ABSTRACT

THE EFFECT OF METFORMIN ON TRANSFORMING GROWTH FACTOR-BETA (TGF-β) AND ALPHA-SMOOTH MUSCLE ACTIN (α-SMA) EXPRESSION IN FIBROTIC ANTERIOR CAPSULE LENS MODEL IN VITRO

Purpose: to investigate the effect of metformin to TGF-β and α-SMA levels in lens epithelial cells (LECs) inducted fibrotic condition

Methods: LECs were isolated from anterior capsule's tissue of cataract patient. LECs were divided into 4 groups consist of FBS 2% as control group and 3 others metformin group using different doses f 0.1 mM, 0.5 mM and 1 mM. LECs was identified by characterization staining with vimentin and P63 antibodies. Confluenced cells was investigated by staining of FITC TGF-β and α-SMA antibodies and the results were observed under a fluorescence microscope.
This study were analyzed oneway Anova test followed by posthoc test with significant level of $p<0.05$.

Results:
TGF-β antibody expression levels decreased after administration of metformin 0.1mM (6.96×10^6 pixels ± 1.03×10^6pixels), metformin 0.5mM (5.35×10^6pixels ± 1.23×10^6pixels), and metformin 1mM (1.93×10^6 pixels ± 0.94×10^6 pixels). The Tukey HSD post hoc test showed a significant decrease in expression levels in the 0.5mM metformin group ($p = 0.027$) and 1mM metformin ($p = 0.000$) compared to the 2% FBS control. The levels of α-SMA antibody expression decreased after administration of metformin 0.1mM (4.49×10^6pixels ± 0.74×10^6 pixels), metformin 0.5mM (3.34×10^6 pixels ± 0.47×10^6 pixels), and metformin 1mM (2.26×10^6 pixels ± 0.55×10^6 pixels). The Games-Howell post hoc test showed a significant decrease in expression levels between the control groups compared with the three treatment groups metformin 0.1mM ($p = 0.035$), metformin 0.5mM ($p = 0.008$) and metformin 1 mM ($p = 0.002$) compared to the FBS control 2%.

Conclusion: metformin might have antifibrotic effect on LECs fibrotic model through inhibiting TGF-β and α-SMA levels expression