

general anesthesia prior to the skin incision. The polymer tube serving as a scaffold for the cells was composed of a co-polymer of L-lactide and  $\epsilon$ -caprolactone (PCL-PLA, 50:50). This co-polymer is degraded by hydrolysis. The matrix is > 80% porous and the diameter of each pore is 100-200  $\mu$ m. Polyglycolic acid (PGA) woven fabric with a thickness of 0.5 mm was used for reinforcement. Twenty-one TE conduits (TCPC grafts) and fourteen TE patches were used for the repair of congenital heart defects. The patients' ages ranged from 1 to 24 years (median, 5.5 years). All patients underwent a catheterization study and/or computed tomography (CT) scans for evaluation after operation. The patients received anti-coagulation therapy for 3 to 6 months after surgery. **Results:** Mean follow-up after surgery was 424 days (maximum, 38 months). There were no complications such as thrombosis, nor stenosis or obstruction of the tissue-engineered autografts. One late death at 3 months after TCPC was noted in HLHS patients, which was unrelated to the TE graft. There was no evidence of aneurys formation on cineangiography or CT. On examination in late period, all tube grafts were patent, and the diameter of the tube graft increased over time. (110 +/- % of the implanted size)

**Conclusions:** Biodegradable conduits or pulmonary vessel patches seeded with autologous BMCs showed normal function (good patency up to maximum follow-up of 38 months). As living tissues these vessels may have the potential for growth, repair and remodeling. The TE approach may provide an important alternative to the use of prosthetic materials in the field of pediatric cardiovascular surgery. Longer follow-up is necessary to confirm the feasibility of this approach.

**Key Words:** Tissue-engineered vascular autografts, bone marrow cells

## Clinical Results of Transplantation of Tissue-Engineered Cartilage and Future Direction of Cartilage Repair - Novel Approach with Minimally Invasive Procedure -

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Articular cartilage has very limited potential to spontaneously heal, because it lacks vessels and is isolated from systemic regulation. No treatment has repaired the defects with long-lasting hyaline cartilage. Recently, a regenerative medicine by a tissue-engineering technique for cartilage repair has been given much attention in the orthopaedic field. In 1994, Brittberg et al. introduced a new technology in which chondrocytes expanded in monolayer culture were transplanted into the cartilage defect of the knee. As a second generation of chondrocyte transplantation, we have been performing transplantation of tissue-engineered cartilage made *ex vivo* for the treatment of osteochondral defects of the joints since 1996. This signifies a concept shift from cell transplantation to tissue transplantation made *ex vivo* using tissue-engineering technique. We have reported good clinical results with this surgical treatment. However, extensive basic research is vital to achieve better clinical results with this tissue-engineering technique. I would like to describe our recent research using a minimally invasive tissue-engineering technique to promote cartilage regeneration.

**Key Words:** Cartilage, tissue-engineering, scaffold

## Role of Exocrine Pancreatic Progenitor Cells in Pancreatic Carcinogenesis

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Elucidating the mechanisms that regulates proliferation and differentiation in the pancreas and understanding the mechanisms leading to neoplastic transformation are essential steps for the development of novel diagnostic and therapeutic strategies in the management of pancreatic disorders, such as diabetes mellitus and pancreatic cancer.

The cellular origin of pancreatic carcinoma is one of the most recently studied questions. As a reason for this interest, the pancreas is an organ in which there is little cellular proliferation under normal circumstances, but the little proliferation that does occur is seen in all three components epithelia; ducts, acini and islets. The pancreatic cells, although