

# NewReGeneration Cocoa

*Restoring skin tissues*

## A STORY

The Cocoa tree | *Theobroma cacao*, *Sterculiaceae*  
The magic fruit tree connected to ancient gods

«Food of gods», - theo (god) broma (beverage) - this is how Linnaeus called Cocoa in the 18th century, as Mayas and later Aztecs thought the drink made with cocoa beans - xocolatl in Aztec language - useful to communicate with gods, even after death, more than 2000 years ago. Indeed they started to cultivate Cocoa trees in the tropical rainforests they lived in. To answer an increasing worldwide demand for chocolate, cocoa trees are cultivated now even in the sun now in Africa or Indonesia for instance, and with pesticides and sometimes children labour in some African countries. Full of precious molecules, including alkaloids like theobromine and caffeine, and minerals like potassium, magnesium or calcium, parts of cococa tree have been used as a medicinal remedy in tropical areas for antiseptic, diuretic, parasiticide or as a skin and scalp treatment, or as a heart tonic.

## Key points

### An active plant cell

Developed to deliver the highest amount of original active molecules

### A high tech natural ingredient

Created to preserve and improve the identity and the benefits of a natural product

### A general anti-ageing action

Increases the cell cohesion to limit ageing signs

Because skin needs dense and regenerated tissues, it is necessary to maintain their «creation» and cohesion at a sufficient level. To get a skin firmer, more resistant, looking younger.



## PRODUCT BENEFITS

### Anti-ageing

#### Firming

Contributes to densify the dermis. Helps to improve or restore the dermis functions, skin resistance.

#### Regenerating

Increases natural epidermis cell regeneration.

#### Restructuring

Restores higher levels of the synthesis of fibers and glycoproteins in the extra cellular matrix and the dermo-epidermis junction.

#### Protection

Contributes to strengthen the protective skin barrier.

To be used in skincare or make-up products such as cream, fluid, serum, balm, lotion, milk, foundation, concealer, etc. In any cosmetic or skincare product dedicated to fighting and preventing skin ageing.

**NÆOLYS**

Related products | ALL FIBER BOOSTER CHINESE HIBISCUS | ALL EVEN SWEET IRIS | TOTAL GENERATION CURRY PLANT

**HOW IT WORKS**

# New ReGeneration Cocoa: relaunching the inner process of skin structure creation and cohesion

NewRegeneration Cocoa acts on the formation of tissues that changes with ageing: this change means a sagged and thinner skin. Indeed, natural skin ageing is translated by a slowing down of creation of the very material of skin, that happens especially because cells slow down their activities. Then, at the dermis level, New ReGeneration Cocoa will stimulate the synthesis of fibers in the extra cellular matrix: collagens, proteoglycans, and proteins responsible for their cohesion in the dermo-epidermis junction. In the same time, they help to balance regeneration of epidermis in terms of production of keratinocysts and specification of cells, a process that decreases with ageing.

Thanks to those actions, the two skin layers can be more densified and globally balanced.

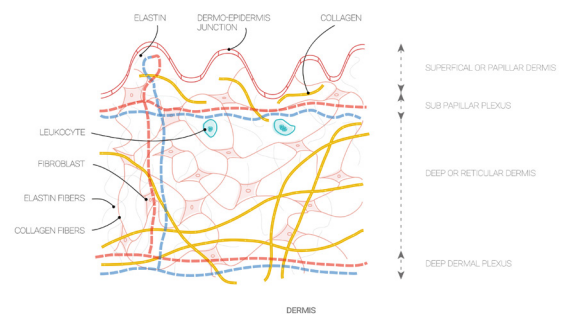
## *In vitro* testing results

### Study of the extra-cellular matrix and the dermo-epidermis junction - dermis level

In the dermis, the extra cellular matrix (ECM) is made of different non cellular components, and provides not only essential physical scaffolding for the cellular constituents but also initiates crucial biochemical and biomechanical cues that are required for tissue morphogenesis, differentiation and homeostasis. It is made of water, polysaccharids and proteins; the two main classes of macromolecules are proteoglycans and fibrous proteins like collagens, elastins, fibronectins and laminins synthesized by fibroblasts, the dermis cells.

