Background Head and neck tumors (HNT) are of paranasal sinuses origin (the salivary glands and the upper aerodigestive tract). It constitutes the sixth most common tumors. Studies have shown that, factors such as tobacco and alcohol intake and viral infections may increase the relative risk to the tumor. RIN1 is a Ras effector protein that regulates epithelial cell properties and has been implicated in a number of tumors. Notch1 pathways are frequently altered in many tumors, however, the clinical significance of NOTCH1 dysregulation in head and neck tumors is poorly understood.

Methods RIN1 and NOTCH1 expression were analyzed using quantitative real-time PCR (qRT-PCR) and immunohistochemical staining on tissue samples from a consecutive series of 150 head and neck tumor patients and 150 normal head and neck tissues who underwent tumor resections over a four-year period.

Results The oral cavity was the most frequent anatomical site for the head and neck tumors comprising of 34.0%, followed by tumor of the respiratory (25.2%), mandible (24%) with the least anatomical site of the tumor been salivary gland (0.76%) and the eye (0.76%). Low level for the expression of RIN1 within ages between ≤40, >40 in the head and neck malignant tumors with p-value 0.02. There was a significant difference between the histological differentiation of the malignant tumor with p values of 0.001, when poor and well moderate was compared. The staining patterns of Notch1 were seen in the nucleus and cytoplasm. The percentage of low expression of Notch1 were 71.4% in the malignant tissue (n=98) and 76.9% (n=52) in the benign tissue. The anatomical site with high of low expression of the NOTCH1 was found in oral cavity (37.1%) followed by respiratory (27.1%) followed by mandible (14.3%).

Conclusions Low expression RIN1 in head and neck tumors but high expression of RIN1 in normal head and neck tissues. Low expression of NOTCH1 in head and neck tumor tissues suggesting that NOTCH1 may be a tumor suppressor gene. We further propose that, NOTCH1 offers a potential tool as a target molecule in the development of therapies for head and neck tumors.

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Ethics Approval The research protocol was approved by the Ethical Review Committee of the Cape Coast Teaching Hospital (REF: CCHERC/RS/EC/2018/52).

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