

The placenta for life: detecting childhood susceptibility to allergy

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The placenta plays an essential role in adapting to the maternal environment in order to optimise fetal growth and increase fetal survival. It has an amazing repertoire of adaptations that sustains the fetus in adverse environments which include an ability to adapt to maternal stressors such as asthma, cigarette use and pre-eclampsia. More recent research has identified that the placenta could be used as a biomarker for future health risk in offspring. We have had an interest in whether placental function varies between healthy children and children that subsequently develop an allergy. Allergic disease has increased to epidemic proportions especially in children below the age of 5 years. It is proposed that susceptibility to allergy may be programmed in utero and that the placenta could provide clues of those children at risk of allergic disease. We have been particularly interested in glucocorticoid regulated pathways and demonstrated there are 8 known isoforms of the glucocorticoid receptor (GR) in the human placenta that vary with cellular location, fetal size, maternal exposures and gestational age. In children that subsequently develop an allergy we have observed differences in their placental GR profile and alterations in GR-regulated gene expression relative to children that do not develop an allergy. These data suggest the placenta may be a biomarker of life long health and could be the first organ to be considered for screening in the prediction of disease risk in children and adults.