Actually the ECM is a highly dynamic structure that is constantly being remodeled, either enzymatically or non-enzymatically. The ECM generates the biochemical and mechanical properties of skin, such as its tensile and compressive strength, elasticity, and also mediates protection by a buffering action that maintains extracellular homeostasis and water retention.

With ageing, the synthesis of the different macromolecules made by fibroblasts decreases, then the biochemical cues in the ECM are modified, therefore its properties decrease too.



#### Studies about 5 components of ECM: proteoglycans, collagen, integrin and laminin and MMP3

The different studies on the components of the ECM run by Naolys have been performed on fibroblast cultures.

Naolys studied the synthesis of the 3 types of proteoglycans made by fibroblasts, which is a very precise study.

Proteoglycans are made of a combination of a protein and a GAG. As they are made of long O-glycolized chains, they are like «water traps». They have buffering, hydration, binding and force-resistance properties.

Collagen is the most abundant fibrous protein within the interstitial ECM and constitutes the main structural element of the ECM; collagens provide tensile strength, regulate cell adhesion, support chemotaxis and migration, and direct tissue development.

Integrin are a family of adhesion molecules that mediate interactions between two cells and a cell with its environment, like the ECM.

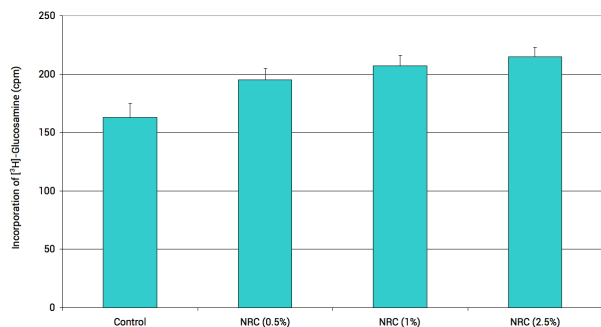
Laminins are large glycoproteins located in basal membran at the level of the dermo-epidermis junction, that promote cell attachment, are involved in cell proliferation, migration and differentiation

MMP3 (or Stromelysin-1) is an enzyme of the ECM that is involved in the breakdown of the ECM and tissue remodeling. It degrades collagen types II, III, IV, IX and X, proteoglycans and other fiber proteins.

#### Technical information to formulate New ReGeneration Cocoa

<b>INCI name of cells</b> theobroma cacao (Cocoa) leaf cell extract	<b>form</b> cells (20%) in glycerin or sunflower oil (80%)	<b>aspect</b> liquid	<b>concentration</b> starting at 0.5%	<b>dispersible</b> in any formulation
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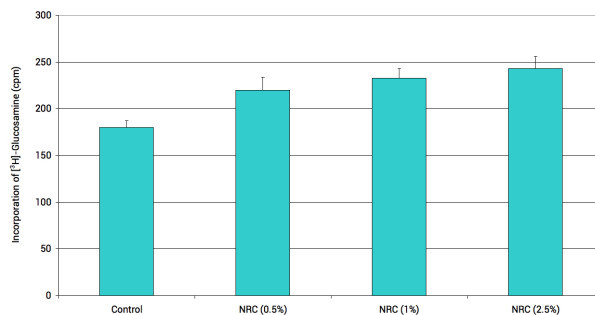
### Study of the synthesis of proteoglycans



#### Increase of the peri-membrane proteoglycans rate

→ At concentrations of 0.5%, 1% and 2.5%, increase of the peri-membrane proteoglycans rate respectively by 20%, 27% and 32%

