

## CHANGES OBSERVED OVER TIME IN DENTIN DEVELOPMENT AFTER NEONATAL DESENSITISATION

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**INTRODUCTION:** The neonatal application of capsaicin has been known to produce a selective desensitisation of nociceptive fibers in a physiological system [1, 2]. Additionally, it has been observed that a lack of functional nociceptive fibers in the pulp has a detrimental effect on dentine development after 120 days [1]. The purpose of this study was to observe dentine development in the neonatally capsaicin-treated rat in a spectrum from 30 to 155 days of life.

**METHODS:** This study was carried out with the subcutaneous application of capsaicin at a dose of 50 mg/Kg body weight in a sterile vehicle in 48 Wistar rats on the 3<sup>rd</sup> day of life. This group served as the experimental group in which 12 rats lived to 30 days, 12 to 60 days, 12 to 90 days and 12 to 155 days. The control group was made up of 48 rats which were treated with the sterile vehicle of identical volume which did not contain capsaicin. Furthermore, in the control group 12 rats lived to 30 days, 12 to 60 days, 12 to 90 days and 12 to 155 days. All rats were deeply anaesthetized before being sacrificed with cardiac puncture and intravital perfusion and fixation. Jaws were then immediately dissected and further fixed for no more than 24 hours in 4% buffered paraformaldehyde. Jaws were opened sagittally from pulp horn to pulp apex and prepared for the scanning electron microscopy (SEM). Photo documentation was carried out at SEM magnifications of X200, X700, X1000, X1800, and X4000.

**RESULTS:** Our results demonstrate an extreme change in dentine development in a time spectrum from 30 days to 155 days in the experimental group, where changes in dentine development were not noted in the same time spectrum of the control group. More specifically, no changes were found between

the 30 day experimental group and the 30 day control group. In the 60 day group, dentine defects such as irregular dentine tubuli diameter and voids in dentine structure are noted in the experimental group. These dentine defects are more extreme in the 90 day experimental group compared with the 60 day experimental group. Finally, while there is still dentine defects seen in the 155 day group compared with the 30 day experimental group, there is no progression of dentine deterioration when comparing the 90 day experimental group with the 155 day experimental group.

**DISCUSSION & CONCLUSIONS:** With this study we were able to show that the neonatal application of capsaicin produces changes in dentin development over time in the rat.

**REFERENCES:** <sup>1</sup> K. Chung, C.M. Klein, R.E. Coggeshall (1990) The receptive part of the primary afferent axon is most vulnerable to systemic capsaicin in adult rats. *Brain Res* **511**: 222-226. <sup>2</sup> T. Krage, I. Lambrichts, K. Zanger, W.H.-M Raab (2002) Capsaicin-treated animals vs. NO-3 knockout mice: a SEM and TEM comparison in *Proceedings to the International Conference on Dentin/Pulp Complex 2001* (ed Ishikawa et al.) Quintessence Publishing, Tokyo, pp 187-189.

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