Promotion of haematopoietic activity in embryonic stem cells by the aorta-gonad-mesonephros microenvironment.

We investigated whether the in vitro differentiation of ES cells into haematopoietic progenitors could be enhanced by exposure to the aorta-gonadal-mesonephros (AGM) microenvironment that is involved in the generation of haematopoietic stem cells (HSC) during embryonic development. We established a co-culture system that combines the requirements for primary organ culture and differentiating ES cells and showed that exposure of differentiating ES cells to the primary AGM region results in a significant increase in the number of ES-derived haematopoietic progenitors. Co-culture of ES cells on the AM20-1B4 stromal cell line derived from the AGM region also increases haematopoietic activity. We conclude that factors promoting the haematopoietic activity of differentiating ES cells present in primary AGM explants are partially retained in the AM20.1B4 stromal cell line and that these factors are likely to be different to those required for adult HSC maintenance.