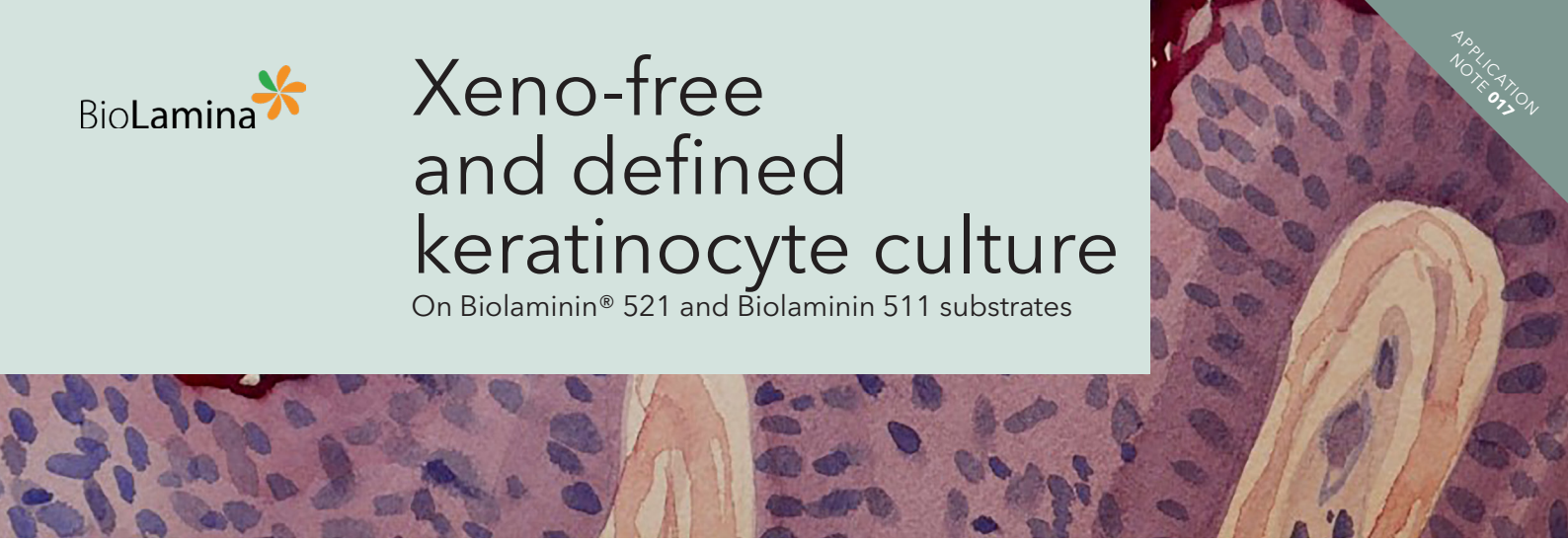
BioLamina

Xeno-free and defined keratinocyte culture

On Biolaminin® 521 and Biolaminin 511 substrates

APPLICATION NOTE 017



Biologically relevant cell culture environment

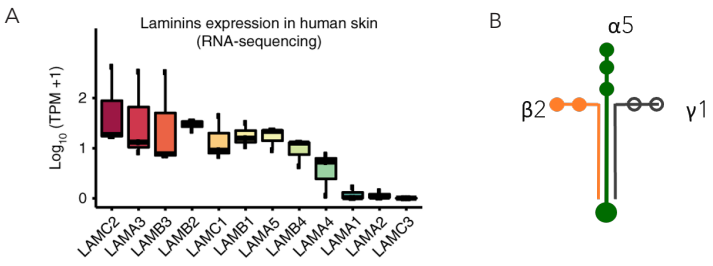
Human epidermal keratinocyte (HEK) cells are the major cell type of the epidermis, the outermost layer of the skin. HEK cells maintain the barrier function of the skin and vital to wound healing. The keratinocytes are positioned on the basement membrane (BM) composed of laminin proteins and collagens. The BM is highly enriched in laminin isoforms 521 and 511. The human recombinant laminin 521 and 511 (Biolaminin 521, LN521 and Biolaminin 511, LN511) are a potent cell culture substrate for HEK cells *in vitro*

A chemically defined and xeno-free method to culture human epidermal keratinocytes

LN521 and LN511 have been shown to enable robust, completely xeno-free and defined long-term expansion of primary adult human dermal keratinocytes.
Culture on LN511 replaces the 3T3-J2 feeder co-culture system and increases colony-forming efficiency, basal marker profile and the ability to form normal stratified epidermal structure in both in vitro and in vivo models (Tjin, 2018).
LN521 and LN511 cultivated HEK cells also demonstrate a significantly reduced pro-inflammatory signaling pathway expressions compared to feeder culture-based systems.

FIGURE 1

Laminin RNA expression in human skin



A) RNA-sequencing of adult human skin (epidermal basement membrane) shows high expression of alpha 5 (LAMA5), beta 1 (LAMB1), and gamma 1 (LAMC1).
B) Together these three chains make up the laminin 511 protein. Tjin MS et al., 2018.

