Context: Abnormal Placenta trophoblast proliferation and apoptosis is related to the pathogenesis of preeclampsia. Emerging evidence also indicated that key pregnancy-associated hormones, such as hCG, progesterone, are found in high concentration at the maternal-foetal interface.

Objective: The purpose of the study is to investigate the expression of CYP11A, a key enzyme in steroid hormone synthesis and metabolism, in normal pregnancy and severe preeclampsia placenta and to explore the underlying mechanism of the relationship between the altered CYP11A expression and onset of preeclampsia.

Design: Immunohistochemistry SP method was used to study the localization of CYP11A gene in the placenta; reverse transcription polymerase chain reaction (RT-PCR) and Western blot were used to check CYP11A expression in mRNA and protein level in patients with severe preeclampsia and normal placental tissue. CYP11A overexpression in trophoblast cells were used to check the effect on proliferation and TUNNEL staining were used to check whether overexpression of CYP11A will affect trophoblast cell apoptosis.

Results: The result showed that CYP11A was selectively expressed in placental trophoblast cells in the mitochondrial. RT-PCR and Western blot analysis showed that CYP11A was also significantly increased in severe preeclampsia compared with normal pregnancy in both RNA and protein levels. Overexpression of CYP11A could reduce trophoblast cell proliferation and increase HTR-8/SVneo cells apoptosis through activation of activated caspase-3 expression.

Conclusion: The CYP11A gene expression was higher in patients with preeclampsia than in normal pregnancy. We propose that abnormal high expression of CYP11A could inhibit trophoblast proliferation and increase apoptosis therefore be involved in the pathogenesis of preeclampsia.