

## **Injectable microcarrier with sustained growth factor delivery for bone regeneration**

**Xiaohua Liu**

Texas A&M University Baylor College of Dentistry, USA

### **Abstract**

Injectable biomaterials are desirable for many clinical tissue repair and regeneration. Here we report a unique injectable system in which the biomimetic nano-fibrous microspheres (NF-MS) serve both as an injectable cell carrier and as a growth factor carrier for bone tissue regeneration. The NF-MS were fabricated by a novel approach, which integrated an emulsification and a thermally induced phase separation technique. The NF-MS mimicked the architecture of natural collagen fibers at a nanometer scale and had many unique properties including extraordinarily high surface area and extremely low density. Growth factors were effectively encapsulated into the NF-PLLA microspheres through a simple process without using any organic solvent. *In vitro* release kinetics indicated that the encapsulated recombinant human bone morphogenetic protein 7 (rhBMP-7) in the NF-MS were released in a temporal controlled manner. When used as an injectable scaffold for repairing the rat critical-size calvarial defects, the rhBMP-7-loaded NF-MS induced a much more significant amount of new bone formation than the rhBMP-7-free NF-MS control. We conclude that the biomimetic NF-MS combined with the controlled growth factor release is an excellent cell carrier for bone regeneration.

### **Biography**

Xiaohua Liu completed his Ph.D. at the age of 28 years from Tsinghua University and postdoctoral studies from University of Michigan. He is an Assistant Professor at the Biomedical Sciences Department, Texas A&M University Baylor College of Dentistry. His research focuses on design and synthesizes biomimetic materials and control drug delivery system for translational medicine. He has published more than 35 papers in reputed journals including *Nature Materials*, *Biomaterials*, and *Tissue Engineering*. His work has been cited by others for over 1000 times and has an H-index of 17. He serves as a reviewer for more than 15 journals.