Docket #: S18-427

Existing drug therapies utilized to treat squamous cell carcinoma (SCC)

Stanford researchers at The Lee Lab have discovered a novel epidermal tumor suppressor to treat squamous cell carcinoma (SCC) by utilizing existing drug therapies. An extensive list of current FDA-approved drug therapies that mimic C2orf54 proteins was identified; bringing the drug to the market sooner and allowing tremendous cost savings. C2orf54 proteins help decrease tumorigenesis by stabilizing the RET proto-oncogene. These proteins are downregulated in SCC and were identified by a transcriptome-based screen for novel open reading frames (ORF). When the drug mimic was administered to a humanized Ras-driven SCC mouse model, tumor progression was shown to be significantly suppressed. The research was able to highlight several drugs that target key cancer mechanisms such as HDAC inhibitors, mTOR inhibitors, and PI3K inhibitors, and provide therapeutic candidates. According to The Cancer Genome Atlas (TCGA), the C2orf54 protein is frequently deleted in 21 common cancer types and these deletions are associated with decreased survival rate. As of now, there are over 1 million cases of SCC diagnosed in the U.S. each year and 15,000 of those people end up dying. Current therapies/research are tedious, unpredictable, and require frequent monitoring so alternative therapies like this one are needed.

Figure

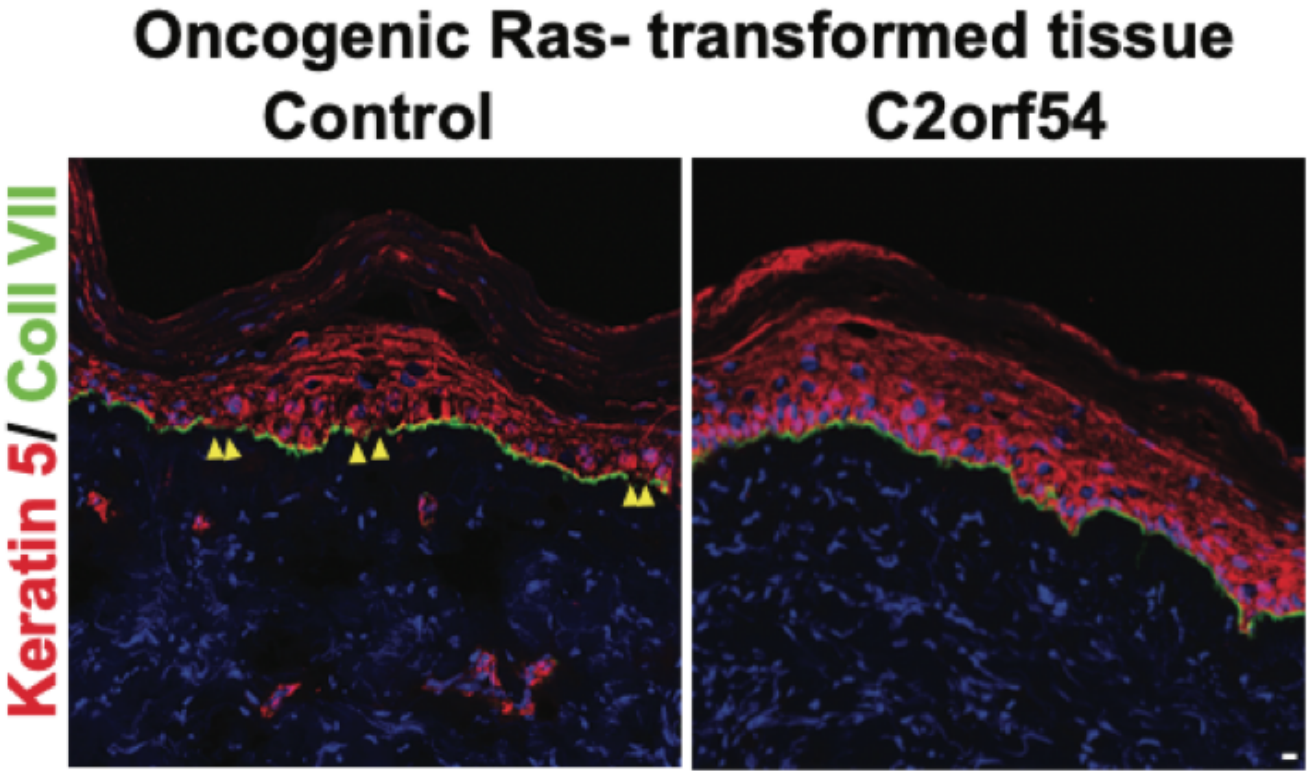

Figure description: The addition of C2orf54 decreases invasion (absence of Keratin 5-positive cells beneath the basement membrane), which is shown on the right compared to the control (altered primary keratinocytes) on the left. Yellow arrowheads indicate focal areas of basement membrane degradation.

Stage of Development

- Pre-clinical: demonstrate the tumor-suppressing effects of the drugs using an animal model of human SCC

Applications

- C2orf54 dependent cancers such as SCC, pituitary adenoma, liver cancer, and breast cancer

Advantages

- **First in class approach** – Utilizes existing FDA approved agents to bring the drug to market more quickly and at a much lower cost
- **First to use C2orf54's gene expression** to identify new therapeutic targets

- **Large market size** - Over 1 million cases of SCC are diagnosed in the U.S. each year. 15,000 of those people end up dying each year which is 2X greater than that of melanoma.

Publications

- Srivastava, Ankit et al. "MAB21L4 Deficiency Drives Squamous Cell Carcinoma via Activation of RET." Cancer research vol. 82,17 (2022): 3143-3157.

Patents

- Published Application: 20210023083
- Issued: 11,666,570 (USA)

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