Researchers develop less destructive method to whiten teeth

Chinese researchers have now developed a new, less destructive method. As is commonly known, teeth can become discoloured with the consumption of staining foods and drinks. As a result, many people turn to non-invasive whitening treatments. Currently, the most common bleaching agent is hydrogen peroxide, but high concentrations can break down the enamel, causing sensitivity or even cell death.

Researchers and senior authors of a recent study Xiaolei Wang and Lan Lian, along with their colleagues at Nanchang University, investigated whether a different compound activated with blue light could act as a safer, yet still effective, alternative. The team modified titanium dioxide nanoparticles with polydopamine (nano-TiO₂@PDA) so that they could be activated with blue light. In a proof-of-concept experiment, the particles were evenly coated on the surface of a tooth and irradiated with blue light.

After 4 hours of treatment, the whitening level was similar to that obtained with hydrogen peroxide-based agents. The researchers did not find significant enamel damage on the surface of the tooth, and the treatment was significantly less cytotoxic than hydrogen peroxide. In addition, the nano-TiO₂@PDA therapy showed antibacterial activity against certain bacteria.

The study, titled ‘Blue-light-activated nano-TiO₂@PDA for highly effective and nondestructive tooth whitening’, was published in ACS Biomaterials Science and Engineering on 19 June 2018.

By DTI

NANCHANG, China: Social media adverts for whitening products show celebrities flaunting their pearly whites, putting pressure on consumers to conform to the ideal of white teeth. Patients can opt for over-the-counter or professional tooth whitening treatments, but both can harm the teeth. To combat this problem, Chinese researchers have now developed a new, less destructive method.

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INTERVIEW
Dental Tribune had the opportunity to speak with Andrea Green, who has been working in the field of dentistry for over 25 years about what can be done to improve business education for dentists.

PRACTICE MANAGEMENT
In addition to knowledge, experience and the latest technology, communication is key in the success of a dental practice. In this issue, an expert talks about how to deal with grumbling patients.

NO SCREWS, NO CEMENT
Case report about the fabrication of a fixed superstructure for the edentulous mandible that uses an innovative attachment system.
Survey reveals Australian dental product suppliers face rising costs

By DTI

CANBERRA, Australia: To allow manufacturers and suppliers of dental products to express their level of business confidence in the industry, the Australian Dental Industry Association (ADIA) conducts the Australian Dental Products Business Conditions Survey on a quarterly basis. According to the results of the most recent survey, there is an overall feeling that the industry is facing some challenges, mostly due to rising costs.

“Businesses that supply the products used by dentists and allied oral healthcare professionals are facing challenges that range from rising electricity costs to higher prices associated with importing products from overseas. This doesn’t diminish the dental industry’s commitment to making available the latest innovations, it just means that the businesses have increased challenges,” said ADIA CEO Troy Williams.

According to ADIA, the survey is a clear indicator that the Australian government needs to maintain its efforts to reduce bureaucratic hurdles. However, a new proposal by the Therapeutic Goods Administration for a tax on the supply of medical devices in the dental and medical industries may be doing the exact opposite.

Speaking about some of the positive aspects of the survey, Williams noted that the dental industry is growing, and the survey provides clear indication that businesses are employing more people. In addition, the survey revealed that large-scale trade shows such as ADX18 Sydney, Australia’s largest healthcare trade show, can positively influence sales volumes. This result Williams said reinforces ADIA’s commitment to providing the industry with “world-class trade shows”.

Summing up the results of the survey, Williams went on to say “ADIA member businesses want to invest in their business and want to create jobs. This survey shows they are being challenged by rising business costs and that’s why we need government to cut the red tape, which will lead to reduced compliance costs.”
Researchers pinpoint mutations that give bacteria antibiotic resistance

By DTI

Antibiotic resistance is a growing major healthcare concern. (Photograph: Sirirat/Shutterstock)

HOKKAIDO, Japan: The researchers, from Hokkaido University and the National Institute of Advanced Industrial Science and Technology, have developed an approach to systematically screen for resistant ribosomal RNA (rRNA) genes. rRNA is the indispensable part of the cell that creates proteins. It is one of the primary targets of antibiotics, but rRNA mutation is now a well-known route to resistance. That resistance has many healthcare professionals concerned. In a recently presented study at EuroPerio9 in Amsterdam, results showed that antimicrobial resistance is on the rise among German patients with severe periodontitis.

Dr Kei Kitahara, a molecular microbiologist at Hokkaido University and co-author of the current paper, said: “Our results suggest that there are many unfound and uncharacterised antibiotic resistance point mutations in rRNA genes.”

In order for Kitahara and co-author Prof Kentaro Miyazaki to arrive at this conclusion, they took rRNA from a wide range of bacterial species in the natural, or non-clinical, environment, where mutations are continually taking place. From there, the researchers were able to insert them into inactive Escherichia coli lacking in rRNA and found that more than 2,000 imported rRNA could compensate for this lack, thereby preventing the E. coli from dying. They then tested whether a common antibiotic, spectinomycin, effectively killed the bacteria or if the rRNA gave the E. coli resistance.

According to the study results, the screening found three previously unreported mutations in rRNA from the pathogens that resisted the antibiotic, along with other mutations that were already known. Although using inactive E. coli to test for mutations has been proposed before, this screening can analyse rRNA from other pathogens rather than just what is present in the E. coli.

The discovery by the researchers comes at a time when antibiotic research is becoming increasingly challenging. Earlier this year, the Star Tribune reported that Novartis, a Swiss multinational pharmaceutical company based in Basel, was the latest drug-manufacturing giant to announce it was shutting down its antibiotics and antiviral research programmes. According to the article, a Novartis representative said the move would allow the firm to “prioritise resources in other areas where we believe we are better positioned to develop innovative medicines.” The study, titled “Functional metagenomic approach to identify overlooked antibiotic resistance mutations in bacterial rRNA”, was published in Scientific Reports on 3 April 2018.