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## **The Antimicrobial peptide Temporin-Ra induces the secretion of TNF- $\alpha$ pro-inflammatory cytokine in A549 cells**

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Antimicrobial peptides as the body's defense strategy play an important role in resistance against infection of microorganism. These peptides are able to modulate the immune and inflammatory processes through the production of defensive molecules. In this study, the toxicity effect of Temporin-Ra (T-Ra) antimicrobial peptide on A549 cell line was investigated by MTT assay. To study the toxicity of peptide on host's cells, the hemolytic effect of peptide was investigated on human's red and white blood cells. To assess expression of TNF- $\alpha$  as pro-inflammatory cytokine, the expression levels of this gene was investigated by real time- PCR, 48h after administration of different doses of peptide on A549 cells. Furthermore, the production of reactive oxygen species was studied by flow cytometry and changes in cell attachment was also examined. According to our results, T-Ra decreased the viability up to 15% of A549 cells, while had no hemolytic and cytotoxic effects on human blood cells. In addition, T-Ra Increase the expression of pro- inflammatory cytokine (TNF- $\alpha$ ) in the highest time and dose. Production of reactive oxygen species and cell attachment significantly increased. In conclusion, our results demonstrate that T-Ra induced the expression of TNF- $\alpha$ , which consequently increased the production of reactive oxygen species which as a result induced apoptosis in A549 cell lines.

**Key words:**

Temporin-Ra, Real Time PCR, Reactive oxygen species, Flow cytometry, TNF- $\alpha$ .