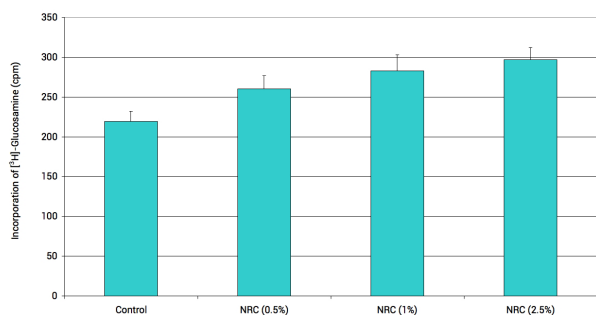
### Study of the synthesis of proteoglycans



#### Increase of the trans-membrane proteoglycans rate

→ At concentrations of 0.5%, 1% and 2.5%, increase of the trans-membrane proteoglycans rate respectively by 22%, 29% and 35%

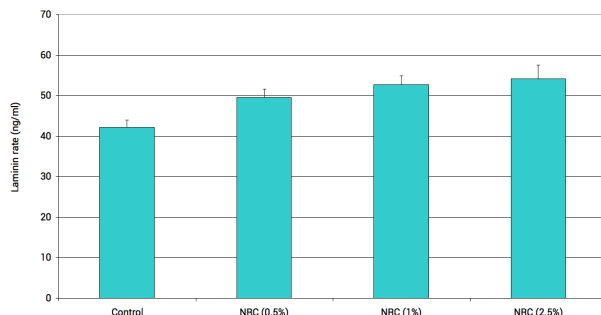
### Study of the synthesis of proteoglycans



#### Increase of the matrix proteoglycans rate

→ At concentrations of 0.5%, 1% and 2.5%, increase of the matrix proteoglycans rate respectively by 19%, 29% and 36%

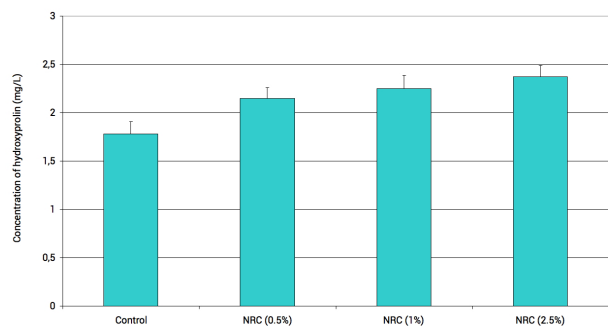
### Study of the synthesis of laminin



#### Increase of the laminin rate

→ At concentrations of 0.5%, 1% and 2.5%, increase of the laminin rate respectively by 17%, 25% and 28%

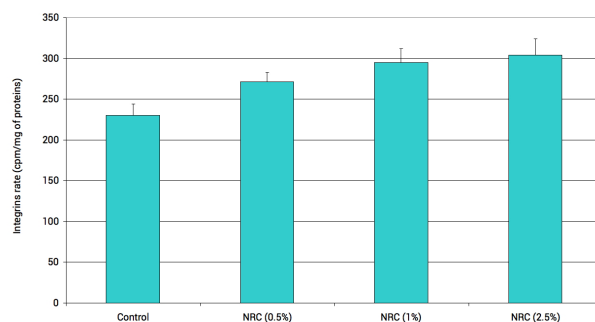
### Study of the synthesis of collagen



#### Increase of collagen rate

→ At concentrations of 0.5%, 1% and 2.5% increase of collagen rate respectively by 21%, 26% and 33%

### Study of the synthesis of integrin



#### Increase of integrins

→ At concentrations of 0.5%, 1% and 2.5%, increase of integrin rate respectively by 18%, 28% and 32%

#### Decrease of the MMP3

→ At concentrations of 0.5%, 1% and 2.5%, decrease of the MMP3 respectively by 21%, 25% and 30%

