# CLINICAL DATA – HYDROLYSED ALGIN

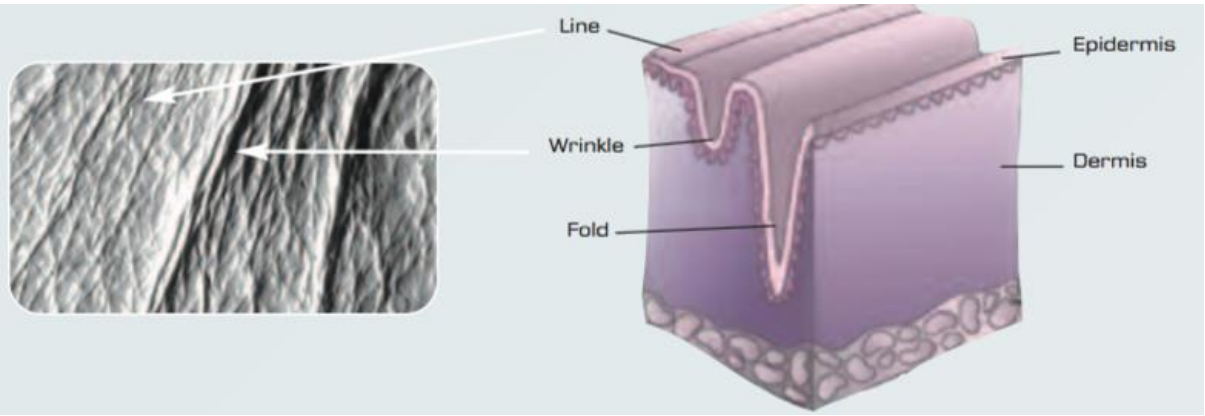
**Biotechnology Concentrate**

Hydrolysed Algin belongs to a generation of high-tech active cosmetic substances derived from marine biotechnology. It is produced by controlled enzymatic depolymerisation with a marine enzyme of membrane polysaccharides obtained from the brown seaweed *Laminaria digitata*. The oligosaccharide obtained has a moderate degree of polymerization of 10 (DP10) and a molecular weight of approximately 3,500 Da, enabling a better assimilation by the skin. It is a linear, anionic macromolecule composed of two uronic acids: β-D mannuronic acid and α-L-guluronic acid. Hydrolysed Algin is also known for its anti-inflammatory, soothing and healing properties.

**Mobilize your epidermal stem cells and erase the injures of time**

Hydrolysed Algin optimizes the division capacities of epidermal stem cells thereby eliminating developing wrinkles once and for all.

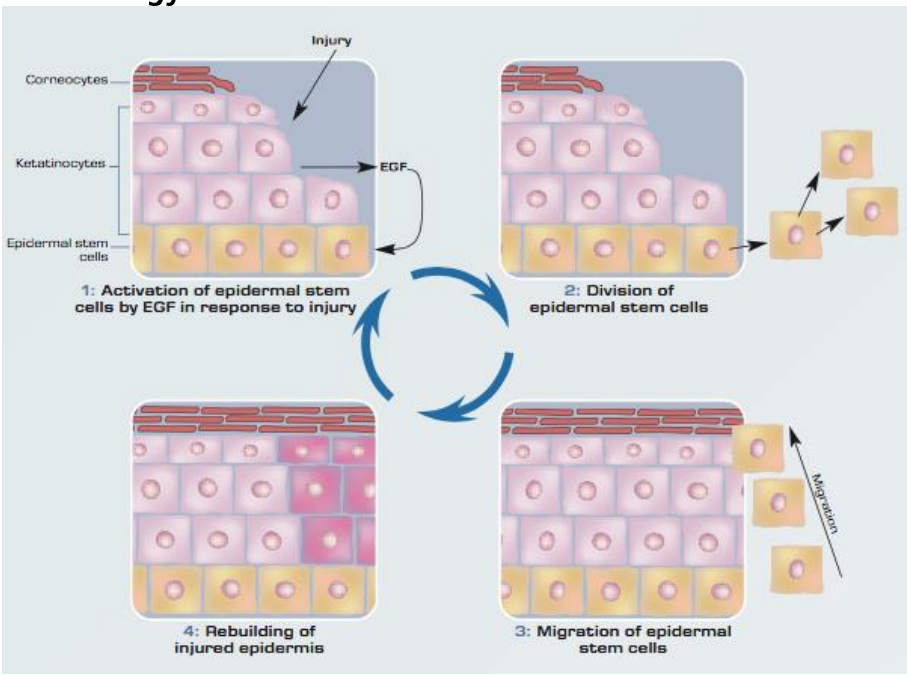
Wrinkle formation may be considered to be a form of injury which disorganizes and breaks up the cohesion of the epidermis. After injury to the skin, healing processes are activated under the control of a molecule called Endothelial Growth Factor (EGF), which stimulates the division of adult stem cells, still called epidermal stem cells, at the healing site in order to rebuild the skin. Unlike stem cells, these epidermal stem cells are already differentiated, they are not capable of forming all cell or tissue types but only keratinocytes. Once stimulated, they divide to reconstruct wounds or micro-furrows.
The number of keratinocytes in the skin decreases during time creating a depression in the form of micro-furrows, which develop into lines and then continually deepen into wrinkles and folds.




