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Tamsulosin and Pioglitazone Effects on Proinflammatory and Profibrotic Activities of SV40 MES 13 Mesangial Cells Induced with High Glucose

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Objectives : Chronic kidney disease (CKD) is a condition characterized by a sustained decrease in renal function for at least 3 months. In 2022, it affected more than 800 million people worldwide. One of the main etiologies is diabetes mellitus and hypertension, causing a chronic inflammatory state that leads to fibrosis and renal damage. In this work we evaluate in vitro the anti-inflammatory and antifibrotic effects of tamsulosin on SV40 MES 13 cells activated with a high-glucose medium, with the aim of proposing new drugs for CKD.
Methods : SV40 MES 13 line was used as a cell model and treated with high glucose (20mM). The treatments consisted of tamsulosin at 50 nM or pioglitazone at 100 nM. To analyze cell activation through proliferation and cell viability, MTT, Hoechst nuclear counting and SYTOX Green were performed. The physiological effect was assessed by wound assay (migration), Rhodamine-phalloidin (F-actin) and Fura-2 AM (intracytoplasmic calcium). Oxidative stress was measured using MitoSOX assay. Inflammatory (NF-κB_{p65}, IL-1β, IL-17), fibrogenic (TGF-β, α-SMA, Collagen I) and antioxidant markers (NRF2) were analyzed by RT-qPCR and immunofluorescence assays.
Results : Viability and proliferation assays show that tamsulosin and pioglitazone treatments reduce the activation of SV40 MES 13 cells caused by high glucose medium. Damage was attenuated, increasing their migration capacity and cytoskeletal activity (F-actin); on the other hand, the release of intracellular calcium, while maintaining cell function, was reduced. Inflammatory, fibrogenic, and antioxidant markers showed a decrease upon the addition of the treatments.
Conclusions : Our results suggest that pioglitazone and tamsulosin upregulated the antioxidant, anti-inflammatory and antifibrotic response in SV40 MES 13 mesangial cells, which become potential drugs for the treatment of CKD.

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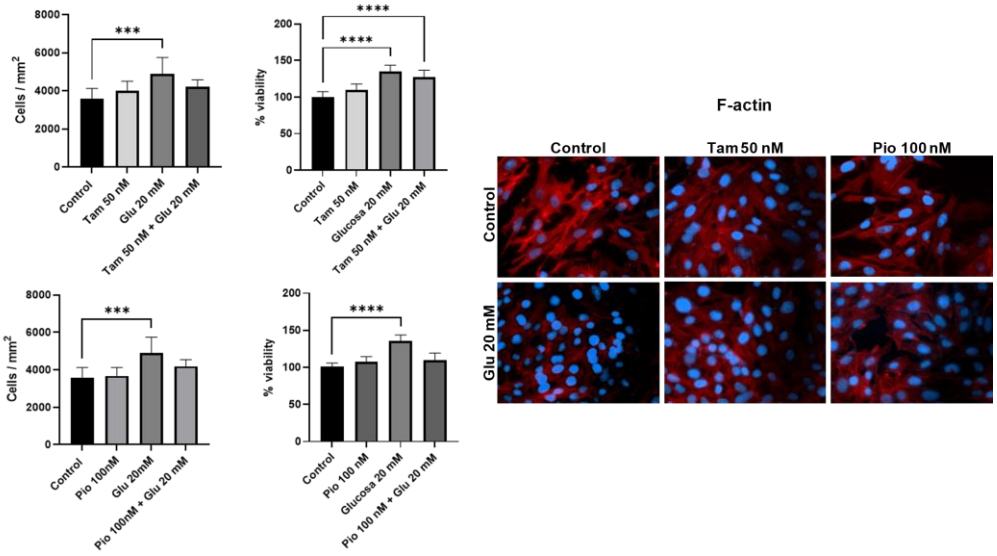

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