Objective: Targeting the molecular pathways associated with carcinogenesis remains the greatest opportunity to reduce treatment related morbidity and mortality. Extracellular matrix metalloproteinase inducer (EMMPRIN), also known as CD147, is a cell surface molecule known to promote tumor growth and angiogenesis in preclinical studies of head and neck carcinoma. To evaluate the feasibility of anti-CD147 therapy, an ex vivo human head and neck cancer model was established.

Methods: Twenty-two head and neck cancer specimens were obtained at the time of surgery and tumor slices were prepared via sharp dissection and weighed to control for variability. Tumor slices were exposed to varying concentrations of anti-CD147 monoclonal antibody and a pairwise comparison of mean ATP levels for control and antibody treated tissue slices was performed. Following treatment, tumor slices were assessed by immunohistochemistry and Western blot analysis for apoptosis (TUNEL) and CD147 expression.

Results: A total of 47% of tumor specimens demonstrated a significant reduction in mean ATP levels following treatment with anti-CD147 antibody as compared to untreated controls ($P < 0.05$). Samples which demonstrated reactivity to anti-CD147 also had greater CD147 expression based on immunohistochemistry staining (49%) when compared to nonresponders (25%, $P = 0.06$). In addition, TUNEL analysis revealed a larger number of cells undergoing apoptosis in antibody treated tumor slices (77%) compared to controls (30%, $P < 0.001$) with activation of apoptotic proteins caspase 3 and 8.

Conclusion: This study demonstrates the potential of anti-CD147 to inhibit proliferation and promote apoptosis. Anti-CD147 may play an important role in future targeted treatment of head and neck cancer.

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