

**P012** Regulation of amino acid transporters by glucose and growth factors in primary human trophoblast cells is mediated by mTOR signaling

**Sara Roos<sup>1</sup>, Theresa L Powell<sup>2</sup>, Thomas Jansson<sup>2</sup>**

*<sup>1</sup>Dept of Physiology, University of Gothenburg, Sweden,*

*<sup>2</sup>Dept of OB/GYN, University of Cincinnati, USA*

The activity of placental amino acid transporters is decreased in intrauterine growth restriction (IUGR). We have previously shown that mammalian target of rapamycin (mTOR) regulates placental system L activity and that placental mTOR activity is decreased in IUGR. IUGR fetuses may be hypoglycaemic, hypoinsulinimic, and have reduced IGF-I levels. Maternal levels of glucose and IGF-I may also be reduced in this condition. We hypothesized that glucose, insulin, and IGF-I regulate placental amino acid transporters by inducing changes in mTOR signalling. Primary trophoblast cells were isolated and cultured until syncytialization and subsequently incubated in various glucose concentrations, insulin or IGF-I, with or without the mTOR inhibitor rapamycin. System L amino acid transporter activity decreased in response to decreasing glucose concentrations, however this effect was abolished in the presence of rapamycin. In contrast, the activity of system A was unaffected by glucose deprivation. Insulin stimulated system A and system L activity, and IGF-I stimulated system A activity, these effects were mTOR-dependent. These data support our hypothesis that the mTOR pathway represents an important link between nutrient and growth factor concentrations and amino acid transport in the human placenta.