

Bioengineered tooth replacement opens doors to new therapies

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Tooth loss is a significant health issue currently affecting millions of people worldwide. While artificial dental implants are the existing standard tooth replacement therapy, they do not exhibit many properties of natural teeth and can be associated with complications leading to implant failure. Two articles published in the September 2018 issue of the *Journal of Dental Research* share recent advances in bioengineering teeth.

In the article "Bioengineered Tooth Buds Exhibit Features of Natural Tooth Buds" Pamela Yelick, Tufts University School of Dental Medicine, Boston, Mass., USA and co-authors explored new methods to create highly cellularized bioengineered [tooth](#) bud constructs that include features that resemble natural tooth buds such as the dental epithelial stem cell niche, enamel knot signaling centers, transient amplifying cells and

mineralized dental tissue formation. The constructs were composed of postnatal dental cells encapsulated within a hydrogel material that were implanted subcutaneously into immunocompromised rats.

This is the first report that describes the use of postnatal dental cells to create bioengineered tooth buds that exhibit evidence of these features of natural tooth development, pointing to future bioengineered tooth buds as a promising, clinically relevant tooth replacement therapy.

In the article "Bone Marrow Stromal Cells Promote Innervation of Bioengineered Teeth" Sabine Kuchler-Bopp, French National Institute of Health and Medical Research and Fédération de Médecine Translationnelle de Strasbourg, France, and co-authors developed a strategy where autologous mesenchymal [cells](#) coming from bone marrow can be used to supply nerves to bioengineered [teeth](#) without treatment that uses an immunosuppressor. The innervation of teeth is essential for their function and protection but does not occur spontaneously after injury. This new method provides innervation while avoiding multiple side effects associated with immunosuppressors.

"These exciting studies point to a promising future for bioengineered teeth," said Journal of Dental Research Editor-in-Chief William V. Giannobile. "This cutting-edge research has the potential to advance tooth replacement therapy and the science base to bring such regenerative medicine treatments to improve clinical care."

More information: E.E. Smith et al. Bioengineered Tooth Buds Exhibit Features of Natural Tooth Buds, *Journal of Dental Research* (2018). [DOI: 10.1177/0022034518779075](https://doi.org/10.1177/0022034518779075)

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