Non-melanoma skin cancers (NMSC) are the most common types of skin cancer and include both basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). NMSC primarily form on sun-exposed skin including the head, face, neck, arms, and hands. BCC accounts for >75% of NMSC cases; however, SCC is more aggressive and may occur in other locations as well. Combined, BCC and SCC are responsible for >15,000 deaths each year in the US alone, which exceed deaths due to melanoma. Current diagnosis of NMSC relies on an in-depth visual assessment of the lesion in question followed by a surgical skin biopsy for histopathologic review. This analysis investigated whether the non-invasive collection of skin tissue with “smart stickers” and subsequent gene analysis could properly classify NMSC. Adhesive skin collection kits were used to collect the lesional skin from 58 patients with BCC, 41 patients with SCC, and 42 patients with non-cancerous skin diseases. Whole transcriptomic analysis was conducted on each sample and differentially expressed genes were determined by comparing BCC and/or SCC with non-cancerous skin disease (other) using multiple comparisons. Eighteen genes were significantly (fold change >1.5, p<0.1) increased in BCC compared to other skin diseases while 14 genes were increased in SCC (fold change >1.5, p<0.1). Further analysis identified 12 genes that were differentially expressed in both lesional BCC and lesional SCC compared to other skin diseases. These results require further investigation but suggest that “smart sticker” enabled non-invasive skin sampling and genomic analysis may provide an opportunity to identify patients with NMSC earlier and without the need for surgical biopsy.

**Subjects**

Subjects at least 18 years of age with clinically suspected basal cell carcinoma (BCC) or squamous cell carcinoma (SCC) lesions were enrolled in this study. Non-invasive skin samples were collected from all enrolled subjects using the DermTech adhesive skin collection kit (DermTech, Inc.; La Jolla, CA) as described below. Additionally, skin biopsies were collected from all enrolled subjects for histopathological confirmation. The study was reviewed and approved by Aspire IRB (Sanitec, CA). All subjects provided written consent prior to enrollment. The breakdown of histopathologically confirmed subjects is provided in Table 1.

**Top Genes Differentially Differentiating Basal Cell Carcinoma From Other Skin Diseases**

**Top Genes Differentially Differentiating Squamous Cell Carcinoma From Other Skin Diseases**

**Conclusions**

- Approximately 1/3 of subjects enrolled in this study were incorrectly clinically diagnosed as BCC or SCC, suggesting the importance of additional objective assessments in ruling out non-melanoma skin cancer prior to a surgical biopsy.
- Non-invasively assessing BCC or SCC lesions identified gene signatures capable of distinguishing non-melanoma skin cancer from non-cancer skin inflammation.
- Additional studies would provide further characterization of BCC and/or SCC lesions to aid in diagnosis while refining biomarker signatures.