

Scientists work to bring tissue regeneration to replace root canal treatment

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Want to avoid a root canal? In the future, you might be able to opt for tissue regeneration instead. ADA Forsyth scientists are testing a novel technology to treat endodontic diseases (diseases of the soft tissue or

pulp in your teeth) more effectively.

The study, "[RvE1 Promotes Axin2+Cell Regeneration and Reduces Bacterial Invasion](#)," which appeared in *The Journal of Dental Research*, demonstrates regenerative properties of resolvins, specifically Resolvin E1 (RvE1), when applied to [dental pulp](#). Resolvins are part of a greater class of Specialized Proresolving Mediators (SPMs). This class of molecule is naturally produced by the body and is exquisitely effective in the control of excess inflammation associated with disease.

"Pulpitis (inflammation of dental pulp) is a very common oral health disease that can become a serious health condition if not treated properly," said Dr. Thomas Van Dyke, Vice President at the Center for Clinical and Translational Research at ADA Forsyth, and a senior scientist leading the study. "Root canal therapy (RCT) is effective, but it does have some problems since you are removing significant portions of dentin, and the tooth dries out leading to a greater risk of fracture down the road. Our goal is to come up with a method for regenerating the pulp, instead of filling the root canal with inert material."

Inflammation of this tissue is usually caused by damage to the tooth through injury, cavities or cracking, and the resulting infection can quickly kill the pulp and cause secondary problems if not treated.

The study applied RvE1 to different levels of infected and damaged pulp to explore its regenerative and anti-inflammatory capacities. There were two major findings. First, they showed RvE1 is very effective at promoting pulp regeneration when used in direct pulp-capping of vital or living pulp (replicating conditions of reversible pulpitis). They were also able to identify the specific mechanism supporting [tissue regeneration](#).

Second, the scientists found that placing RvE1 on exposed and severely infected and necrotic pulp did not facilitate regeneration. However, this

treatment did effectively slow down the rate of infection and treat the inflammation, preventing the periapical lesions (abscesses) that typically occur with this type of infection. Previous publications have shown that if the infected [root canal](#) is cleaned before RvE1 treatment, [regeneration](#) of the pulp does occur.

While this study focused on this technology in treating endodontic disease, the potential therapeutic impact is far reaching. Dr. Van Dyke explained, "because application of RvE1 to dental pulp promotes formation of the type of stem cells that can differentiate into dentin (tooth), bone, cartilage or fat, this technology has huge potential for the field of regenerative medicine beyond the tissues in the teeth. It could be used to grow bones in other parts of the body, for instance."

Study authors include Yu-Chiao Wu, Ning Yu, Carla Alvarez Rivas, Nika Mehrnia, and Alpdogan Kantarci.

More information: Y-C. Wu et al, RvE1 Promotes Axin2+ Cell Regeneration and Reduces Bacterial Invasion, *Journal of Dental Research* (2023). [DOI: 10.1177/00220345231197156](https://doi.org/10.1177/00220345231197156)

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