Immunohistochemical Analysis of TH-positive Region in Ganglion Trigeminae of Rat Chronic Periapical Periodontitis

YAMAMOTO Toshiro\textsuperscript{1)}, WAKAMORI Megumi\textsuperscript{1)}, GOTO Fumihiro\textsuperscript{1)}
SHIZUKA Chikayo\textsuperscript{1)}, HASEGAWA Toru\textsuperscript{1)}, UENISHI Toshihiro\textsuperscript{1)}
UMEMURA Seiko\textsuperscript{1)}, ADACHI Keiji\textsuperscript{1,2)}, KITA Masakazu\textsuperscript{4)}
and KANAMURA Narisato\textsuperscript{1)}

\textsuperscript{1)}Department of Dental Medicine, Kyoto Prefectural University of Medicine Graduate School of Medical Science
\textsuperscript{2)}Department of Dentistry, Kyoto Prefectural Rehabilitation Hospital for the Disabled
\textsuperscript{3)}Department of Microbiology, Kyoto Prefectural University of Medicine Graduate School of Medical Science

Abstract: Most sensations in the oral cavity are afferent sensory responses from the trigeminal nerve. We previously reported that persistent pain and inflammation in periapical periodontitis is associated not only with nerve fibers immunoreactive to calcitonin gene-related peptide (CGRP) in sensory nerve fibers of the periodontal ligament, but also with tyrosine hydroxylase (TH) as a rate-limiting enzyme for the synthesis of catecholamine as a representative marker of sympathetic nerve fibers. In this study, the influences of periapical periodontitis on the trigeminal ganglion were histologically evaluated.

A rat periapical periodontitis model was produced. The rats were fixed by perfusion. The mandible and trigeminal ganglion were resected, and frozen serial sagittal sections were prepared and stained with hematoxylin eosin (HE) and immunohistologically stained with TH.

HE staining of periapical tissue showing pulpal infection revealed an enlarged periodontal space and increased inflammatory cells, suggesting periapical periodontitis. The intensity of TH expression in the periodontal ligament was increased in rats with compared to controls without periapical periodontitis. With periapical periodontitis, the number of TH positive regins in the trigeminal ganglion was significantly higher compared with the control \(p<0.05\).

These results suggest that the sympathetic nerves are involved in pain and inflammatory responses at the trigeminal ganglion level in periapical periodontitis.

Key words: Periapital periodontitis, Ganglion trigeminae, TH