Researchers identify DNA sections responsible for periodontitis

By DTI

BERLIN, Germany: An international network of researchers led by scientists at the Charité—Universitätsmedizin Berlin in Germany has identified variations of certain DNA sequences that are clearly associated with an increased risk of developing different forms of periodontal disease. For at least two gene regions, the study team found a highly significant association with the disease.

In a genome-wide association study, the group, led by Prof. Arne Schäfer from the Charité Institute for Dental and Craniofacial Sciences, investigated the relationship between sequence differences in genetic information and the incidence of the disease in several thousand patients with aggressive and chronic periodontitis. The results were compared with healthy individuals.

“This type of study is very systematic in nature. It aims to identify the genes that have an effect on a person’s risk of developing a specific disease,” Schäfer explained. Millions of DNA sequence variants, distributed throughout the genome and describing most of a person’s genetic information, were examined in various patient groups. “DNA sequence variations can have an effect on a person’s risk of developing a particular disease. By comparing frequencies of variants in patients and healthy controls, it is possible to find which areas of a chromosome are associated with the disease,” he added.

The scientists found two gene regions that appeared to be associated with an increased risk of developing different forms of periodontitis. One of the two regions is responsible for the synthesis of alpha-defensins (antimicrobial peptides), which are produced by specialised immune cells. These immune cells, neutrophils, are part of the body’s immune response and are involved in the identification and destruction of microorganisms. The second gene region inhibits the activation of these immune cells.

“Our results show that the different forms of gum disease share a common genetic origin,” said Schäfer. He emphasised: “This means that there are groups of patients who are susceptible to developing gum disease, but whose susceptibility is independent of other risk factors, such as smoking, oral hygiene or aging.”

Worldwide, the prevalence of severe periodontal disease is estimated to be about 11 per cent.

The disease is considered complex because individual susceptibility is determined by the interaction between the oral microbiome and the immune system, smoking and diet, as well as by metabolic disorders such as diabetes mellitus. The response of the body to these factors is largely influenced by the individual’s genetic make-up.

The study, titled “A genome-wide association study identifies nucleotide variants at SIGLEC5 and DEFA1A3 as risk loci for periodontitis,” was published in the July issue of the Human Molecular Genetics journal.

Less is more: Study looks into the traits of a “perfect” smile

By DTI

MINNEAPOLIS, USA: Lopsided, big, toothy, shy—smiles are described in many different ways. However, according to research from the University of Minnesota, how people perceive the facial expression in social interaction and non-verbal communication can differ significantly.

In the study, the researchers asked 802 study participants to rate 27 computer-animated smiles on their perceived effectiveness (very bad to very good), genuineness (fake vs. genuine), pleasantness (creepy to pleasant) and emotion expressed (anger, contempt, disgust, fear, happiness, sadness or surprise). The animated expression was altered by variations in the mouth angle, the extent of the smile, the degree to which teeth were shown and how symmetrically the smile developed.

The findings suggest that for a winning smile—one that is perceived as effective, genuine and pleasant—less is more. In the study, smiles with a medium angle tended to be more favorably judged, while wide open-mouth smiles were often interpreted as a sign of fear or contempt. In fact, the two lowest-rated smiles were both very toothy.

Although research has suggested that facial symmetry is often perceived as being more beautiful than asymmetry, slightly crooked smiles were rated higher in the current study. According to the researchers, this result is consistent with principles of smile design, in which dynamic symmetry, that is being very similar but not identical, allows for a more vital, dynamic, unique and natural smile compared with static symmetry.

The study’s results could have broad applications in a variety of areas, such as facial reanimation surgery and rehabilitation in individuals who have suffered from trauma, cerebrovascular accidents, neurological conditions, cancers or infections that have robbed them of the ability to express emotions through facial movement.

The psychological and social consequences of facial impairment can be extensive. Research has shown that individuals with partial facial paralysis are often misinterpreted, have trouble communicating, and often report symptoms such as anxiety and depression.

The study, titled “Dynamic properties of successful smiles,” was published on 28 June in the PLOS ONE journal.