

Fine Tuning Specialty Media



Specialty Media are typically thought of as media designed for a specific cell type (e.g. keratinocytes).

However adjusting a medium for a single cell type is just the start. Media can also be more finely tuned to deliver a specific behaviour of that cell type. Here are three examples.

Proliferation vs Differentiation

In 1983, Boyce and Ham published a new feeder and serum-free method for culturing keratinocytes. The key: Bovine Pituitary Extract (BPE).

BPE has been widely used ever since for epithelial cell culture, due to its strong stimulation of proliferation.

However an often overlooked element of that 1983 publication was the strong inhibitory effect BPE has on keratinocyte differentiation.

The same also applies in today's world of fully defined media. Many well known growth factors (including EGF) have been clearly shown to significantly inhibit differentiation.



Specialty medium, optimized for 3D epidermal barrier function.



Over the last 50 years, media development has focused almost exclusively on improving proliferation. To obtain good differentiation, proliferation media must be significantly modified, to remove or reduce components that inhibit differentiation, and add components that support it.

An example of this approach is the new 3D Barrier medium (CnT-PR-3D), which is specifically formulated to encourage both terminal differentiation and correct lipid deposition by cornified epidermal keratinocytes.

Aging In Vitro

Traditional methods for aging keratinocytes in vitro commonly depend on the use of acute doses of strong oxidisers like peroxide.

In addition to being non-physiological, this approach is also weakened by the fact that all standard media are designed to be strongly protective and anti-aging, to extend longevity in vitro.

To address this weakness, we developed the VitroAge medium. VitroAge retains basic metabolic and structural components (such as amino acids) at standard levels, whilst reducing the concentrations of other protective components.



The VitroAge medium (CnT-AG2) encourages keratinocyte aging, without the need for chemical treatments.

The net result is a medium in which cells age naturally over several weeks, without the need for chemical or other oxidative treatments.

Without strong chemical stimuli, this model provides a more sensitive way of evaluating the effect of anti-aging active ingredients.

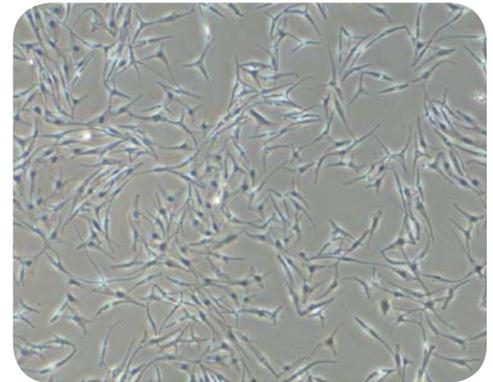
Melanocyte Pigmentation

Melanocyte progenitor cells (melanoblasts) demonstrate a proliferative, bipolar (fibroblast-like) phenotype. With differentiation they form dendrites, increase melanin expression, and proliferation decreases.

With powerful growth factors, it has been possible to develop media that deliver both good growth and features of differentiation such as increased dendricity and melanin expression.

However this does raise the question - are such cells that display such conflicting features really behaving in a physiological way?

CELLnTEC is currently developing media for both melanoblasts and the more differentiated melanocyte phenotypes.



As melanoblasts differentiate, dendricity and melanin increases, whilst proliferation decreases.