

Caffeic acid stimulates migration and invasion of human trophoblast HTR-8/SVneo cells

Abstract

The placenta is a transient organ essential for development of the fetus. Adequate invasion of trophoblast cells, specialized cells of the placenta, is of utmost importance for the establishment and maintenance of healthy pregnancy. Caffeic acid (CA), one of the most abundantly present hydroxycinnamic acids in everyday human diet, exhibits various physiological effects such as antioxidant, anti-inflammatory and anticancer activities including an inhibitory effect on migration and invasion of different cancer cell types. There are not many studies on CA safety in human pregnancy. Therefore, the aim of this research was to investigate the potential of CA to affect trophoblast cell function. We evaluated adhesion, migration and invasion of human trophoblast HTR-8/SVneo cells following CA treatment by functional assays. Furthermore, expression of molecular mediators of these processes such as integrin $\alpha 1$, $\alpha 5$ and $\beta 1$ subunits and matrix metalloproteinase (MMP)-2 and MMP-9 was evaluated at the mRNA level by qPCR and the protein level by cell-based ELISA assay or zymography. Our results showed that 24 h treatment with 10 μ M CA stimulated migration and invasion of HTR-8/SVneo cells as well as expression of the integrin $\alpha 1$ subunit. Furthermore, treatment with 100 μ M CA stimulated expression of MMP2 and MMP9 mRNA in the treated HTR-8/SVneo cells as well as secretion of MMP-9. According to obtained results, we can conclude that CA could have the potential to affect processes important for placentation. However, further research is needed to elucidate all aspects of potential CA effects on placental function and pregnancy as a whole.