Placental expression of Tryptophan degradation enzymes and Angiotensin (1-7) in physiological pregnancies delivered at term

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Objective. The objective of this study is to characterize the placental expression of Indoleamine 2,3-dioxygenase (IDO) and tryptophan 2,3-dioxygenase (TDO), two key enzymes for tryptophan degradation in the placenta, that is crucial for immune tolerance during pregnancy, and to investigate TDO co-expression with Angiotensin(1-7), a protein with anti-inflammatory properties.

Materials and Methods. Prospective observational study on 20 singleton physiological pregnancies delivered vaginally at term. Fresh placental tissue was collected immediately after delivery. Placental TDO mRNA expression was assessed by Real Time PCR and TDO, IDO and Ang(1-7) localization was evaluated by immunofluorescence analyses. The expression of the enzymes in different areas of the placenta was compared using univariate and multivariate analyses.

Results. TDO mRNA was expressed in the maternal and fetal sides of the placentas. TDO protein was localized in the maternal and fetal sides and in the villi and it was co-expressed with IDO in over 40% of cells at these sites (**Figure 1**). The percentage of TDO^+ and IDO^+ cells was influenced by maternal pre-gestational smoking and newborn weight ($p < 0.05$). There was a strong correlation between the percentage of TDO^+ and IDO^+ cells in the villi (Pearson 0.86, $p < 0.01$). TDO^+ cells also expressed Angiotensin(1-7), with a higher percentage in the fetal side and in the villi compared to the maternal surface ($p < 0.0001$).

Conclusions. TDO is localized in placental tissue and is often co-expressed with IDO in all placental sites and with Angiotensin(1-7) in the villi and fetal side.

Figure 1.