GENEMARKERS

Anna Langerveld, PhD, President & CEO from Genemarkers explains her new development of Tape Strips for measuring gene expression

Dr. Anna Langerveld

holds a doctorate in neuroscience and molecular biology from Tulane University and is author of numerous publications and an invited speaker at industry events.

Her company is a leader in genomic analysis for the personal care industry and has a dedicated staff of genomics experts.

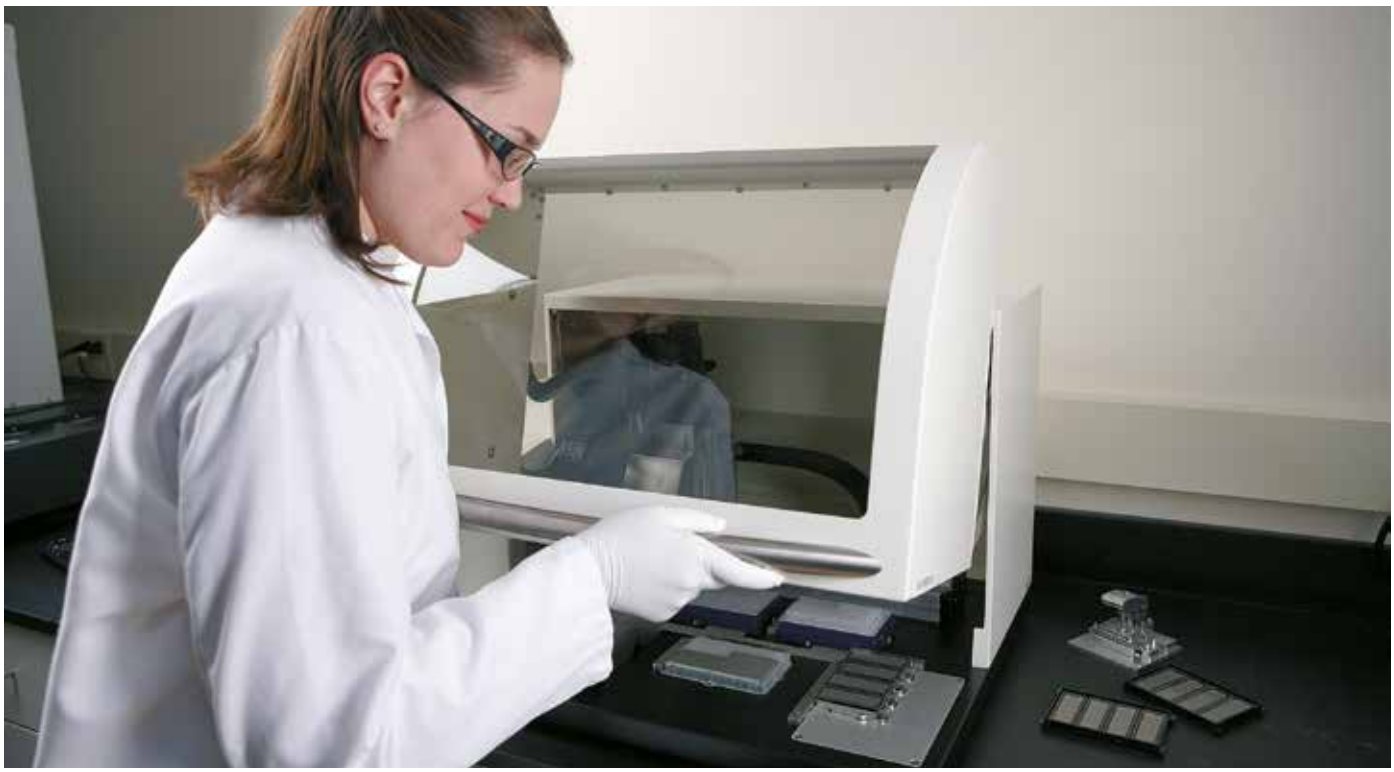
EURO COSMETICS: *We see that Genemarkers has developed a new skin testing method. Could you share with us the value of the new method?*
Dr. Anna Langerveld: We have recently developed a method for measuring gene expression from tape strip samples. Tape strip sampling offers a simple, non-invasive tissue collection method from the upper skin layers (epidermis) for genomic analysis. This method employs flexible adhesive tapes that are applied to the skin with gentle pressure, then removed with adherent skin cells that are collected into an RNA stabilizing buffer.

