In Vitro Comparison of Oral Squamous Cell Carcinoma, HPV-positive and HPV-negative

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Introduction

Oral squamous cell carcinoma (OSCC) is a type of skin cancer that affects the oral cavity. It is characterized by red or red and white, rough lesions. OSCC has a very high mortality rate. In its early stages, the five-year survival rate ranges from 63% to 83%. In its advanced stages, the five-year survival rate is 38%. The etiology of OSCC includes use of tobacco products, heavy alcohol usage, and natural and artificial sun exposure over a significant amount of time. It is estimated that the number of OSCC cases will rise by 40% by 2040.

Head and neck squamous cell carcinoma (HNSCC) involves cancers of the oral cavity, nasopharynx, oropharynx, hypopharynx, larynx, paranasal sinuses, and salivary glands. HNSCC is very aggressive and prone to metastasize. HNSCC also has an extremely low five-year survival rate.

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases. HPV is spread through skin-to-skin contact and is highly contagious. It is estimated around 14 million people in the U.S. are infected. Symptoms include warts or lumps on the skin. HPV can potentially lead to the development of OSCC.

Recent studies suggest that patients that are diagnosed with HPV-positive OSCC have a better prognosis than patients diagnosed with HPV-negative OSCC. OSCC HPV-positive has more obvious symptoms, and body defenses are more likely to respond to the infection.

Cell Lines

Cal-27 oral squamous cells  HPV-negative
• Found on the middle of the tongue
• Taken from a 56-year-old, white male in 1982

SCC090 oral squamous cells  HPV-positive
• Found on the base of the tongue
• Taken from a 46-year-old, white male in 1994

Methods

Wound-healing Assay
• Six well plates seeded at 5x10⁶
• Images at 0 hr and 24 hrs

Cell Count
• Six well plates seeded at 5x10⁶ and 2x10⁶
• Images at 24 hrs and 48 hrs

MTT Assay
• 96 well plate seeded at 2.5x10⁵

Growth Curve

Growth Curve Cal-27 vs SCC090
48-hr cells seeded 5x10⁵

Motility

Wound Healing Assay Cal-27 vs. SCC090
24-hr measurement cells seeded 1x10⁶

Conclusion

• There was no difference in cell growth at 24 hours for cells seeded at low and high density as observed in the MTT and cell counting results.
• Observation of cells seeded at 5x10⁶ showed that Cal-27 cells had a greater increase on day three when compared to SCC090 cells.
• There was a significant difference when area under the curve (AUC) was compared over three days.
• Cal-27 had a greater rate of motility than SCC090 with a significant difference when Cal-27 was compared to SCC090 over 24 hours.

Future Direction

• Perform an agarose invasiveness assay comparing the two cell lines.
• Cell culture Cal-27 and SCC090 cell lines in a 3D spheroid system for a more realistic way to model cell behavior.

This research project was supported through the LSU Health Sciences Center School of Graduate Studies and Olesaner Medical Technologies