Background of Study: In the sheep, maternal undernutrition during the first part of gestation (0 to 110 days) delays follicle development in the fetal ovary without affecting total follicular number (Rae et al., Reprod. 122:915, 2001).

Objectives: To determine the role of apoptosis regulatory genes (mcl-1: anti-apoptosis, bax: pro-apoptosis) in delayed follicle development

Methods: Adult pregnant ewes were fed 50% or 100% (Control) of their nutritional requirements from days 0–30, 31-50 or 65, 65-110 or 0-110 (n=8 per group). Control and underfed ewes were slaughtered at days 50, 65 or 110 of gestation. Bouin’s fixed fetal ovaries were examined for mcl-1 and bax mRNA and protein by in-situ hybridisation and immunohistochemistry.

Results: At days 50 and 65, mcl-1 and bax staining was predominant in the oocytes and undernutrition had no effect. At day 110, mcl-1 was predominant in the oocyte, bax in the granulosa cells and both genes were present in the vasculature. Animals underfed from day 0 to 110, had significantly increased mcl-1 (P<0.05) and bax (P<0.05) in the primordial follicles and endothelial cells (P<0.05). Follicular Mcl-1 and bax were also increased when nutritional restriction was limited to days 31-65 (mcl-1 & bax: P<0.05) or 65-110 (mcl-1 & bax: P<0.05) but not 0-30 days.

Conclusions: Undernutrition during mid-gestation increased fetal ovarian mcl-1 and bax in the follicle and vasculature. These changes may have a causal role in the delayed follicular development which characterises maternal undernutrition or may be downstream from these processes.