

# *endermologie®* :

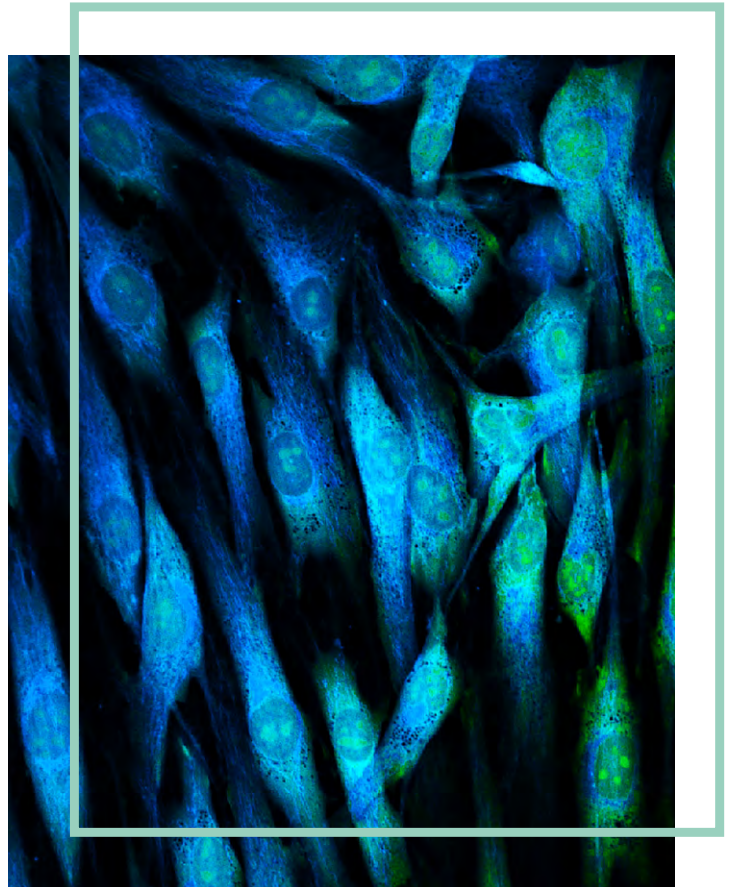
## EVIDENCE OF *FIBROBLAST* STIMULATION

Fibroblasts are present in dermis and are responsible for the production of three main components that constitute the extracellular matrix and contribute to physiological properties of the skin :

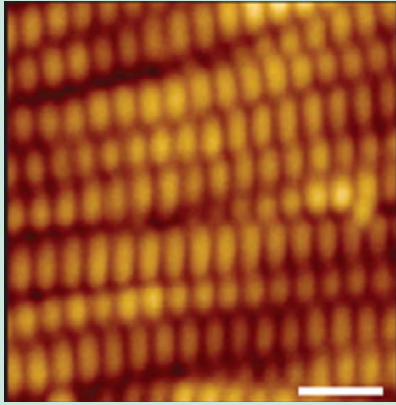
- **Collagen:** is by far the most abundant protein and constitutes the bulk of the skin (90% of dry weight). During aging, collagen undergoes gradual loss and fragmentation, leading to thin, less firm and structurally weakened skin. Age-related changes in collagen alter the structure and the function of the skin [1].

- **Elastic fibers:** represent 2-4% of the extracellular matrix component. These are stretchable proteins that allow skin to get back into place after being stretched, thus giving it elasticity and resistance.

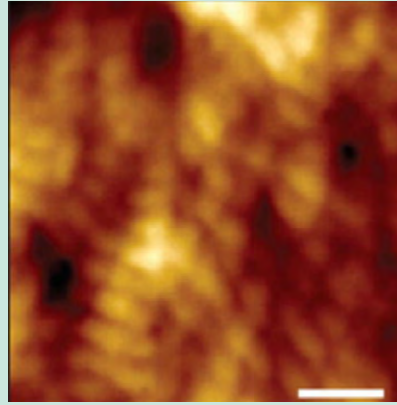
- **Glycosaminoglycans / proteoglycans:** although these components represent only 0.1% - 0.3% of the dry weight of the skin, they play a role in its hydration, largely due to the water retention capacity of hyaluronic acid [2].



YOUNG SUBJECT (25 YEARS OLD)



OLD SUBJECT (84 YEARS OLD)



Alterations in collagen structure during aging observed by atomic force microscopy (very high resolution microscopy).

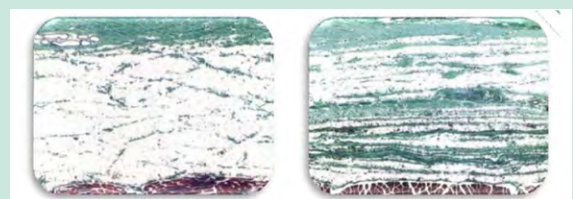
According to Quan & Fisher 2015 <sup>(1)</sup>

Fibroblasts therefore play a vital role in maintaining skin quality by synthesizing molecules that give its firmness, elasticity and hydration. To get those synthesis, fibroblasts must be stimulated. Mechanical stimulation is a non-invasive, effective and natural way to achieve that.

### **SEVERAL STUDIES HAVE DEMONSTRATED THE EFFECT OF endermologie® TREATMENTS ON FIBROBLASTS.**

As early as 1998, in Nashville, Tennessee, researchers from Vanderbilt University tested endermologie® treatments on an animal model: Yucatan mini-pigs. The histological examination - after biopsy of the treated subcutaneous tissues - showed significant changes in the architecture of those tissues with the appearance of dense and horizontal bands of endogenous collagen in a dose-dependent manner. The collagen content varied from 27% to 130% depending on the number of sessions (10 or 20 sessions).

