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TITLE: Characterization of the 4NQO rat model for oral squamous cell carcinoma

ABSTRACT BODY:

Objectives: Head and neck cancer is often associated with a bad prognosis. Current treatments including chemotherapy, radiotherapy and surgery leave the patient with severe discomfort such as speaking difficulties, missing facial parts, etc. Therefore, the development of new and targeted therapies is highly necessary. For future studies, a carcinogen-based rat model for head and neck cancer was established based on the administration of 4-nitroquinoline-1-oxide (4NQO).

Methods: To optimize the model and to gain insight in the development of tumors over time, 4NQO was applied in Wistar rats. Two different exposure methods were used: application directly on the surface of the tongue (3 times a week, 5 mg/mL 4NQO in propylene glycol), and administration of 4NQO through the drinking water (at libitum, 0.1 mg/mL). Every 4 weeks, 3 rats of both groups were sacrificed and histological sections of the tongue were examined. Tumour progression and histopathological changes of the epithelia were observed by microscopic analysis of Masson's trichrome staining. Tumour characterization was evaluated by immunohistochemistry. Human malignancy markers and cell proliferation markers such as Ki-67, P63 and MAGE-3 are used to optimize the animal model and to decide on the better application mode.

Results: In both application groups, epithelial changes are observed leading to the formation of tumors as shown by the different staining methods used in this study.

Conclusions: In conclusion, we successfully optimized the 4NQO rat model for head and neck cancer in our lab. The drinking water administration method will be used for future studies.

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