

Proline Repeats in Protein Help Grow Tooth Enamel (w/ Podcast)

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(PhysOrg.com) -- A simple amino acid that is repeated in the center of proteins found in tooth enamel makes teeth stronger and more resilient, according to new research at the University of Illinois at Chicago.

Researchers compared proline repeats in [amphibian](#) and animal models and discovered that when the repeats are short, such as in frogs, teeth will not have the enamel prisms that are responsible for the strength of human enamel. In contrast, when the proline repeats are long, they contract groups of molecules that help enamel crystals grow.

The findings will be published in the December 21 online version of the journal [PLoS Biology](#).

"Proline repeats are amazing," said Tom Diekwisch, professor and head of oral biology in the UIC College of Dentistry and lead researcher on the study. "They hold the key to understanding the structure and function of many natural proteins, including mucins, [antifreeze](#) proteins, Alzheimer amyloid, and prion proteins.

"We hope that our findings will help many other important areas of scientific research, including the treatment of [neurodegenerative diseases](#)."

When tooth enamel is grown it is bathed in bubble-shaped groupings of proteins, Diekwisch said. The size of the protein bubbles varies in different animals, from 5 nanometers in cows to 20 nanometers in mice

and 40 nanometers in frogs.

Diekwisch's team discovered that the longer the stretch of proline repeats, the more the protein bubbles contracted. The study also showed that the smaller protein bubbles were associated with longer enamel crystals, he said.

The new discovery, Diekwisch said, will give new clues to engineer [tooth enamel](#).

"We hope that one day these findings will help people replace lost parts of the tooth with a healthy layer of new enamel."

Provided by University of Illinois at Chicago

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