FEATURES AND SPECIFICATIONS

- Biolaminin 521 (LN521) and Biolaminin 511 (LN511): defined and xeno-free culture substrates
- Animal origin-free to the primary level
- Biologically relevant cell culture environment
- Expansion of human keratinocytes culture, also from aged donors
- Stable expression of basal keratinocyte markers
- Serum-free culture
- Organotypic culture with normal stratified epidermal structure both *in vitro* and in vivo

Direct link to recommended LN521 product

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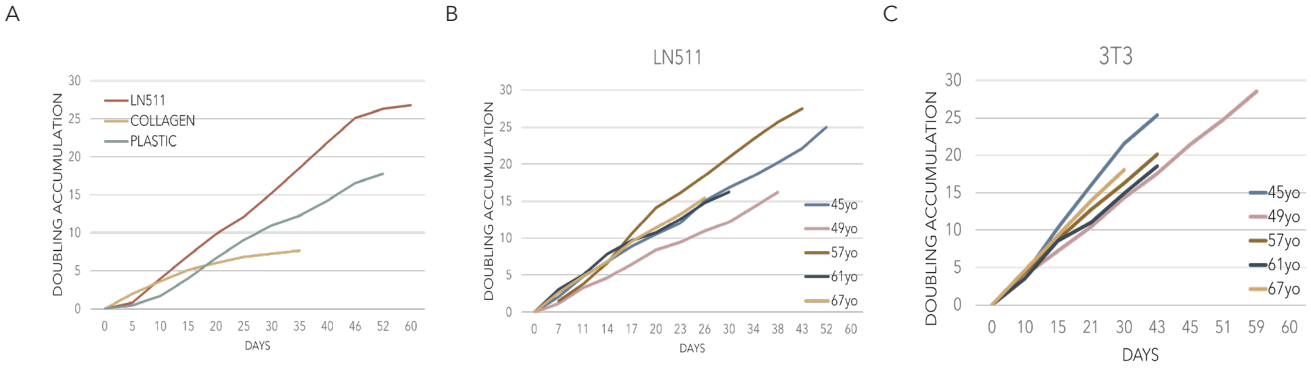
FIGURE 2

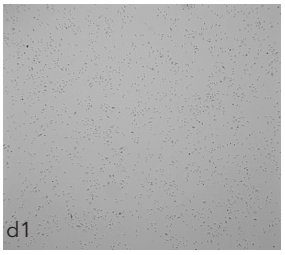
Xeno-free culture of keratinocytes from aged donors on defined Biolaminin substrates



LN511 is an excellent substrate, for culture of primary keratinocytes from donors of all ages.
A) Primary adult keratinocytes show a significant doubling and yield increase when cultured on LN511, compared to culture on plastic or collagen. Population doublings of freshly isolated primary adult keratinocytes from 5 donors aged 45-67 years B) on LN511 and C) on classical mouse feeder 3T3. The xeno-free and defined Biolaminin 511 (LN511) supports the growth of aged primary human keratinocytes

FIGURE 3

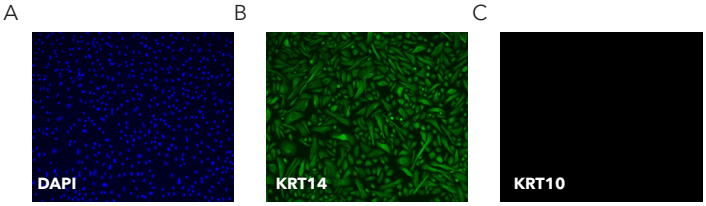
Human keratinocytes show a phenotypical morphology on Biolaminin 521



Cell morphology of adult human keratinocytes on Biolaminin 521 (LN521) at day 1 and 5. The cells migrate easily on LN521 and grow as homogenous monolayer. The cells develop the typical cobblestone-like morphology. HEK culture on LN521 is compliant with serum free cell culture media.

FIGURE 4

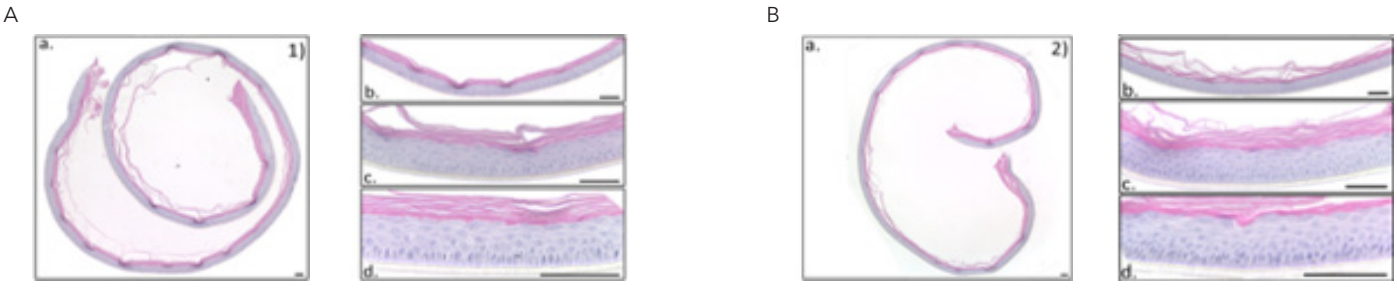
Human keratinocytes cultured on Biolaminin 521 substrates express basal keratinocyte markers



B) The keratinocytes express basal keratinocyte markers KRT14 showing epidermal stem cell state of keratinocytes.
C) The keratinocytes show a negative expression for KRT10–the marker is expressed when HEKs leave their epidermal stem state and begin differentiation.

FIGURE 5

Epidermal tissue model



The epidermal reconstruction produces the typical layers found in vivo and allows the study of differentiated keratinocytes and production of the cornified barrier. LN511 (B) shows a similar epidermal morphology to the collagen control (A). Scale bar: 100 µm.
Data by: A. Boyadjiev, Prof. Przyborski lab, Durham University, UK.

REFERENCES

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