

Genes that control nervous system development play a role in gum disease

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(Medical Xpress)—By simultaneously investigating millions of gene variants in more than 5,000 individuals, researchers at the University of North Carolina at Chapel Hill reveal that genes that are responsible for nervous system development and immune function also play a role in an insidious gum disease known as chronic periodontitis.

The work, led by Kimon Divaris, a research assistant professor at UNC School of Dentistry, is the first genome-wide association study of the disease, offering an unparalleled breadth of insight into its genetics and how it is affected by environmental factors such as smoking.

"Periodontitis is a serious infection and inflammation of the gums that can progressively destroy the bone and tissues that support your teeth," said Divaris, whose work appears in the March 4 issue of [Human Molecular Genetics](#). "Now we not only confirm that this is a heritable disease, which occurs in some form in nearly 50 percent of the population, but we also know which [genes](#) play a large role – and that gives us pretty interesting clues about how the disease works and what we can do to better treat and prevent it."

Divaris and his team, including senior author Stephen Offenbacher, chair of the department of periodontology, identified six genes and 12 pathways important to nervous system and [immune function](#) that are involved in the disease. Variants of those genes could potentially increase or decrease people's risk of developing periodontitis, depending on how these genes interact with one another and their environment.

Based on their findings, Divaris and his team propose that genes in the immune system and the nervous system play off of one another to predispose people to chronic periodontitis, and that smoking interacts with these genes to increase that risk. One hypothesis is that when bacteria that live on and beneath our gums become harmful, the [nervous system](#) sends signals to elicit an [immune response](#) to scale back the infection. That response leads to inflammation and possible destruction of the tooth-supporting gums and tissues.

"It has long been known that it isn't the bacteria, but our defense against the bacteria – the inflammation – that causes periodontal destruction and tooth loss," said Divaris. "But now we have a plausible network of genes – a circuit – that can, in part, explain how that inflammation comes to be."

Provided by University of North Carolina at Chapel Hill School of Medicine

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