**Identification of Syncytiotrophoblast-Specific Transporter Genes and Their Protein Expression in Mouse Placenta**

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**Background and aims.** Syncytiotrophoblast (SynT), which constitutes the human and mouse placental barrier, expresses a variety of transporters and regulates the materno-fetal exchange. Transporters that are specifically expressed in SynT across the species may play essential roles in fetal development. This study aimed to identify SynT-specific transporter genes conserved between human and mice using RNA-seq data, and to determine their protein localization in the mouse placenta.

**Methods.** RNA-seq data from human placentas at 6–9 weeks of gestation (1) and single-nucleus RNA-seq data from mouse placentas at embryonic days 9.5–14.5 (2) were analysed to identify SynT-specific transporter genes in each species. Among the identified genes, the localization of SLC26A7 and SLC7A2 in the mouse placenta was observed using immunohistochemistry.

**Results.** In humans and mice placenta, 45 and 50 transporter genes were identified as SynT-specific, respectively, with 10 shared between the two species. Of these, we focused on SLC26A7, an iodide transporter, which is characteristically expressed in mouse SynT-I (the maternal-facing layer), and SLC7A2, encoding cationic amino acid transporter 2 (CAT2), which is characteristically expressed in SynT-II (the fetal-facing layer). Immunostaining with anti-SLC26A7 antibody revealed linear signals in the labyrinth, where SynTs are located. In double staining with Connexin26, which connects SynT-I and -II layers, SLC26A7 was localized slightly toward the maternal side, suggesting the localization in SynT-I. Immunostaining with anti-SLC7A2 antibody revealed linear signals in the labyrinth, closely adjacent to Connexin26 and partially overlapping with SLC6A13, which localizes to the fetal-facing plasma membrane of SynT-II.

**Conclusion/Discussion.** *SLC26A7* and *SLC7A2* were identified as SynT-specific transporter genes conserved in humans and mice. In addition, the localization of SLC26A7 protein in SynT-I and SLC7A2 protein in SynT-II was determined. These transporters potentially play important roles in the materno-fetal/placental supply of iodide and cationic amino acids, respectively.

**References:**

(1) Okae H. et al., *Cell Stem Cell* **22**:50–63 (2018).

(2) Marsh B. and Blelloch R., *eLife* **9**:e60266 (2020).