Singapore team using pig bone near "ideal" reconstructive surgery  
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SINGAPORE, 14 July 2004 (Deutsche Presse-Agentur) – A team of researchers in Singapore using pig bone and a U.S.-patented tissue technique announced on Wednesday they are close to developing an "ideal" scaffold for reconstructive surgery.

The scientists at the Institute of Bioengineering and Nanotechnology (IBN) have prepared an implantable anorganic scaffold that has the "original chemical and physical properties of natural bone", IBN said in a statement.

Orthopaedic patients currently receive bone grafts from several sources. One is to obtain bone from a different part of the patient's body or autograft. The lead scientists - Drs. Pei Lin Mao, Shona Pek, Lihong Liu and Michael Yu - noted autografts are highly recommended for patients with serious bone defects, but require additional surgery and may result in further infection at the donor site.

Other procedures involve the harvesting of bone from another person, called an allograft, or animal, known as a xenograft. Allografts are restricted by the limited donor bone supply and patients run the risk of viral infection. Using acquired human or animal bone also presents a challenge in the graft preparation process, where the bone needs to be cleaned and purified before implementation, the scientists said.

"Patients still run the risk of contracting transmitted diseases with the processed bone," they noted. The use of animal bone, however, presents several practical advantages such as its low cost and wide availability, Mao said.

She and her team claim to have designed "a bioprocessed tissue preparation that eliminates the use of toxic chemicals and enzymes". The technique involves the use of natural treatments and a mild solvent on organic pig bone, Mao said. A repeated boiling process and ultrasound treatment leave a scaffold "that has almost the same properties as natural human bone," she added.

The resulting bioprocessed anorganic porcine bone retains its original architecture and components, the scientists said. It is biocompatible and can be implanted safely without the risk of viral infection or immunological response. Serving as a scaffold on which bone cells can attach and grow, it also stimulates immature bone cells to "grow and mature", the team said.

"Bone scaffolds of different sizes may either be seeded with the patient's own cells or directly implanted into the patient's body," the scientists added. "In the near term, our technology is available immediately for use in in-vitro cell culture for tissue engineering," noted Mao. "In the long-term, our bone material has the potential to replace all existing bone scaffold materials," she said.