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MelanoDerm | Data Sheet

Features

- Co-Culture of Human Keratinocytes and Melanocytes
- Progressive, Macroscopic Darkening
- Comprised of Black, Caucasian, or Asian Cells
- Completely Serum-Free Medium System
- Human Skin-Like Structure
- Highly Reproducible
- Easily Handled Cell Culture Inserts
- Quantifiable, Objective Endpoints
- Cost Effective Alternative to Clinical Testing
- Full Thickness (epidermis & dermis) Available

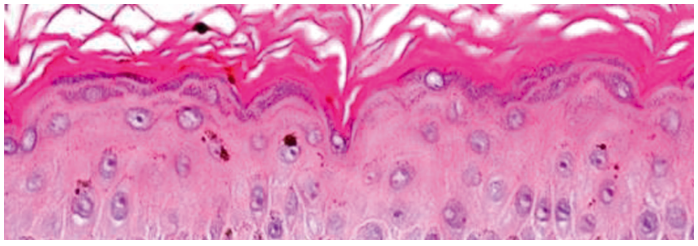
The MelanoDerm Model

Mattek's MelanoDerm System consists of normal, human-derived epidermal keratinocytes (NHEK) and melanocytes (NHM) which have been cultured to form a multilayered, highly differentiated model of the human epidermis. The NHM within co-cultures undergo spontaneous melanogenesis leading to tissues of varying levels of pigmentation. The tissues are produced using serum-free medium without artificial stimulators of melanogenesis such as TPA and IBMX. The cultures are grown on cell culture inserts at the air-liquid interface, allowing for topical application of skin lighteners or self-tanning agents. Thus, the model provides a useful *in vitro* means to evaluate cosmetic and pharmaceutical agents designed to modulate skin pigmentation.

The MelanoDerm Skin Model exhibits *in vivo*-like morphological and ultrastructural characteristics which are uniform and highly reproducible. NHM localized in the basal cell layer of MelanoDerm are dendritic and spontaneously produce melanin granules which progressively populate the layers of tissue. When cultured for up to 3 weeks (post-shipment), cultures become increasingly pigmented with retention of normal epithelial morphology. Cultures containing NHM derived from black donors show increased pigmentation versus those containing Caucasian-derived or Asian-derived NHM; all three types of cultures are distinctly darker than NHM-free cultures (EpiDerm). The topical application of known inhibitors of melanogenesis significantly reduce melanin production and macroscopic darkening. Conversely, NHM within the tissue will respond to known stimulants of melanogenesis, such as α-melanocyte stimulating hormone and β-fibroblast growth factor, to produce tissues which darken faster than untreated controls. Various cosmetic and pharmaceutical laboratories are actively seeking alternatives to expensive and time consuming clinical and whole animal testing. Many companies have initiated MelanoDerm testing to assess the ability of their raw materials and final product formulations to modulate skin pigmentation. A growing body of data demonstrates that MelanoDerm provides an inexpensive and effective means of assessing various skin pigmentation issues while avoiding species extrapolation and the use of laboratory animals.

The protocols for using the MelanoDerm System are clear and straightforward. The organotypic cultures allow for topical or subcutaneous application of melanogenesis inhibitors or stimulators. Analytical methods have been developed to evaluate melanocyte dendricity and viability, pigment granule transfer to adjacent keratinocytes, bulk darkening of tissue, and total melanin content and synthesis rates. Finally, technicians find MelanoDerm's rigid substrate design easy to handle and manipulate.

Histology of MelanoDerm



Tissue Structure. H&E Stained paraffin section of MEL-300-B cultured for 14 days showing melanin granules (400X).

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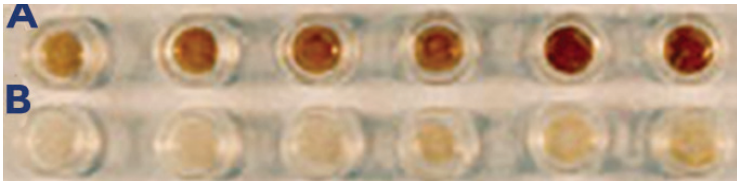
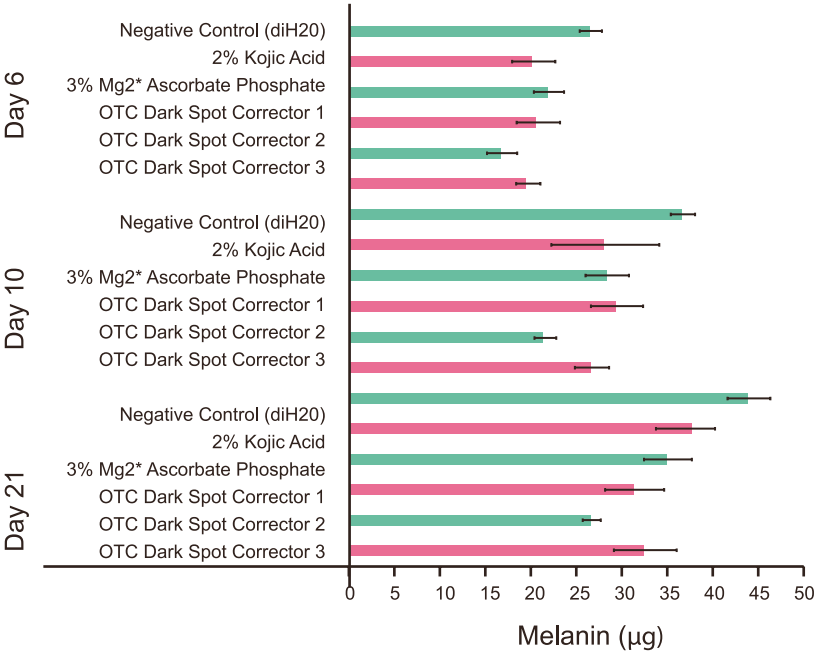
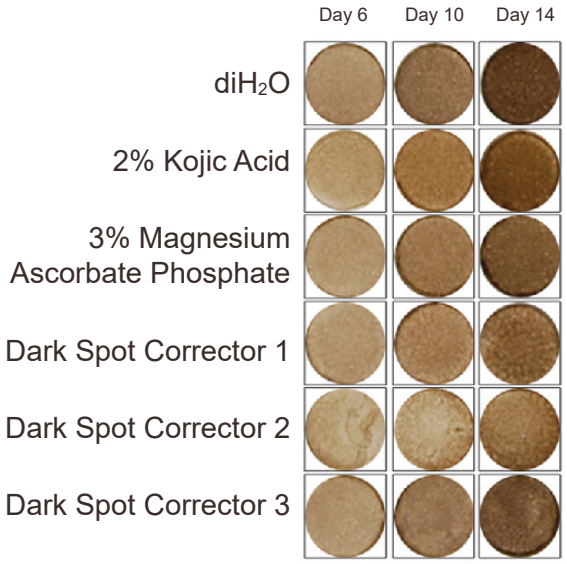


Macroscopic Darkening. Comparison of macroscopic darkening in MelanoDerm tissue (MEL-300) containing melanocytes harvested from A) black and **B)** Caucasian donors.

Melanocyte Morphology. Dendritic melanocytes in MelanoDerm (top view)





Effect of raw ingredients and final formulations on A) macroscopic darkening and B) melanin production in MelanoDerm (MEL-300-B). 25 µL of test material were applied to the apical tissue surface every 48 hrs for up to of 14 days. Macroscopic darkening and melanin production were analyzed on days 6, 10 and 14.

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