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Genetic Modification Responsible for Continuously Growing Incisors in Rodent

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Abstract

So what makes a rodent different from other mammals? The most distinguishing characteristic is their teeth. All rodents have a pair of upper and a pair of lower teeth called incisors. Unlike our teeth, these incisors don't have roots, and they never stop growing! To keep these teeth from growing into their brains, rodents grind their teeth against each other. This friction is similar to using a grindstone to sharpen a knife. "Self-sharpening" not only keeps the teeth short, but it also keeps the edges very sharp, almost like a chisel. You might have guessed that the word rodent means "to gnaw." In addition to grinding their teeth together, gnawing on objects (pipes, furniture, buildings, wood molding, etc.) helps keep their teeth short and sharp. Not only do rodent incisors keep growing, they are very hard too. Rodent teeth are harder than lead, aluminum, copper, and iron. Rats often gnaw through metal pipes. After that, gnawing through PVC pipes, plastic containers or cereal boxes is easy.

Rodents are considered one of the most dangerous animal pests on humans and its property due to continuously growing incisors. so, they lend anything which helps maintain relatively constant length. to ensure the continuity of her life. The research paper is interested in identifying the discoveries of scientific research about changing the gene responsible for the continuous growth of rodent teeth and producing genetically engineered rodents and thus eliminating the highest problem caused by rodents on the planet Earth.

Introduction

Teeth are typical examples of organs in which genes determine the progress of development from initiation to the final shape, size and structure, whereas environmental factors play a minor role. Advances in gene technology over the last three decades have led to powerful novel methods to explore the mechanisms of embryonic development.. Today we know few hundred genes that manage tooth development, and changes in dozens of these genes have been appeared to cause abnormalities in tooth development in mice and/or humans. The functions of an expanding number of genes in tooth development have been found utilizing genetically modified mouse models. We are currently beginning to understand the programme underlying the procedure of tooth formation. Key components of the programme are signals mediating communication between cells and complex gene regulatory networks in which the signal pathways are integrated. Under-standing the mechanisms of tooth improvement at the level of genes, cells and molecules will lay the reason for better approaches to prevent and treat dental defects and diseases. Over the last decade knowledge about dental stem cells has accumulated rapidly and novel stem cell technologies have been developed, Thesleff [1].This research presents the most important results of scientific research on how to stop the growth of the teeth of continuous mice.

Results and Discussion

I. Combining stem cell research with knowledge on the mechanisms of tooth development may open up novel possibilities to prevent the continued growth of rodent teeth.

II. Scientific research uses mice as experimental animals in the field of genetic engineering in new discoveries to develop human teeth and this is very beneficial to humanity, but it is important to study the gene responsible for the continuous growth of teeth in mice and prevent it by causing genetic mutations because it causes severe damage to humans and its properties, Takahashi [2].

III. Research studies are currently transferring the gene responsible for the continuous growth of rat teeth and transferring it to humans and developing it. Patricia Losco [3].

IV. Tooth eruption consists of the movement of teeth from the bony crypt in which they initiate their

Development to the occlusal plane in the oral cavity. Interactions between the tooth germ and its encompassing alveolar bone occur in order to offer spatial conditions for its turn of events and emission. This involves bone remodeling during which resoption is a key event. Bisphosphonates are a group of drugs that interfere with the resorption of mineralized tissues. To examine the impacts of sodium alendronate (a strong bisphosphonate inhibitor of osteoclast activity) on alveolar bone during tooth development and eruption, we gave newborn rats daily doses of this drug for 4, 14, and 30 days. Samples of the maxillary alveolar process containing the tooth germs were processed for light, transmission, and scanning electron microscopy and were also submitted to tartrate-resistant acid phosphatase histochemistry and high-resolution colloidal-gold immunolabeling for osteopontin. Inhibition of osteoclast activity by sodium alendronate caused the absence of tooth ejection. The lack of alveolar bone renovating brought about essential bone with the presence of latent osteoclasts and plentiful osteopontin at the interfibrillar regions. The developing bone trabeculae attacked the dental follicle and arrived at the molar tooth germs, inciting deformations in enamel surfaces. No root formation was observed. These findings suggested that alendronate effectively inhibited tooth eruption by interfering with the activation of osteoclasts, which remained in a latent stage. Bradaschia-Correa [4].

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