INTRODUCTION

Fatty acids comprise a major part of the lipids and have remarkable effect on cell biology (1). Trans-palmitoleic acid (t-PA), a naturally occurring IFA has been shown to be related to better lipid profile including higher HDL-C and lower triglyceride, and associated with decreased insulin resistance, lower metabolic risk and incident of type2 diabetes (2).

AIM

The aim of this study was to investigate the effects of IFA on lipid accumulation in liver cells and the gene expression of fatty acid synthase (FAS) enzyme and the activity of peroxisome proliferator-activated receptor alpha (PPARα), an important nuclear receptor in the regulation of lipid metabolism.

METHOD

• HepG2 liver cells were cultured and treated with different concentrations of IFA and palmitic acid.
• Intracellular triglyceride (TG) levels were evaluated by Oil red O staining of the cultured cells as well as extraction of cellular lipids and measurement with an enzymatic method. Cell viability was assessed by MTT.
• The expression of FAS gene was assessed by real-time PCR, after total RNA extraction and measurement with an enzymatic method. Cell viability was assessed by MTT.
• The activity of PPARα was evaluated by luciferase reporter assay, after transfecting HEK293T cells with the vector comprising the PPARα response element.

RESULTS

Both IFA and palmitic acid caused TG deposition in liver cells; however, the TG levels were significantly lower in cells treated with IFA compared with the cells that were treated with palmitic acid (P<0.001) (Figure 1). IFA did not have any detrimental effect on the viability of HepG2 cells and on the other hand, increased their survival (Figure 2).

The gene expression of FAS was enhanced by both fatty acids, but in cells treated with IFA, it was significantly lower than palmitic acid (P<0.001) (Figure 3). IFA reduced palmitate-induced FAS induction (Figure 3B).

Treatment of cells with IFA resulted in the activation of PPARα, especially at lower concentrations (P<0.001), while palmitic acid did not have any effect on this nuclear receptor (Figure 4).

CONCLUSIONS

The results showed that less TG is accumulated in liver cells treated with IFA compared to palmitic acid and thus this fatty acid has better influence on liver cells compared to its saturated counterpart.

REFERENCES