Maternal glucocorticoids: timing is everything for the fetal brain

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Fetuses at risk of premature delivery are now routinely exposed to maternal treatment with synthetic glucocorticoids. In randomised clinical trials these substantially reduce acute neonatal morbidity and mortality after premature birth and reduce intraventricular hemorrhage. However, the overall neurodevelopmental impact is surprisingly unclear; worryingly, postnatal glucocorticoids are consistently associated with impaired brain development, but less is known about antenatal glucocorticoids. Perhaps most strikingly, we know very little about whether glucocorticoids modify the fetal responses to hypoxia-ischaemia; a common insult during preterm birth. This lack of knowledge exists despite a growing body of literature showing that glucocorticoids have marked effects on fetal cardiovascular, neural and endocrine function and fetal behavior. Further, much of our current understanding about the potential effects of pre-natal steroids are derived from post-natal experimental models. Our current research concerns the effects of antenatal glucocorticoids on fetal brain injury after hypoxia-ischaemia *in utero*, the importance of understanding the timing between steroid exposure and hypoxia-ischaemia, and the potential mechanisms by which steroids may increase brain injury.