EURO COSMETICS: *How would this method assist a skin care researcher or product formulator?*
Dr. Anna Langerveld: Tape strip sampling provides benefits to R&D scientists interested in characterizing epidermal cell mechanisms. For example, the method can be used to identify genetic biomarkers for new product development or to understand differences in skin characteristics between different populations of consumers – such as the rapidly emerging multi-cultural skin care market. Product formulators can utilize the method in tandem with clinical studies to enhance the effectiveness of product and ingredient evaluations.

EURO COSMETICS: *Why is gene expression preferable to protein analysis?*
Dr. Anna Langerveld: Gene expression is the preferred method for high throughput screening. Protein analysis is more costly and is technically challenging due to the fact that proteins are often folded and embedded into cell membranes, making them more difficult to isolate and measure. A standard approach is to screen materials using gene expression and follow up with protein analysis of specific gene targets.

EURO COSMETICS: *Is this method sensitive enough to capture differences among different treatment samples?*
Dr. Anna Langerveld: Yes. Our in-house data demonstrates changes in gene expression from individuals treated with a topical product containing 0.1% retinol. The results are consistent with published studies using *in vitro* models.

EURO COSMETICS: *What type of data is generated?*
Dr. Anna Langerveld: RNA isolated from tape strip samples is used to measure gene expression. The methodology employs Life Technology's TaqMan™ qPCR platform, the gold standard in genomics analysis. Genemarkers has created a Standard Skin Panel that contains 107 genes important for skin biology. Additional genes can be added to the existing panel or custom panels can be created.



EURO COSMETICS: *What is new about this method of testing?*
Dr. Anna Langerveld: It was first described in the early 1940s as a medical method to observe the morphology of surface skin cells. Since then it has been used in a variety of applications: genomics, barrier removal, malignancy testing, etc.
To date, tape strip sampling has not been commonly employed for cosmetic ingredient and personal care product development due to the difficulty of isolating RNA from the adhesive. The improved methodology is an optimization of RNA isolation and qPCR parameters that generates highly reproducible data. **This allows for state-of-the-art, high throughput analysis of gene expression.**

EURO COSMETICS: *How are tape strip samples collected?*
Dr. Anna Langerveld: The sampling process involves briefly cleaning the skin area being tested, the first strip is discarded to remove superficial cells, and then 5 sequential tapes are stripped and collected into the provided sample jar. D-Squame™ Sampling Discs are placed into a vessel containing RNALater™. Sample collection generally does not cause pain or require any extensive training by the collector. Once collected, the tape strip samples are shipped to Genemarkers for analysis. The samples remain stable in RNALater™ at room temperature for up to one month.

EURO COSMETICS: *What do the results look like?*
Dr. Anna Langerveld: The sampling method enables easy and cost-effective recruitment of a large number of subjects and/or test samples. This ensures scientifically robust data that can be confidently used in product development and marketing. The qPCR data is translated into easy to understand reports that include data tables and graphs that can be incorporated into marketing materials and publications.

The figure describes the differences between the tape strip methods and punch biopsies.

TAPE STRIPS

- ✓ Sampling is easy and non-invasive and does not require specialized training
- ✓ Samples can be collected from any anatomical location without pain or scarring
- ✓ Tape strip sampling does not require anesthetics which can modify gene expression
- ✓ Tape strip sampling collects cells only from the uppermost layers of the skin, providing a more homogeneous sample and thus, less subject to subject variability

PUNCH BIOPSIES

- ✗ Invasive method of sampling that typically requires anesthetic, stitching and a follow up visit
- ✗ Provides heterogeneous skin sample containing dermal and epidermal cell layers
- ✗ Difficult to obtain a consistent sample from subjects, increasing subject to subject variability

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