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## INFLAMMATORY RESPONSES TO CHORDA TYMPANI NERVE SECTIONING IN *Tnfr1* KNOCKOUT MICE AND THEIR ROLE IN TASTEBUD DEGENERATION

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# Inflammatory Responses to Chorda Tympani Nerve Sectioning in Tnfr1 Knockout Mice and their Role in Tastebud Degeneration

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## ABSTRACT

Cytokines such as tumor necrosis factor (TNF) play a key role in the development and maintenance of pain after peripheral nerve injury or infection. These are pro-inflammatory cytokines- small proteins that are crucial in controlling the proliferation, recruitment and activity of immune cells. Mechanisms responsible for taste bud regeneration are not fully understood, so this hinders strategies towards restoring natural taste sensation after trauma, cancer treatment, and even viral infection. A striking example of this is a loss of taste, commonly attributed to long-term SARS-CoV-2. Previous research conveys that TNF receptor signaling is required for taste bud regeneration after experimental nerve sectioning. Interleukin-1 (IL-1) receptor also showed that neural responses to taste were also affected after nerve sectioning. Based on this, we proposed that neutrophil recruitment due to CT nerve injury would be dampened in Tnfr1/2 knockout (KO) compared to the wild-type mice receiving injury. To test the hypothesis, CT nerve axotomy was performed in anesthetized C57BL/6J (wild-type mice) and Tnfr1/2 KO mice. Mice were euthanized 6 hours post-injury, and tongues were harvested, frozen, and cryosectioned. Hour 6 C57BL/6J (wild type mice) and Tnfr1/2 KO mice cryosections were stained with MPO+ neutrophil marker, and DAPI nuclei marker then analyzed for MPO+ neutrophil pixels using MetaMorph imaging software. Significant neutrophil responses were observed at a greater rate in TNFR KO mice than in the wild-type mice, which does not support the hypothesis. These findings suggest that other cytokines, like IL-1, can compensate for neutrophil recruitment. Further studies will focus on different time points after injury as

well as observing the mucosa as a region of interest to observe the migration of neutrophils from the vasculature to the papillae.

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