

Researchers use stem cells to regenerate parts of teeth

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A multi-national research team headed by USC School of Dentistry researcher Songtao Shi, DDS, PhD, has successfully regenerated tooth root and supporting periodontal ligaments to restore tooth function in a swine (an animal) model. The breakthrough holds significant promise for clinical application in human patients.

The study appears December 20 in the inaugural issue of PLoS ONE.

Utilizing stem cells harvested from the extracted wisdom teeth of 18- to 20-year olds, Shi and colleagues have created sufficient root and ligament structure to support a crown restoration in their mini-pig (animal) model. The resulting tooth restoration closely resembled the original tooth in function and strength.

The technique relies on stem cells harvested from the root apical papilla, which is responsible for the development of a tooth's root and periodontal ligament. Previous studies conducted by Shi and collaborator Stan Gronthos at the National Institutes of Health had utilized dental pulp stem cells. Shi found the new technique to be superior.

"The apical papilla provides better stem cells for root structure regeneration. With this technique, the strength of the tooth restoration is not quite as strong as the original tooth, but we believe it is sufficient to withstand normal wear and tear," says Shi.

He hopes to move the technique to clinical trials within the next several years, a potential boon for dental patients who are not appropriate candidates for dental implant therapy or would prefer living tissue derived from their own teeth.

"Implant patients must have sufficient bone in the jaw to support the implant. For those who don't, this therapy would be a great alternative," says Shi.

According to Shi, the not-so-distant future may be one in which not only wisdom teeth, but those baby teeth once left to the tooth fairy for a pittance, will become valuable therapeutic tools.

"We will be able to provide not only this technique, but other new therapies utilizing a patient's own stem cells harvested from their preserved teeth. This is a very exciting discovery and one that I hope to see in wide-spread clinical use in the near future," says Shi.

Source: Public Library of Science

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