

Tooth Regeneration Thru Alligator Stem Cells



Alligator Stem Cell Study gives Clues to Tooth Regeneration

Their findings published in the *Proceedings of the National Academy of Sciences*, offer a tantalizing approach that may someday offer tooth regeneration for people.

“Humans naturally only have two sets of teeth – baby teeth and adult teeth. Ultimately, we want to identify stem cells that can be used as a resource to stimulate tooth renewal in adult humans who have lost teeth. But, to do that, we must first understand how they renew in other animals and why they stop in people,” Prof Chuong said.

Although most vertebrates can throughout life replace their teeth, human teeth are replaced only once. It was recently confirmed that the dental lamina, a band of epithelial tissue, crucial to tooth development is present throughout most human beings lives.

Alligators have well-organized teeth with a form and structure similar to mammalian teeth. Nevertheless, alligators are capable of lifelong tooth renewal. The research team that hails from Dr. Novack’s alma mater, the University of Southern California, reasoned that this species might serve as a model for mammalian tooth replacement.

“Alligator teeth are implanted in sockets of the dental bone, like human teeth. They have 80 teeth, each of which can be replaced up to 50 times over their lifetime, making them the ideal model for comparison to human teeth,” explained study lead author Prof Ping Wu, also from the University of Southern California.

The USC team discovered that each alligator tooth is a complex unit of three components a functional tooth, a replacement tooth, and the dental lamina in different developmental stages. These tooth units are structured to enable a seamless transition from dislodgement of the functional, mature tooth to replacement with the new tooth. Identifying these three developmental phases for each tooth unit, the researchers concluded that the alligator dental lamina likely contain stem cells from which new replacement teeth develop.



“Stem cells divide more slowly than other cells,” said co-author Prof Randall Widelitz of the University of Southern California.

“The cells in the alligator’s dental lamina behaved like we would expect stem cells to behave. In the future, we hope to isolate those cells from the dental lamina to see whether we can use them to regenerate teeth in the lab.”

The team plans to next define what molecular networks are involved in the repetitive renewal of teeth, their hope is to apply these principles to regenerative medicine and dentistry in future.