

In vitro effects of topical neuromodulatory medication on orofacial tissue

March 12 2015

Today at the 93rd General Session and Exhibition of the International Association for Dental Research, researcher M.J. Al-Musawi, Newcastle University, Newcastle upon Tyne, UK, will present a study titled "In Vitro Effects of Topical Neuromodulatory Medication on Orofacial Tissue." The IADR General Session is being held in conjunction with the 44th Annual Meeting of the American Association for Dental Research and the 39th Annual Meeting of the Canadian Association for Dental Research.

Systemic neuromodulatory medication (NM) such as Amitriptyline, Gabapentin and Carbamazepine are used in the management of neuropathic orofacial pain. Topical administration of NM has also been reported, but the effect of exposure of oral mucosa and skin to topical NMs has not been examined. In this study, researchers aimed to investigate the effects of NM on cell lines relevant to the orofacial tissue in vitro.

Cell viability was measured at different time-points, in human skin keratinocyte (HaCat) and oral keratinocyte (OKF6-TERT1) exposed to different concentrations of pure Amitriptyline, Gabapentin and Carbamazepine using alamarBlue. Using High-Performance Liquid Chromatography (HPLC), drugs concentrations released from NM orabase-pastes (after 30 minutes of incubation) were calculated. Using these clinical concentrations, morphological changes and cytokine expression were investigated using scanning electron microscopy and human inflammatory antibody array respectively

At low concentrations, Amitriptyline was more cytotoxic in HaCat cells compared with control. An increase in IL-8 was observed in HaCat cells exposed to NMs for 30 minutes compared with untreated cells. The greatest increase in IL-8 expression occurred with 5.54mM Gabapentin, which was also associated with increased Exotoxin-1, Exotoxin-2 and IL-3 expression. OKF6-TERT1 cells were resistant to all medications, with viability only decreasing at high concentrations (1.4 mM) of Amitriptyline over long time periods. IL-8 expression was decreased in OKF6-TERT1 cells with Gabapentin and Amitriptyline treatment, although an up-regulatory response was observed with Carbamazepine in these cells.

The research findings demonstrate that at lower concentrations, Amitriptyline is more cytotoxic to HaCat cells compared with OKF6-TERT1 [cells](#). Higher concentrations of Amitriptyline are cytotoxic for both cell types. Gabapentin and Carbamazepine were less cytotoxic with effects only observed at high concentrations and longer exposure times. Changes in cytokine [expression](#) were observed with all NMs. Results suggest further research is necessary to determine the long term in vivo effects of topical NMs.

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More information: This is a summary of abstract #0763 titled "In Vitro Effects of Topical Neuromodulatory Medication on Orofacial Tissue," to be presented by M.J. Al-Musawi on Thursday, March 12, 2015, from 2 p.m. - 3:15 p.m. in Hall B of the Hynes Convention Center.

Provided by International & American Associations for Dental Research

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