

PHYSICIAN CATEGORY

Developing a Method to Identify Circulating Osteogenic Precursor Cells

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Circulating osteogenic precursor (COP) cells, mononuclear blood-derived adherent cells that can produce bone *in vivo*, have been associated with pubertal growth, and conditions of pathological bone formation outside of the normal skeleton. COP cells are bone-marrow derived, and are uniquely defined by a combination of hematopoietic (CD45) and osteogenic markers (osteocalcin and type I collagen). The possibility that circulating, hematopoietic-derived cells with osteogenic potential can seed sites of inflammation and tissue injury has tremendous clinical implications. We have developed a method to quantitate peripheral blood levels of COP cells using flow cytometry. A combination of hematopoietic (CD45), osteogenic (osteocalcin), and chemokine receptor (CXCR4) markers could reproducibly detect COP cells. Osteocalcin and CD45 positive cells ranged from 0.21 to 0.89% in health young subjects and among them, about 18-38% were positive for CXCR4. This methodology will help us to determine the association between COP cells and pathologic conditions of de novo bone formation such as fracture and end-stage of aortic valvular disease. In addition, this methodology can potentially elucidate the roles of COP cells in other osteogenic conditions and to develop therapeutic or prognostic markers.