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## Polymer functionalized cells distribution in experimental animal for bone regeneration

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Mesenchymal stem cells (MSCs) are an attractive stem cell source for transplantation. MSCs can easily differentiate into osteoblasts and increase in osteoblast number will have positive effect on the bone regeneration in such conditions as osteoporosis or Paget disease. To provide the targeted delivery of MSCs to bone we have synthesized a novel osteophilic polymer. The primary active sites of the polymer are bisphosphonate functional groups that target hydroxyapatite molecules (HA) on the bone surface. NHS groups on the other end of the molecule allow polymer to bind to the cell surface components. Coating of cell surfaces with the polymer would allow the cells to bind specifically to HA component of bone and localize the cellular repair functions to areas of injured bone. In this study we have characterized polymer/cell and functionalized cells/ bone chips interactions in vitro, and the distribution of the polymer coated cells throughout the body in vivo. We have found that the polymer is not cytotoxic and does not affect further differentiation of MSCs into osteoblasts. The polymer coated cells were shown to be stably attached to bone fragments for at least 2 hours. Injection of the polymer coated cells intravenously through the tail vein of mice has confirmed bone targeting potential of the polymer.