

Regulación en la expresión de deiodinasas por glucosa e insulina en explantes placentarios humanos

Glucose and Insulin regulation of diiodinase expression in human placental explants

Herrera-Chávez N¹., Mellado-Ríos C¹., Guzmán-Gutiérrez E¹.

1. Laboratorio de Patologías del embarazo, Departamento de Bioquímica Clínica e Inmunología, Facultad de Farmacia, Universidad de Concepción.

Introduction: Thyroid hormones (TH) play an important role in embryogenesis and fetal development; during first and part of the second trimester of gestation the fetus requires TH supply from maternal circulation, which are transported through placenta (1). There are elements of placenta that regulate TH transport, such as a group of seleno-enzymes called deiodinases. Three different types of deiodinases are known: deiodinase 1 (DIO1), deiodinase 2 (DIO2) and deiodinase 3 (DIO3)(2). In insulin resistance conditions such as gestational diabetes mellitus (GDM) an increased activity of these enzymes in human placental extracts has been observed (3). **Objective:** To determinate if D-glucose and insulin increase deiodinase expression in human placental explants. **Materials and method:** placentas were obtained from obstetrics and gynecology service of Guillermo Grant Benavente hospital of Concepcion. Placental explants cultures were performed in M199 medium with 10% SFB, 100 U/mL of penicillin and 100 mg/mL of streptomycin for 12 hours at 37°C, 95% O₂ and 5% CO₂. Different concentration ranges of D-glucose and insulin were utilized in order to emulate physiologic and pathologic conditions. Changes in DIO1, DIO2 and DIO3 mRNA expression were evaluated by RT-qPCR. **Results:** DIO1 expression in the placental explant model was not observed. The DIO3 mRNA expression decreased significantly at high D-glucose concentrations (20 mM). Insulin reduced DIO2 mRNA expression at physiologic conditions (0, 1 nM), while at high concentrations (1 nM) a significant increase in DIO3 expression was seen. **Conclusion:** High levels of D-glucose reduce DIO3 mRNA expression, while physiologic concentrations of insulin reduce DIO2 expression. The increased expression of DIO3 in placenta observed in insulin resistance conditions is regulated at transcriptional level by insulin.

Keywords: Placenta, Thyroid hormones, Glucose, Insulin.

Bibliografía

- 1.- Stepien, B.K, & Hutter, W.B.(2019). Transport, metabolism, and function of thyroid hormones in the developing mammalian brain. *Frontiers in endocrinology*, 10 (april),1-16. <http://doi.org/10.3389/fendo.2019.00209>
- 2.-Chan,S., Kachilele, S., Hobbs, E., Bulmer, J.N., Boelaert ,K., Cabe. C.J.M.C .(2003) Placental iodothyronine deiodinase expression in normal and growth-restricted human pregnancies. *88* (november), 45-54. <http://doi.org/10.1210/jc.2003-030228>
- 3.-Guzmán-Gutiérrez (2020). Datos no publicados

El autor no declara conflicto de intereses.