

Mice teeth explain the troubles with human wisdom teeth

During evolution, many of a species' properties are shaped by ecological interactions. This is readily evident in mammalian teeth, whose many features closely reflect what each species eats. However, for a long time scientists have suspected that genetic and developmental interactions may also influence species-specific properties.

Now, researchers at the University of Helsinki's Institute of Biotechnology show how development affects the evolution of teeth, and have devised a simple developmental model to predict aspects of teeth across many species. The results were published in *Nature*.

In the study in the field of evolutionary developmental biology, the researchers Kathryn Kavanagh, Jukka Jernvall and Alistair Evans in the Institute of Biotechnology of the University of Helsinki first studied cheek tooth, or molar, development in mice. Similarly to human teeth, mouse molars develop from front-to-back so that the first molar appears first and the posterior molars bud sequentially along the jaw. Normally the last molar to develop is the third, or wisdom tooth.

Experiments on cultured mouse molars revealed that the size and number of posterior molars depend on previously initiated molars. The mechanism, called an 'inhibitory cascade', acts much like a ratchet that cumulatively increases size differences of teeth along the jaw.

By quantifying their experiments, the researchers constructed a simple mathematical model which they then used to predict relative size and number of molars across many other mouse and rat species. They show that the model accurately predicts tooth proportions and numbers, one curious effect being that the second molar makes up one-third of total molar area, irrespective of species-specific molar proportions.

This new research demonstrates that with advances in the study of the molecular regulation of development, it is now possible to identify how development influences evolution. And this may help explain the troublesome wisdom teeth of modern humans - the blame may lie within a weak inhibitory cascade that allows the development of the last molar in a jaw that is too small.

Source: University of Helsinki

This document is subject to copyright. Apart from any fair dealing for the purpose of private study, research, no part may be reproduced without the written permission. The content is provided for information purposes only.