The injured skin in micro-furrows may therefore be rebuilt by stimulating the division of epidermal stem cells thereby repulping the skin and smoothing out the wrinkles.

Hydrolysed Algin optimizes the action of EGF when it binds to its receptor on the surface of adult epidermal stem cells. By optimizing the binding of EGF to its receptor, Hydrolysed Algin optimizes the activation of the epidermal stem cells by EGF, and therefore their division.

## Memo of skin biology – EGF and stem cell activation




Injured cells produce Endothelial Growth Factor (EGF) which initiates the division of epidermal stem cells into two daughter cells (1).

When an epidermal stem cell is activated by EGF, it divides and secretes EGF in turn, which stimulates the division of the newly formed cells (2). This cluster of cells, generated by a single epidermal stem cell is called a colony.

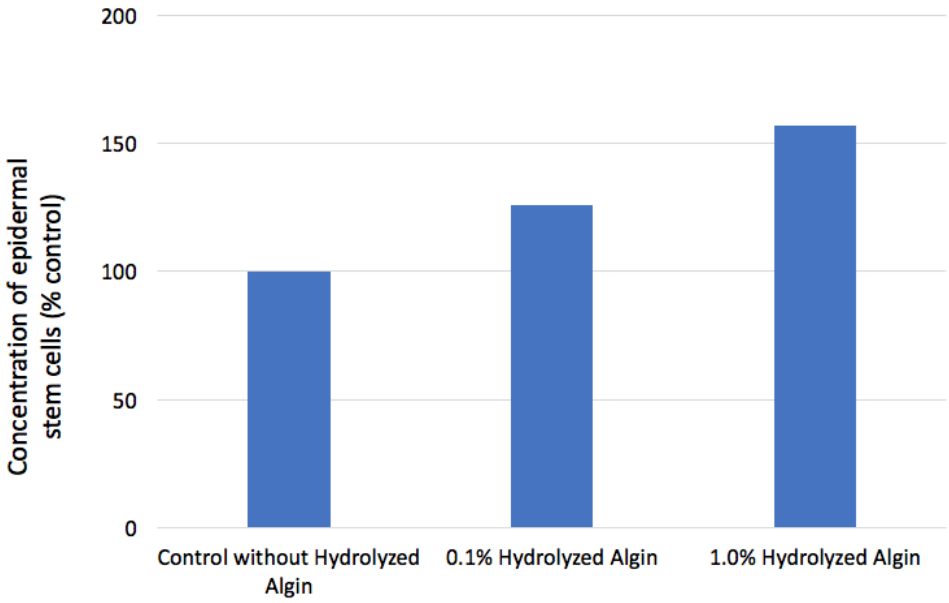
Binding of EGF to its receptor therefore induces the division (2) then the migration (3) of epidermal stem cells to the site of injury.

The critical stage is the binding of EGF to its receptor. The receptor is formed of 2 units which must be bound together to ensure EGF binding. If these units are unlinked, EGF does not bind and the division signal is not transmitted.


**Hydrolysed Algin**

Hydrolysed Algin, an alginate polymer rich in uronic acids, reinforces the link between these two units and ensures that EGF binds in 100% of cases.

