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# Efficacy of Combination of Immunotherapies in a Murine in a Murine Squamous Cell Carcinoma Model

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## Efficacy of Combination of Immunotherapies in a Murine in a Murine Squamous Cell Carcinoma Model

**Introduction:** Head and neck squamous cell carcinomas (HNSCCs) are a type of neoplasm found in the epithelium of the oral cavity, oropharynx, nasopharynx, larynx, or hypopharynx. Recent evidence has demonstrated that 70-90% of HNSCC are associated with Human Papillomavirus (HPV), particularly strain 16 producing oncogenic proteins E6/E7.<sup>1</sup> Currently, HNSCCs are treated with surgery, chemotherapy, and radiation, however immunotherapy with immune checkpoint (PD-1) blocking agents promises to improve outcomes in HNSCC.<sup>2</sup>

**Objective:** This study examined the therapeutic effects of dual and triple combination immunotherapies in a mouse model of HPV-associated HNSCC.

**Methods:** Treatment modalities included a tumor vaccine (attenuated *Listeria monocytogenes* based vaccine encoding HPV16 E6/E7 (AXAL)), an immune checkpoint inhibitor targeting PD1 (RMP1-14) and topical subtherapeutic radiation. Mice were injected subcutaneously with tumor cells expressing HPV16 E6/E7 (TC-1). When tumors were established, mice were vaccinated with AXAL (3 injections) either alone and/or with anti-PDi and/or with a single dose of radiation.

**Results:** Partial responses were observed in some mice receiving dual combination therapies. Most mice treated with triple immunotherapy revealed complete tumor regression.

**Discussion:** Combination immunotherapy is effective in the TC-1 HNSCC model system. The results obtained set the stage for investing immune mechanism underpinning treatment-associated tumor regression.

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<sup>1</sup> El-Mofty SK. Human Papillomavirus (HPV) Related Carcinomas of the Upper Aerodigestive Tract. *Head and Neck Pathology*. 2007;1(2):181-185. doi:10.1007/s12105-007-0021-6.

<sup>2</sup> Albers A, Abe K, Hunt J, et al. Antitumor Activity of Human Papillomavirus Type 16 E7-Specific T Cells against Virally Infected Squamous Cell Carcinoma of the Head and Neck. *Cancer Research*. 2005;65(23):11146-11155. doi:10.1158/0008-5472.can-05-0772.