## Periconceptional undernutrition alters subpopulations of corticotrophs in the fetal sheep pituitary

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Maternal undernutrition during the periconceptional period (PCUN) alters the growth trajectory (MacLaughlin *et al.*, 2005) and activity of the hypothalamic-pituitary adrenal (HPA) axis (Edwards & McMillen, 2002) of twin fetal sheep at the earliest gestational ages investigated (term ~150 days gestation). Altered activity of the fetal sheep HPA axis in late gestation is associated with changes in the relative proportions of pituitary cortictotroph subpopulations that differentially express proopiomelanocortin (POMC), adrenocorticotrophic hormone (ACTH) and the corticotrophin releasing hormone receptor, CRHR1 (Farrand *et al.*, 2006). It is therefore likely that PCUN will alter the relative proportions of corticotroph subpopulations in early gestation. PCUN ewes received 70% of control feed from 45 days prior, to 7 after, mating. At 53-55 days gestation, ewes were killed by overdose with sodium pentobarbitone and twin fetal sheep (control n=6, PCUN n=7) were delivered by hysterectomy and killed by decapitation. Pituitaries were removed and immediately fixed in 4% formaldehyde. Pituitary sections were labelled with antisera to simultaneously identify POMC, ACTH and CRHR1 in individual cells (Farrand *et al.*, 2006). PCUN resulted in a marked decrease in the proportion of pituitary cells that expressed POMC+ACTH+CRHR1 (PCUN: 3.7±0.6% *vs* controls: 7.0±0.6%, $p<0.05$) without altering the levels of corticotrophs expressing POMC only, POMC+CRHR1 or ACTH+CRHR1. This specific reduction in the subpopulation of corticotrophs that express POMC+ACTH+CRHR1 may result in the reduction of an inhibitory signal from the pituitary associated with the elevated HPA activity and altered fetal growth trajectory previously characterised in the PCUN model.

Edwards, L.J. & McMillen, I.C. (2002). *Biology of Reproduction*, **66**: 1562-1569.
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MacLaughlin, S.M., Walker, S.K., Roberts, C.T., Kleemann, D.O. &McMillen, I.C. (2005). *Journal of Physiology*, **565**: 111-24.