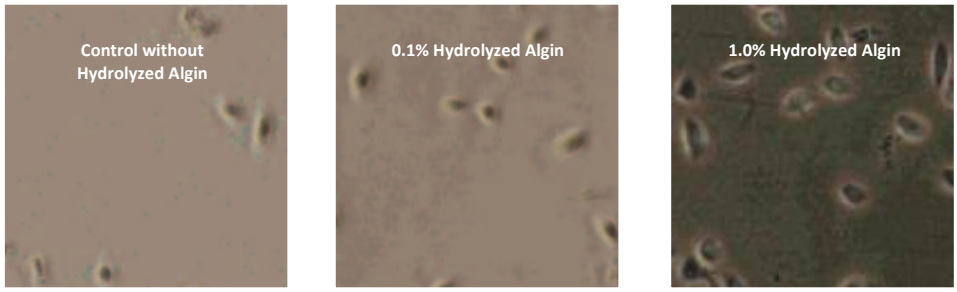
***In-vitro* test: effect of Hydrolysed Algin on the division capacity of adult epidermal stem cells.**




**Protocol:**
Culture of epidermal stem cells with or without Hydrolysed Algin for 10 days. The number of cells is evaluated from the optical density.

Stem cells secrete basal levels of EGF into the culture medium to ensure their division. Addition of Hydrolysed Algin optimizes the effect of EGF and stimulates the division of epidermal stem cells.

***In-vitro* test: Visualisation of the effect of Hydrolysed Algin on the division capacity of adult epidermal stem cells.**




**Protocol:**
Microscopic examination of cultures of epidermal stem cells after 10 days growth with and without Hydrolysed Algin.

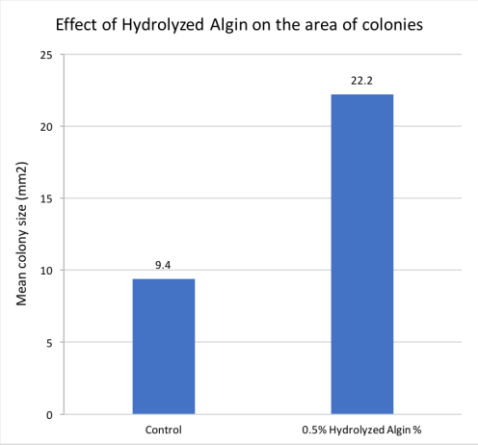
From a concentration of 0.1%, Hydrolysed Algin optimises the division of stem cells.

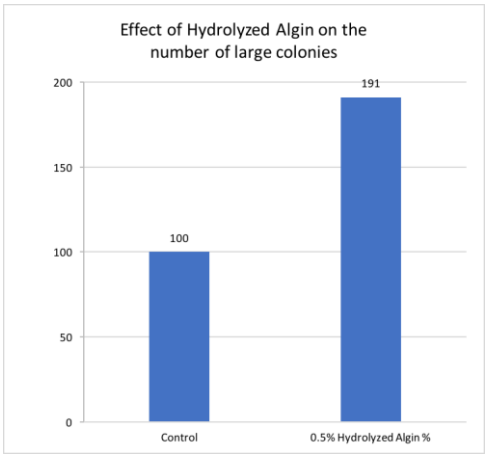
***In-vitro* test: Cumulative effect of Hydrolysed Algin on the division of epidermal stem cells.**

Epidermal stem cells are all the more effective for rebuilding the skin as they are able to generate large colonies.

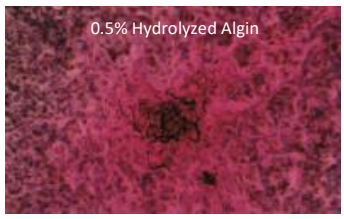
**Protocol:**

Culture of epidermal stem cells on a fibroblast matrix with or without 0.5% Hydrolysed Algin for 12 days.







