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Crispin R Dass

Curtin University, Australia

The ever increasing role of PEDF in bone biology and pathology: Regeneration and cancer as examples

Defects in bone defects can be severely debilitating, painful and reduce quality of life, especially when it affects the young. Osteoregeneration can alleviate some of the complications in bony defects. Pigment epithelium-derived factor (PEDF), a potent anti-angiogenic protein molecule, is associated with bone, and can promote further differentiation of pre-osteoblasts to osteoblasts *in vitro*. In a 3-year study, firstly demonstrated that pigment epithelium-derived factor (PEDF) promotes osteoblastogenesis in mesenchymal stem cells encapsulated in alginate bead scaffolds *in vitro* and *in vivo*. Using immunostained foetal and adult tissues, we show that PEDF immunostaining co-localises with that of collagen I (the major protein in bone), and PEDF upregulates collagen I and its processing proteins, heat shock protein 47 and membrane type I matrix metalloproteinase, while downregulating matrix metalloproteinase 2 in primary bone tumour (osteosarcoma) cells. In a separate 4-year study, we found that PEDF induces apoptosis in prostate and breast cancer cells, and inhibits their orthotopic establishment in bone. PEDF is abundantly expressed in murine foetus, and sustained systemic delivery of PEDF does not perturb physiological angiogenesis, development in utero, bone volume or instinctive behaviour in pregnancy. Our conclusions are that PEDF is a promising and safe biological for osteoregeneration and also a potent antagonist to bone metastasis. Could this protein be tested clinically? We believe that it could have significant benefits against bone ailments.

Biography

Crispin R Dass obtained his B App. Sci. (Hons) and PhD from Charles Sturt University, Australia. He has 22 years of basic and applied research in cancer. He has worked on bigpharma projects (Amgen, Novartis, Glaxo-Wellcome, Johnson & Johnson). He has published in Nature Medicine, Journal of the National Cancer Institute, Journal of Controlled Release and Biomaterials. He has published 147 papers to date, 165 conference presentations, a h-index of 33, with total number of citations for his papers at ~3400. He has also reviewed original research papers in New England Journal of Medicine, Lancet and Nature Communications.

crispin.dass@curtin.edu.au