

# Toxicology and Clinical Pharmacology

# & Generic Drugs and Biosimilars

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## Susceptibility of human trophoblast cells to palmitic acid is depended on SCD1 activity

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Human placentation is highly depended on precise regulation of trophoblast growth. It is reported that saturated fatty acid mediated lipotoxicity induces apoptosis on various cell types including cardiomyoblast and pancreatic  $\beta$ -cells. Although dietary factors influence on the function of trophoblast cells in early pregnancy, effects of palmitic acid which is most widely distributed saturated fatty acid are uncertain. In present study, we verify palmitic acid inhibits proliferation and induces apoptosis and loss of mitochondrial membrane potential on human trophoblast cell lines, HTR8/SVneo. Also, palmitic acid reduces generation of reactive oxygen stress and mitochondrial  $\text{Ca}^{2+}$  concentration in HTR8/SVneo cells. Palmitic acid also inhibits PI3K/AKT signaling pathways in HTR8/SVneo cells. Also, we verify stearoyl-CoA desaturase 1 (SCD1), rate-limiting enzyme in synthesis of saturated fatty acid, alleviates palmitic acid-induced lipotoxicity on HTR8/SVneo cells. In addition, down-regulation of SCD1 using small interfering RNA increases susceptibility of HTR8/SVneo cells to palmitic acid-induced lipotoxicity. Further, we verify triacylglyceride (TAG) synthesis has a protective role against palmitic acid by knockdown of diacylglycerol O-acyltransferase 1 (DGAT1), suggesting accumulation of diacylglycerol and ceramide plays a critical role in palmitic acid-induced apoptosis of HTR8/SVneo cells. Moreover, we investigate whether mitochondrial fatty acid  $\beta$ -oxidation is involved in protection against harmful effects of palmitic acid on human trophoblast cells. Finally, expression of microRNA targeting SCD1 and DGAT1 is altered by palmitic acid. Collectively, these results indicate SCD1 and DGAT1 has a protective role against lipid accumulation induced by palmitic acid.

### Biography

Changwon Yang has completed his BS from Department of Biotechnology, Korea University. He is studying in PhD courses majoring Molecular Bioengineering from 2016. His research has been focused on lipid metabolism in placentation and development of gynecologic cancer including ovarian cancer and choriocarcinoma.

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