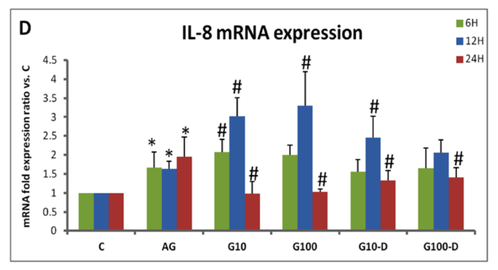
RESULTS

Figure 1









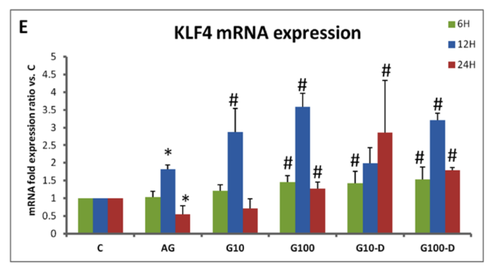
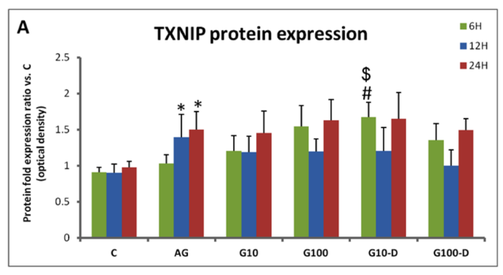
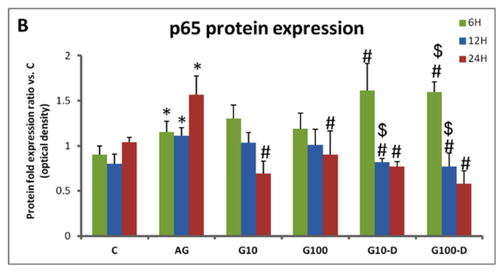
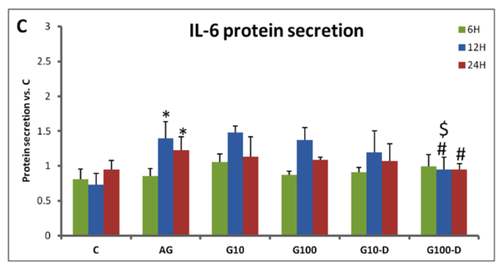
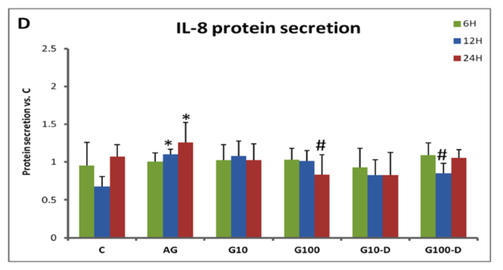


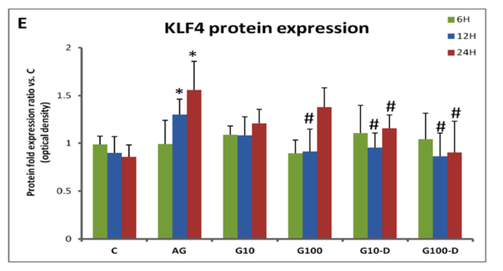
Figure 2











Figs. 1 and 2: Effect of GLP-1 and vitamin D (VITD) on mRNA and protein expression of TXNIP, p65, IL-6, IL-8 and KLF4 in HUVEC stimulated with glucose and AGE-HSA. Fig. 1: (A-E) mRNA expression; Fig. 2: (A-E) protein expression- densitometric analyses. *p < 0.05 compared to C (control group-HSA); **p < 0.05 compared with AG (AGE-Glucose).
$p < 0.05 compared to G10/G100 (GLP10 or GLP100). G10D (GLP10 and vitamin D), G100D (GLP100 and vitamin D).

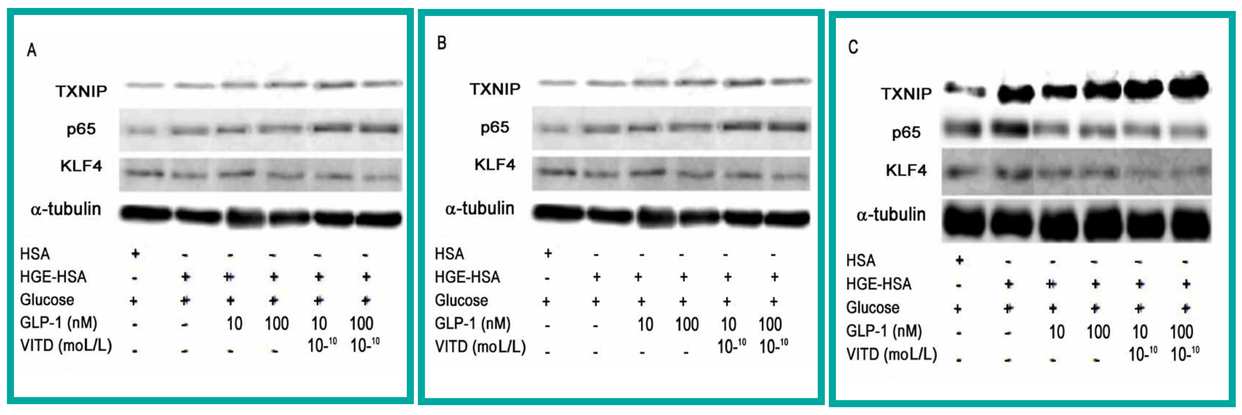


Fig. 3: Effect of GLP-1 and vitamin D (VITD) on TXNIP, p65 and KLF4 protein expression in HUVEC stimulated with glucose and AGE-HSA: western blot analysis, the level of α-tubulin is shown as a loading control. (A) 6 hours, (B) 12 hours, (C) 24 hours.

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