

EVERYTHING YOU WANTED TO KNOW ABOUT *SKIN* AND *FIBROBLAST*

FROM THE EXPERT:

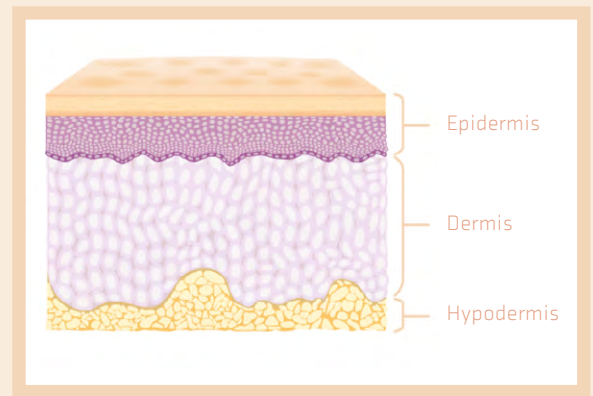
Pr PHILIPPE HUMBERT, Besançon, France

Professor HUMBERT is an internationally renowned dermatologist in Besançon. He teaches medical students and pharmacists at the faculty and does research. Thanks to his very successful research team and thanks to some collaborations, he has developed a number of innovative research projects on the skin. Here is a transcript of the course he gave on Instagram.



Our skin is made up of 3 layers:

- **Epidermis:** (the most superficial part of the skin): protects us from the outside world and limits water loss, which makes up 70% of our body.
- **Dermis:** includes collagen fibers and cells: fibroblasts, essential skin cells that evolve in the extracellular matrix (a combination of water and sugars including hyaluronic acid or heparan sulphate which have the ability to retain water). Dermis is responsible for the skin elasticity.
- **Hypodermis** (fatty tissue): made up of adipocytes and energy storage place.



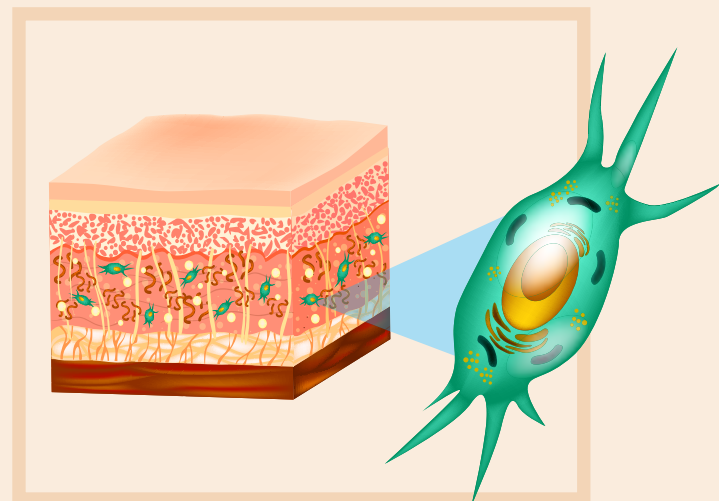
The skin is an organ, like the heart or the liver, it has a unity of form and a unity of structure with its own very important protective and barrier functions. It is made up of cells which are all within an extracellular environment through which vessels pass to nourish the skin, as well as nerves which give the skin its sensitivity.

Dermis cells - fibroblasts - are very important.

These are the cells that build our skin, that make the collagen fibers help come together and form large braids that will give firmness and elasticity to the skin. Collagen fibers are 100 to 1000 times the size of fibroblasts.

These will act in the healing process. After an injury, fibroblasts will immediately come to the site to make collagen, to fill up that wound.

Unfortunately this fibroblast is an aging cell. When fibroblast is healthy, it will transform into a cell whose name is very important to remember: the **myofibroblast**.



That cell has a muscle fiber: the alpha SM actin. It is a fibroblast with muscles, a very active cell.