Those results demonstrated for the first time the effective stimulation of fibroblasts by endermologie treatments and were the subject of 2 scientific publications <sup>[3,4]</sup>.



130% increase in collagen production after 20 endermologie® sessions. Left: untreated side; Right: treated side. According to Adcock and coll. <sup>[3]</sup>

## TO GO FURTHER...

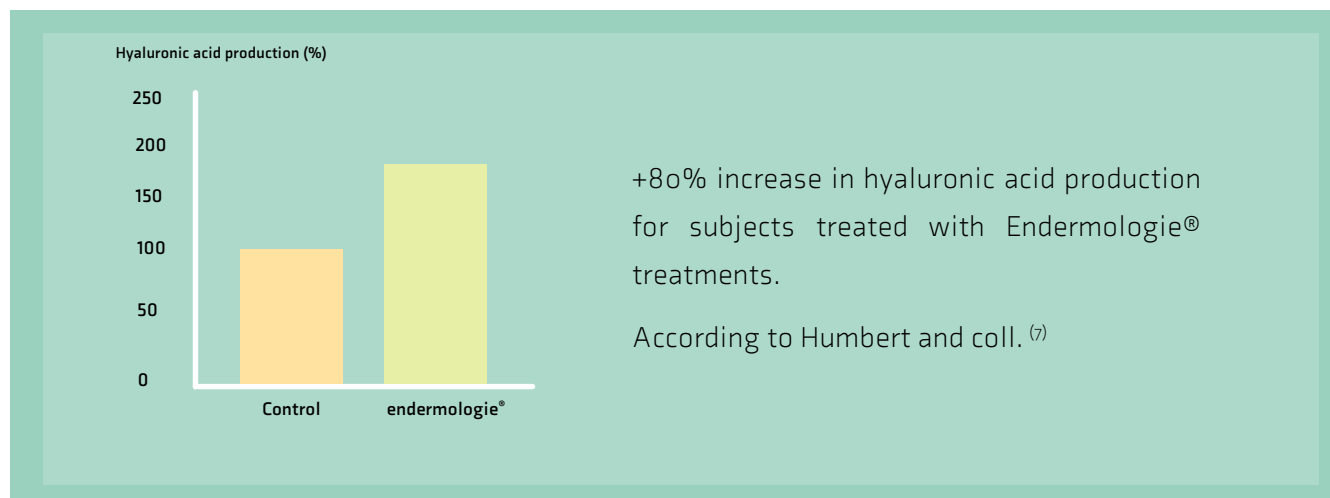
In 2002, results observed on collagen in the animal model were confirmed for humans in a study conducted by the DERMEXPERT laboratories in Paris. Results clearly show the links between mechanical stimuli and production of collagen but also of elastic fibers by fibroblasts. Their densification observed in histology shows a firming of the skin and corroborates the clinical dermatological examination - improvement of skin quality, reduction of signs of facial skin aging <sup>[5]</sup>.



In 2003, an Italian team from La Sapienza University in Rome, carried out a histological study after 8 weeks of treatment. Analysis of skin samples from the treated side showed different changes compared to untreated control skin samples and in particular an increase in the number of fibroblasts nuclei (+37.5% on average) and remodeling of dermis and epidermis. Results show that mechanical stimuli are capable of causing morphological and probably functional changes in skin tissue. Authors interpreted those results as a process of fibroblast activation that proliferates and acquires a «secretory» state under the effect of mechanical stimuli <sup>[6]</sup>.

In 2015, Professor Humbert's team at the Study and Research Center on Tegument of Besançon, France, compared the behaviour of stimulated (endermologie®) and unstimulated (control) fibroblasts stemming from skin biopsies on the face.

Results show the intimate effects of the endermology treatment at the heart of the dermis: stimulation of the production of collagen, elastin and hyaluronic acid (+80%), remodeling of dermis, improvement of signs of skin aging (firmness, luminosity, wrinkles).



There are therefore 4 studies published in international scientific journals on the stimulation of fibroblasts following endermologie® care with unequivocal results on the firming and restructuring action: increased production of collagen, elastic fibers and hyaluronic acid which leads to an improvement in the quality of the skin with a beneficial remodeling of dermis and epidermis.

#### **SOURCES :**

- 1- Quan T, Fisher GJ. Role of Age-Associated Alterations of the Dermal Extracellular Matrix Microenvironment in Human Skin Aging: A Mini-Review. *Gerontology*. 2015; 61(5):427-34. Epub 2015 Feb 4.
- 2- Uitto J, Bernstein EF. Molecular mechanisms of cutaneous aging: connective tissue alterations in the dermis. *J Investig Dermatol Symp Proc*. 1998 Aug;3(1):41-4.
- 3- adcock d. and al. Analysis of the Cutaneous and Systemic Effects of Endermologie in the Porcine Model. *Aesthetic Surg J* 1998, 18(6); 414-22
- 4- adcock d. and al. Analysis of the Effects of Deep Mechanical Massage in the Porcine Model. *Plast. Reconstr. Surg*. 2001 Jul., 108 (1); 233-40.
- 5- Revuz J. and al. Clinical and histological effects of a device, the Lift-6, used in facial skin aging. *Nouv. Dermatol*. 2002; 21 : 335-342.
- 6- INNOCENZI D. and al. Evidence of skin changes induced by the LPG® Technique via image analysis. *DermoCosmetologia Anno II, n°1 – Gennaio/Marzo 2003; p. 9-15.*
- 7- HUMBERT P. and al. Mecano-Stimulation™ of the skin improves sagging score and induces beneficial functional modification of the fibroblasts: clinical, biological, and histological evaluations. *Clin Interv Aging*. 2015 Feb 2;10:387-403.

