

Biofilm research could advance

Development of dental materials

Biofilms are generally regarded as a problem to be eliminated due to the threats they pose to humans and materials. However, new research suggests that communities of algae, fungi or bacteria possess interesting properties from both a scientific and technical perspective. These properties could result in the improved creation of structural templates, including materials for teeth.

All natural materials (whether wood, bone or teeth) have been optimised by evolution over millions of years according to the principle of adapted stability with the lowest possible weight. Thus, nature provides the blueprints for many technical developments. The structural complexity of the original material in nature can however often not be reproduced, as the processes on the nanometer scale are hard to evaluate and mimic.

Prof. Cordt Zollfrank and his team of researchers at the Chair of Biogenic Polymers at the Technical University of Munich, Campus Straubing for Biotechnology and Sustainability, have now presented



© Amnuay.J/Shutterstock.com

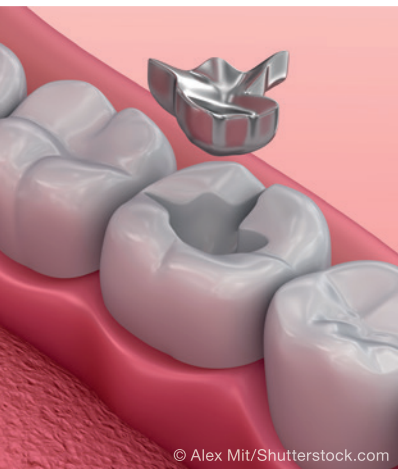
a series of biological procedures that use light, heat, specially-prepared substrates and other stimuli to direct the movement of microorganisms along specific paths.

The findings make it possible to create tailor-made templates for new materials with natural structures from the microbes themselves, or their secretions. The scientists are already applying some of these methods aiming at profiting of the special properties of red algae to create long, fine polymer threads that serve as customised templates for the manufacturing of functional ceramics.

Source: Technical University of Munich

Cancer-inducing effects of

Metal used intraorally



© Alex Mit/Shutterstock.com

US researchers investigated the possible risk factors for carcinoma in the oral cavity—the cancer causing effects of alcohol and smoking have multiply been researched already and such consumptions have indisputably been found to be an important trigger for oral cancer. Nevertheless, there are numerous cases in which they are not consumed. The researchers of the University of Chicago have thus decided to investigate, proposing that metals used in the mouth as tooth replacement or during orthodontic

treatments also have cancer-inducing effects.

54 cancer patients with the fitting precondition participated in the study, of whom 80 per cent had never smoked and 20 per cent only sporadically. No participant had more than two alcoholic drinks per week, 80 per cent even consuming a maximum of only one. All patients had however in one way or another been exposed to metallic materials in the mouth.

It was found, that 40 patients had received tooth replacements containing metal prior to being diagnosed with cancer. The study while determining first indications could, however, not yet prove a causal connection between cancer of the oral cavity and dental materials containing metal.

Source: ZWP online

Cavitating jets improve

Removal of oral biofilm

In their recent study, “Removal of oral biofilm on an implant fixture by a cavitating jet”, Prof. Hitoshi Soyama from Tohoku University and his team from Showa University searching for better ways for dentists to remove plaque from implant fixtures compared the effects of a cavitating jet to the standardly used water jet. With the cavitating jet, high-speed fluid is injected by a nozzle through water to create minuscule vapour bubbles, which in collapsing produce shock waves with sufficient force to remove surface contaminants.

To test the two jets, four volunteers performed no oral care for three days to allow biofilm to develop. Their fixtures were then cleaned using both methods, with the Japanese researchers measuring the amount of plaque remaining at several time intervals.

They found the cavitating jet to be more effective in removing biofilm from the rough surface of an implant fixture.

In addition to the water jet's shear effect, the cavitating jet produces considerable force when the bubbles collapse. Both processes in synergy thus make the cavitating jet superior when cleaning plaque off the irregular surface of dental implants.



© Andy Frith/Shutterstock.com

