ISGE
GYNECOLOGICAL ENDOCRINOLOGY
THE 18TH WORLD CONGRESS
7-10 MARCH 2018 FLORENCE, ITALY

# P181. Translocation of placental target pullulan based nanoparticle drug delivery system in an in vitro placental

*Z Jiang (CN) [1], H Tang (CN) [2], D Bo (CN) [3], Z Zhou (CN) [4], Y Dai (CN) [5]*

Context: Placental diseases caused by severe pregnancy complications are probably the most critical questions facing the obstetrics. Pullulan is a water-soluble natural polysaccharide, due to its non-toxic, non-immunogenic, non-mutagenic nature recently there is an attempt to explore this polysaccharide for various biomedical applications including targeted drug and gene delivery and surface modification.
Objective: Using human placental trophoblast cells?BeWo b30 cells?to develop an in vitro placental model and evaluate the model's integrity; Synthesize pullulan acetate?PA?and folic conjugated pullulan acetate?FPA?, and prepare PA-NPs and FPA-NPs using dialysis method; Investigate placenta targeting and translocation of FPA-NPs and PA-NPs in placental model.
Method: This is a comparative study.
Cell line: The human choriocarcinoma cell line BeWo b30 was cultured in vitro in this study.
Interventions: Then BeWo cells were exposed to nanoparticles in mediums containing 1mM free folic acid or not.
Main Outcome Measures: The transepithellal electric resistance (TEER), the particle size, Zeta potential and morphology of PA and FPA nanoparticles, the translocation of PA-NPs and FPA-NPs in the Millicell monolayer placenta model.
Results: B30 cells spontaneously differentiate into cell monolayers with microvilli and tight junction on the Millicell support membrane. The transepithellal electric resistance value reached the requirement of single-layer model on the 6th day after inoculation and remained stable (TEER>60?•cm2); The prepared polysaccharide oxide nanometer particles have the even diameter distribution, respectively 343.3 ± 98.15nm (PA) and 330.5 ± 104.3 (FPA) ; It was demonstrated by folic acid competition experiment that 1mM free folic acid could significantly reduce the cell uptake and placental transmittance of FPA nanoparticles, figuring that FPA nanoparticles were ingested into the cells through the specific folate receptor pathway and passed through the placenta.
Conclusion: In this study, BeWo b30 was used as a model cell to establish and validation an in vitro placental model. Use pullulan as raw material, a safe and placenta-target nano-drug delivery system was prepared by dialysis method after hydrophobically modify and folate group conjugated. This study showed a novel method of drug delivery and targeting during pregnancy with the use of nanoparticles, provide applications in obstetrics field of drug use during pregnancy.

[1] Beijing Obstetrics and Gynecology Hospital , [2] Beijing Obstetrics and Gynecology Hospital , [3] Institute of Biomedical Engineering, Chinese Academy of Medical Sciences ? Peking Union Medical College, [4] Institute of Biomedical Engineering, Chinese Academy of Medical Sciences ? Peking Union Medical College, [5] Beijing Obstetrics and Gynecology Hospital