FMB

FIBRIN MICROBEADS AS BIODEGRADABLE CARRIERS FOR CULTURING CELLS, FOR ACCELERATING WOUND HEALING AND TISSUE ENGINEERING

We have developed biodegradable fibrin derived microbeads (FMB) as potent cell carriers. These FMB, 50-200 μm in diameter, were tested for their attachment to a wide range of cell types. FMB were shown to be greatly haptotactic to different cell types (such as endothelial cells, smooth muscle cells, fibroblasts and osteoblasts) that respond to fibrinogen. Light, fluorescent, and confocal laser microscopy revealed that the porous FMB accommodate many cells, due to their high surface area, with minimized contact inhibition. Cells could be maintained on FMB as “liquid tissue” in extremely high densities for more than 10 days. Cells on FMB could be transferred to seed culture flasks or to be implanted without prior trypsinization. They could also serve as a vehicle for cell delivery for implantation into tissues.

FMB could also serve for the separation and growth of pluripotent stem cells from bone marrow for their introduction into tissues.

The applications for the FMB are as follows:
  a. Cell culturing and expansion in suspensions
  b. Vehicle to carry high number of cells and implant them into lesions to expedite wound healing and tissue engineering in both soft and hard tissues
  c. High yield separation and growth of mesenchymal stem cells from different sources
  d. Use for growth of cartilage and bone tissues in regenerative medicine

A single fibrin microbead (FMB) + cells

A confocal fluorescence microscopy of cells loaded on a single FMB. Only cell nuclei are stained red with PI. The layers scanned were superimposed to visualize all the cells mounted on the bead.