

Synthetic molecule prevents

Dangerous biofilms from forming



[PICTURE: ©FUJISEBULB]

Escherichia coli plays an important role in the digestive system and is present in every human. However, some variants of *E. coli* can become pathogenic when grouped together and form dangerous biofilms. As part of her doctoral thesis at the Faculty of Dentistry, Ingun Lund Witsø tested the impact of two synthetic molecules, Furanone F202 and Thiophenone TF101, on *E. coli*. Both were created at the Department of Chemistry at UiO. Her goal was to reduce the harmful potential of *E. coli*, mainly by disrupting the bacteria's way of communicating.

She found that Thiophenone molecules were able to disrupt communication between the bacteria, preventing them attaching to the cells of the intestine and forming a biofilm. Consequently, substances such as Thiophenone could be advantageous in the battle against antibiotic resistance, she concluded.

Although her research on *E. coli*'s communication patterns is still at a basic stage, Witsø believes that the results are promising for a multitude of future applications and may result in new methods for combating antibiotic resistance. For example, artificial molecules with the properties of Thiophenone could be added to mouthwash to help loosen dental plaque more efficiently, or the substance could be incorporated into certain prostheses to reduce and prevent the formation of biofilm, Witsø said.

Blueberry extract: A promising agent for

New periodontal therapy

In a laboratory test series, researchers at Université Laval in Quebec tested the effectiveness of *Vaccinium angustifolium Ait.*, an extract from the wild lowbush blueberry, against *Fusobacterium nucleatum*, one of the main species of bacteria associated with periodontitis.

They found that the polyphenol-rich extract successfully inhibited the growth of *F. nucleatum*, as well as its ability to form biofilms. This property may

result from the ability of blueberry polyphenols to chelate iron, the researchers said. In addition, the extract blocked a molecular pathway involved in inflammation.

"This dual antibacterial and anti-inflammatory action of lowbush blueberry polyphenols suggests that they may be promising candidates for novel therapeutic agents," the researchers concluded. They further stated that they are developing an oral device that could slowly release the extract after tooth scaling to help treat periodontitis.

The study, titled "Wild Blueberry (*Vaccinium angustifolium Ait.*) Polyphenols Target *Fusobacterium nucleatum* and the Host Inflammatory Response: Potential Innovative Molecules for Treating Periodontal Diseases," was published online on Sept. 4 in the *Journal of Agricultural and Food Chemistry*.



[PICTURE: ©MAKS NARODENKO]

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Computers Help Dental Implants Look Natural



An article in the current issue of the *Journal of Oral Implantology* describes a simple method to recreate what is known as the mouth's "emergence profile" with implants. It presents step-by-step procedures that the authors used successfully in the clinic and laboratory for 50 implants.

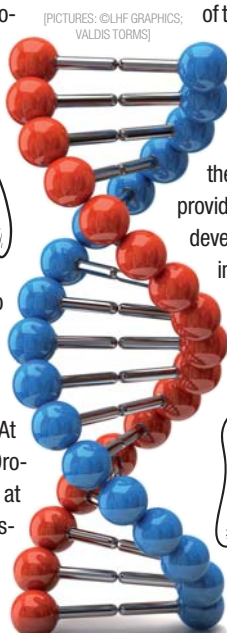
The current study looks at 50 cases of implants with custom abutments made of titanium and zirconia, two

commonly used materials. Abutments connect the replacement tooth to the body of the implant. Customising their design allows surgeons to create a more natural tooth-emergence profile for each patient.

The simple computerised technique provided a precise fit, and it was less expensive and had better accuracy than conventional techniques. To replicate their success, they noted that the process should be well planned before surgery and the implants should be placed accurately. In addition, the surgeon needs to be careful when working with the soft tissue in the patient's mouth and insert temporary crowns properly. All implants were in place and had healed well one year later, with no signs of irritation or inflammation. All patients were satisfied with how the implants looked. Full text of the article "Esthetic Considerations for Reconstructing Implant Emergence Profile Using Titanium and Zirconia Custom Implant Abutments: Fifty Case Series Report," is available in the October issue of the *Journal of Oral Implantology*.

UMC Utrecht discovers genetic cause of Disturbed dental development

Researchers at University Medical Center (UMC) Utrecht have identified a gene that may cause oligodontia, the agenesis of six or more teeth. The discovery of the so-called LRP6 gene makes it possible to diagnose patients more effectively, provide them with better information and develop customised treatment. Oligodontia is a rare but serious congenital anomaly defined by the absence of six or more permanent teeth. Children usually develop milk teeth at a young age, but when their permanent teeth start to erupt, it becomes clear that something is wrong. In several places, no adult teeth come in. In Europe, this condition affects 14 out of every 10,000 people. At the Center of Excellence in Congenital Orofacial and Dental Anomalies, housed at UMC Utrecht, dentists, oral surgeons, plastic surgeons and orthodontists collaborate in a multidisciplinary setting with clinical geneticists of the Department of



Medical Genetics. During a single visit, dental problems are assessed, the patient—and/or parents—are given an explanation of DNA research and are presented with the offer to use it. Based on the findings of the dentist and clinical geneticist, specific genetic research is possible. Van den Boogaard adds, "Most patients want to know the cause. Why does it develop? Will my children get it as well? And what is the risk of this happening? This new research provides better insight into the biology of tooth development. The LRP6 gene is now included in the DNA diagnostics of oligodontia, enabling us to give patients a better diagnosis, and to provide better information and to develop customized treatment."

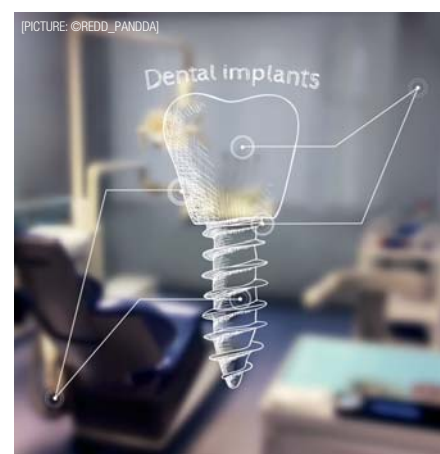


Reference: Massink MPG, Créton MA, Spanevello F, et al. Loss-of-Function Mutations in the WNT co-receptor LRP6 Cause Autosomal-Dominant Oligodontia, *The American Journal of Human Genetics*, in press 2015.

Study suggests many dental Implants may be prone to fracture

An examination of 100 biologically failed dental implants has found that more than 60 per cent of these implants showed signs of mechanical flaws, such as crack-like defects and full cracks.

In publicising these results, the researchers aim to encourage dental implant manufacturers and den-



tists to find ways to reduce the structural damage that occurs when a metal is subject to repeated applied loads.

In the study, the researchers examined 100 discarded dental implants, which had been extracted owing to peri-implantitis, made of a titanium alloy and commercially pure titanium using energy dispersive X-ray analysis and scanning electron microscopy.

They found mechanical defects in 62 per cent of the specimens. In addition, the inspection showed that the pure titanium implants had more cracks than did the titanium alloy implants. It was also found that the width and length of the different implants in this study were not correlated with the observed defects.

Shemtov-Yona is now aiming to conduct further studies to investigate the reasons for the development of cracks to determine whether the causes lie in manufacturing, use or both. The study, titled "On the mechanical integrity of retrieved dental implants", was published in the September issue *Journal of the Mechanical Behavior of Biomedical Materials*.