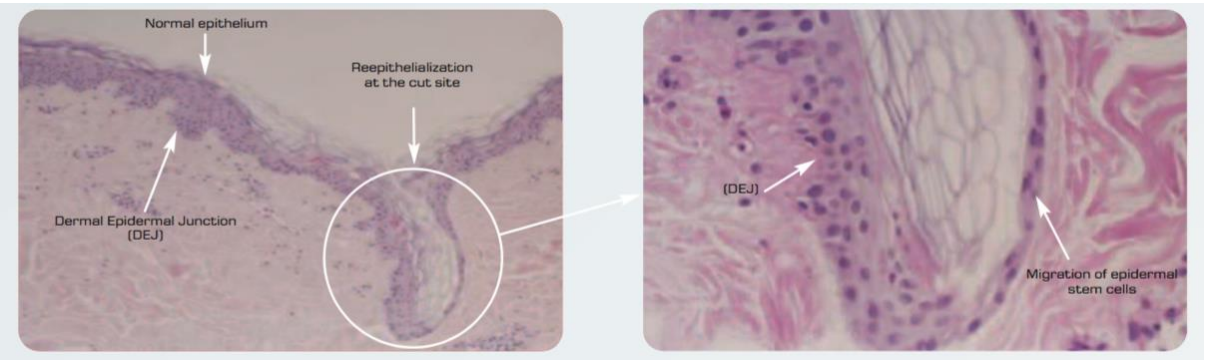

Hydrolysed Algin, optimizes binding of EGF to epidermal stem cells but also to all the cells generated by division. This therefore leads to a capitalization of the properties of Hydrolysed Algin: there are an increasing number of much larger colonies leading to a much more rapid and effective regeneration of the epidermis. Hydrolysed Algin stimulates the activity of stem cells without affecting the activation or multiplication of adult stem cells.

***In-vitro* test: Study of the reepithelialisation of the skin in the presence of Hydrolysed Algin.**

**Protocol:**

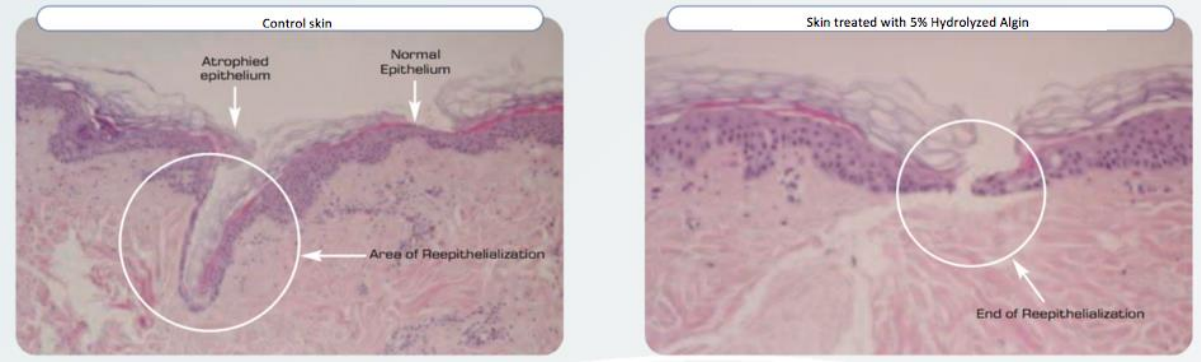
Human skin explants are cut with a scalpel and then grown in culture with or without 5% Hydrolysed Algin.

Control skin after 4 days:



All along the site of the cut, the epidermal stem cells located at the border between the skin and the Dermal-Epidermal Junction divide and migrate to the site of the cut to rebuild the epithelial matrix and close the wound. This is called reepithelialisation.

**Examination of control skin and skin treated with Hydrolysed Algin 5% after 8 days of culture:**




The addition of 5% Hydrolysed Algin optimizes the effect of EGF and reinforces the division and migration of epidermal stem cells. The rebuilding of the skin is much faster than under normal conditions.

During skin ageing, the formation of wrinkles and lines involves the same process as during an injury. Hydrolysed Algin may therefore be used to stimulate the activity of epidermal stem cells and their role in the reconstruction of the epidermal matrix. Once the skin has been reconstructed, wrinkles and lines are filled in and smoothed out.

| **HYDROLYSED ALGIN** | |
|---|---|
| **Cosmetic Activities** | ANTI-AGE REPAIR<br>• Optimises the division capacities of epidermal stem cells<br>• Promotes the regeneration of epidermal tissue |