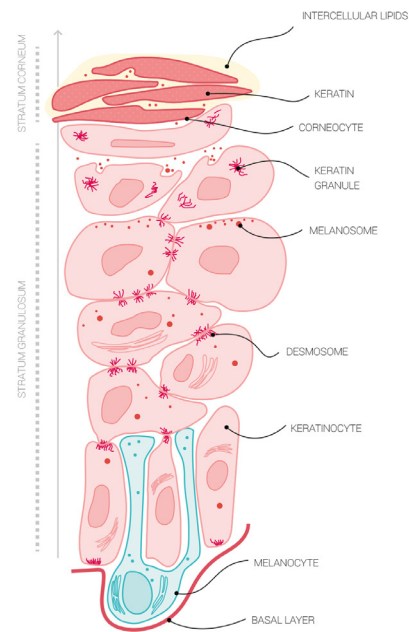
## Study of cell renewal - epidermis level

The epidermis, the superficial layer of skin is first made of cells called keratinocytes which renew non stop according to a 21 days cycle That renewal of the epidermis is made thanks to the cell proliferation and the differentiation that keep the balance of adult tissues, therefore keratinocytes, divide at the level of the basal layer of the epidermis, which is mainly made of non differentiated cells and migrate to the surface changing their form: they lose their nuclei and load hard filaments of keratine. When they reach the cornified layer, they become corneocytes, dead cells that create a solid membran (thanks to keratine) impermeable and protective: the protective natural barrier of the epidermis. Those built up corneocytes will naturally break away and be shed. The alteration of that balance, essential to the good of tissues called homeostasis is responsible for physical changings linked to ageing: skin wilting because of the decrease of cell proliferation, lack of healing in case of wounds, loss of hair...

### Study of the proliferation and the differentiation of epidermis cells

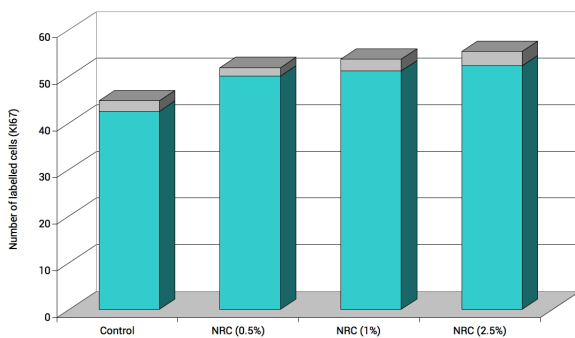
In order to show that the balance of tissues has been maintained, Naolys studied both proliferation and differentiation of epidermis cell. KI67 is a anti-gene to mark cell proliferation and filaggrin is a protein to mark cell differentiation.

Studies have been made on reconstructed epidermis.



THE EPIDERMIS AND KERATINISATION PROCESS

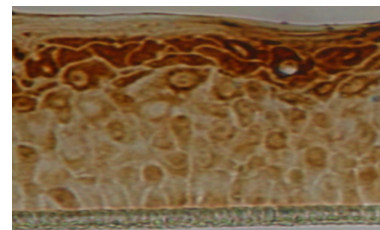
### Study of epidermis cell proliferation



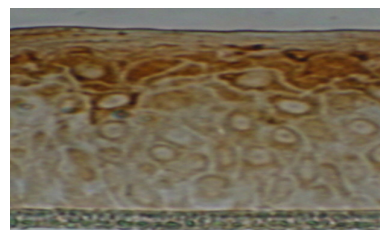
#### Increase of KI 67

→ At concentrations of 0.5%, 1% and 2.5%, stimulation of the proliferation of keratinocytes in the basal layer for treated epidermis respectively by 18%, 20% and 23%

### Study of filaggrin



Labelling of filaggrin: control epidermis



Labelling of filaggrin: epidermis treated with New ReGeneration Cocoa at 2.5%

Decrease of the cell differentiation translating by a labelling of filaggrin less intense but uniform at the level of the granular layer