

**2010年臺灣國際科學展覽會  
優勝作品專輯**

**國家：United States**

**編號：080007**

**作品名稱**

**Mechanisms of Tumor Cell Invasion: The Role of Stat3 in  
Squamous Cell Carcinoma**

**得獎獎項**

**Biochemistry First Award**

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## **Abstract**

Skin cancer, including basal cell and squamous cell skin carcinoma, is known to be the most common cancer type. Skin cancer is thought to make up half of all known cancers. Over one million non-melanoma skin cancers (NMSC) are reported every year. Approximately 300,000 of these cases are squamous cell carcinoma (SCC). It is estimated that about 2,000 people die from NMSC each year. Of the two skin cancer types, SCC tends to be the more clinically aggressive and likely to spread and invade, typically by way of blood or lymphatic vessels. Understanding the signaling pathways in SCC cells that regulate invasion will be important for developing improved cancer treatments. The signal transducer and activator of transcription 3 (Stat3) protein is a central regulator of numerous cellular activities, including proliferation, survival, and motility. Stat3 also has enhanced activity in many cancers, including skin SCC. This study shows that Stat3 regulates several invasive properties in a human skin SCC cell culture model.

HGF (hepatocyte growth factor)- induced cell scattering was assessed for SRB12-p9 cells (p9WT), a human skin SCC cell line, along with SRB12-p9 cells engineered to have reduced Stat3 activity. Next, a cell viability-based adhesion assay was performed with these cells. Finally, severe combined immunodeficient (SCID) mice were injected subcutaneously with P9WT and S3DN cells and tumors were measured twice weekly. Extracted tumors were analyzed by immunohistochemistry and Western blotting for expression of the invasion related enzyme, MMP-2 and MMP-9.

The suppression of Stat3 activity in S3DN cell lines resulted in reduced motility, greater adhesion, and a less invasive phenotype in SCID mice. Immunohistochemistry and Western blotting indicated higher levels of MMPs in the P9WT cells with expression localization towards the outer perimeter of the tumors. This data suggests that Stat3 plays a role in skin SCC invasion and better understanding of Stat3 function could lead to improved treatment and prevention of the disease.