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ASIA EDITION

Australia creates potential alternative to invasive bone graft procedures in children

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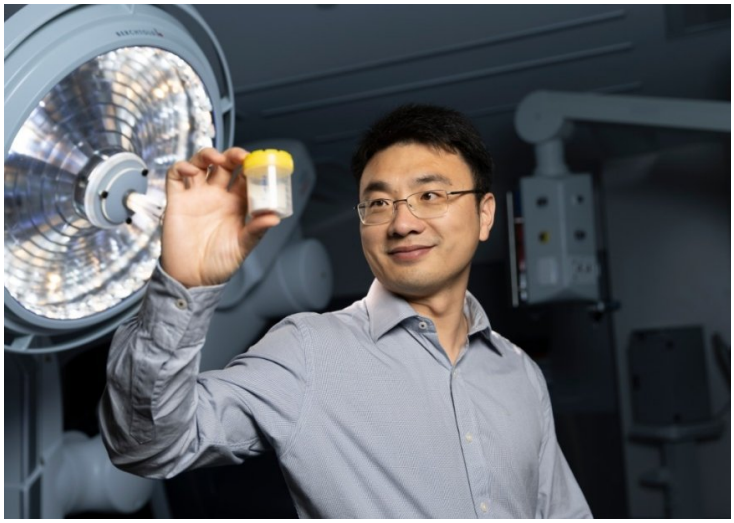
The technology remains in the preclinical stage and further testing is required before human trials can begin



For children born with cleft lip and palate, repairing gaps in the jawbone often means waiting until they are 10 to 12 years old before undergoing invasive bone graft surgery. Australia' University of Sydney researchers have developed a biodegradable ‘nanobone’ material that allows the body to harness its own healing properties to regrow bone, offering a potential future alternative to procedures that have changed little in more than 50 years.

In the longer term, the researchers hope the technology could allow treatment much earlier in childhood, reducing the need to wait years for bone grafting.

Published in *ACS Nano* and developed by researchers at the University of Sydney School of Dentistry, Charles Perkins Centre and Sydney Nano, in collaboration with the University of Queensland, the study found that in a preclinical bone model, the material generated approximately 80 percent more new bone than a material control after eight weeks. It also activated a key bone-repair growth factor with around 10 times the level achieved using conventional methods.

Rather than delivering manufactured growth factors, the new material – a calcium-aluminosilicate nanomaterial – activates a naturally occurring growth factor called latent Transforming Growth Factor ?1 (TGF-?1), which already exists within the body. Once activated, it attracts bone-forming stem cells to the injury site and encourages them to develop into bone-producing cells. Over time, this process replaces the material with the body’s own tissue.

The material also promoted blood clotting within around 30 seconds, helping stabilise the injury site during the earliest stages of healing.

Associate Professor Xu and his team are exploring how the material could be incorporated into personalised 3D-printed scaffolds designed to match an individual patient’s bone defect.