

특강 I (Special Lecture I)

BIOMIMETIC SELF-ASSEMBLING OF MINERISED COLLAGEN FOR BONE GRAFT

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Various bone grafts including autograft, allograft, xenograft and bioceramics, etc. were used so far, although each has its serious shortcomings. Among them autografts are considered to be the gold standard and have been routinely used for a long time with best clinical results, but the supply of autograft is limited and donor site morbidity is also a concern.

We had developed a new bone graft with similar both composition and structure to autograft. It is the nano-hydroxyapatite/collagen (nHAC) bone graft fabricated at room temperature by biomimetic self-assembling processing. The nHAC comprises a mineralized collagen, fully resorbable hydroxyapatite that coats each fibre of a collagen bundle. These together provide a three-dimensional porous structure that mimics natural bone and, as such, provides the ideal scaffold for the adhesion, migration, growth and differentiation of bone-forming cells. High resolution TEM images had proved that the new bone materials process the hierarchical structure of natural bone. The technique for making nHAC had filed 5 China patents and one USA patent.

Now nHAC had been clinically proven alternative to autograft surgery. It is approved for all indications where autograft is used and is designed to reduce the time, pain, blood loss and morbidity associated with autologous harvesting for spinal fusion surgery and other bone defect repair. Data now available from more than 5000 registry of patient outcomes has demonstrated comparable performance to autograft. Follow-up data is now available for over three years.

주요 학력 및 경력 :

- 1984 : PhD of Materials Science , Tsinghua University, Beijing
- 1986 : Posdoc in FOM Institute, Amsterdam
- 1992- : Professor, Tsinghua University, Beijing
- 1997 : Visiting Scholar in Center of Materials Science of MIT, Boston
- 1998- : Director of Biomaterials Laboratory, Tsinghua University, Beijing
- 2003 : Winner of Somiya Award from International Union of Materials Research Societies
- 2005- : Member of Editorial Board, J. of Materials Science: Materials in Medicine
- 2006- : Vice-President, Sub-Society on Biomaterials of CMRS