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The Effect of Saturated Fatty Acid on the Expression of Apoptotic and Fibrotic Proteins in Renal Tubular Epithelial Cells

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The Effect of Saturated Fatty Acid on the Expression of Apoptotic and Fibrotic Proteins in Renal Tubular Epithelial Cells*

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Abstract

Diabetic Nephropathy, triggered by diabetes, is a kidney disease with severe health consequences and is a high economic burden. Literature suggests that the deterioration of kidney function correlates best with the degree of renal tubulointerstitial fibrosis. Proximal tubule epithelial cells can orchestrate renal fibrosis, as a result of fatty acid accumulation, also known as lipotoxicity. The objective of the study is to evaluate the effect of saturated fatty acid on renal tubular epithelial cells. Human kidney proximal tubule cells (HK-2) were cultured in 5% FBS/DMEM/streptomycin/Hepes and incubated at 37°C until cells are 90% confluent. Palmitic acid (PA) was prepared in serum-free medium with 1% Bovine serum albumin (BSA) before cells were treated for 24 hours and 48 hours. After treatment, cell lysates were extracted, quantified by DC assay and analyzed by Western blot. As expected, BSA increased Bax and decreased BCL-2 proteins in HK-2 cells. Interestingly, a slight increase in BCL-2 and a decrease in Bax and Cyclin D1 proteins were observed in PA-treated cells after 24 hours. These changes were even greater when the cells were exposed to PA for 48 hours. Additionally, we observed an increase in fibronectin after chronic PA treatment. These results suggest the effect of PA on apoptosis related proteins is independent of BSA in renal tubular epithelial cells.

KEYWORDS: Diabetic Nephropathy; Lipotoxicity; Apoptosis; Renal Tubular Epithelial Cells

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ABSTRACT

Diabetic Nephropathy, triggered by diabetes, is a kidney disease with severe health consequences and is a high economic burden. Literature suggests that the deterioration of kidney function correlates best with the degree of renal tubulointerstitial fibrosis. Proximal tubule epithelial cells can orchestrate renal fibrosis, as a result of fatty acid accumulation, also known as lipotoxicity. The objective of the study is to evaluate the effect of saturated fatty acid on renal tubular epithelial cells. Human kidney proximal tubule cells (HK-2) were cultured in 5% FBS/DMEM/streptomycin/Hepes and incubated at 37°C until cells are 90% confluent. Palmitic acid (PA) was prepared in serum-free medium with 1% Bovine serum albumin (BSA) before cells were treated for 24 hours and 48 hours. After treatment, cell lysates were extracted, quantified by DC assay and analyzed by Western blot. As expected, BSA increased Bax and decreased BCL-2 proteins in HK-2 cells. Interestingly, a slight increase in BCL-2 and a decrease in Bax and Cyclin D1 proteins were observed in PA-treated cells after 24 hours. These changes were even greater when the cells were exposed to PA for 48 hours. Additionally, we observed an increase in fibronectin after chronic PA treatment. These results suggest the effect of PA on apoptosis related proteins is independent of BSA in renal tubular epithelial cells.

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