The Antioxidants L-2-oxothiazolidine-4-carboxylate (OTZ) and N-Acetyl Cysteine (NAC) Protect Human Fibroblasts Against H₂O₂-induced Oxidative Stress

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Introduction
Tissue repair is partially determined by changes in the cell redox state (1). Since fibroblasts dysfunction is a key factor in the non-healing of chronic ulcers, in this study, modulation of the redox state of human skin fibroblasts has been carried out using N-Acetyl cysteine (NAC) and L-2-oxothiazolidine-4-carboxylate (OTZ), as antioxidant agents, in order to evaluate their possible application in chronic ulcers.

Materials and Methods
Cells were pre-treated with NAC (0.05-20 mM) or OTZ (0.05-20 mM) and then exposed to H₂O₂ (0.1-1.5 mM). Changes in proliferative activity (MTT assay), in GSH content (labelled with monochlorobimane) and in reactive oxygen species levels (ROS, using 2,7-dichlorofluoresceine) were analysed. Statistical analysis was performed using GraphPad™ software (San Diego, CA, USA). Student's t-test and ANOVA were used as appropriate.

Results
The both biomodulators induce a GSH levels increase, although the effect was stronger in the case of NAC. The effect of H₂O₂ was dose-dependent (Figure 1), showing high toxicity above the concentration of 0.5 mM. Under such conditions, NAC demonstrates greater protective capacity than OTZ, reducing ROS levels, increasing cellular viability and maintaining proliferative activity of cells (Figure 2).

Discussion and Conclusions
The oxidative stress suppose a problem for the behaviour of wound cells. Between the both used biomodulators, NAC significantly protects cells against the induced stress and it allows them to maintain their biologic activity. In summary, our study suggest that NAC could be used for wound healing as useful antioxidant agent.

References

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Disclosures
There are no commercial conflict of interest, and authors have nothing to disclose.