At my Research Center in Besançon, we have conducted a study which shows that when the skin is mechanically stimulated with a determined frequency (face endermologie®), fibroblast is transformed into **myofibroblast**, allowing the skin to reduce its wrinkles and its ptosis (sagging). Every time we touch the skin, every time we model the skin, we give stimuli to the cell to become a myofibroblast.

WHY DO *WRINKLES* APPEAR?



When the skin during a whole life faces muscle contractions (consequences of expressions), the skin tries to remain tense, not to wrinkle and to do so it uses the transformation of the fibroblast into myofibroblast. But at some point, **that skin becomes exhausted** because it has been exposed to the sun, it has lost some of its protective capacity. Wrinkles appear, hollows in the skin appear. Fibroblasts are tired so they need to be stimulated. To stimulate an athlete, you have to put him on a treadmill. Small gestures made with hands or with mechanical stimulation devices, create **stimulation of the fibroblast which starts to become younger, becomes a myofibroblast**. And the amazing thing is that we have demonstrated that with 6 weeks of mechanical stimulation, all the skin collagen is renewed, 45% elastin and 80% hyaluronic acid are produced. No need to inject any! This mechanical stimulation with endermologie® rejuvenates the skin by activating fibroblast.

WHAT SHOULD BE DONE FOR AGING IN GENERAL ?

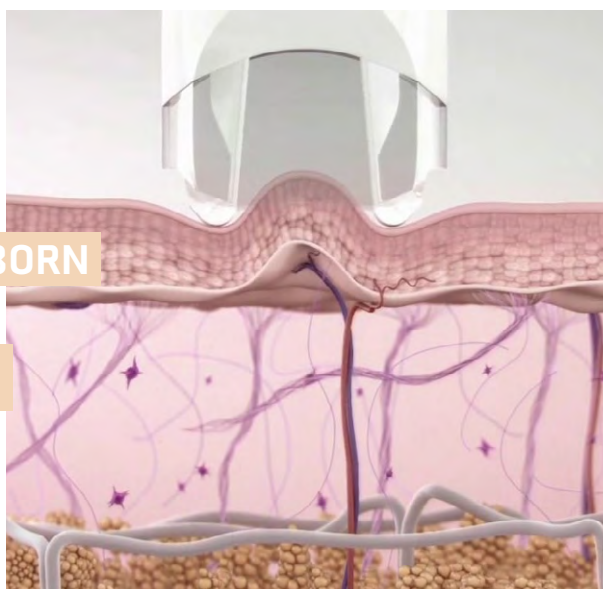
When a cell is stimulated in that way, it rejuvenates, but it needs energy. **The organism needs to be well nourished**. With age coming, our intestine does not absorb calories and vitamins properly. It is therefore necessary to provide the body with these additional vitamins. When you give a patient vitamins, you give him a substance that the organism cannot be deprived of. Without vitamin D, one cannot live. Without vitamin C one cannot live. But these substances - unlike cholesterol, creatinine or albumin which are produced by our organism - are **substances essential for life** and not produced by our organism. That's why the word vitamin means that we have to get it outside, in our food. It's not just a little tonic. If our intestine is a bit sluggish or if it has aged, the vitamins we eat will no longer be sufficient.

They must be provided especially above a certain age, 45-50 years old, in large quantities to give the cell everything it needs for the fibroblast to become that myofibroblast which will do all the work.

AGING IS NOT A FATALITY

Of course, we all have our genes. **When the skin is mechanically stimulated, we stimulate the fibroblast, but above all we stimulate the microcirculation.** This is what can be observed right from the first session with an improvement in skin radiance and which has been demonstrated in a remarkable way in the study that we have conducted. The person immediately feels a positive effect, after a session, one is beautiful, one has a radiant face and by continuing the sessions, other results will appear : significant improvement in ptosis severity scores, production of hyaluronic acid, collagen and elastin.

MECHANOBIOLOGY WAS BORN
IN 2 UNIVERSITIES:
BESANÇON AND GENEVA



Large laboratories have recently been talking about **mechanobiology**, a field at the interface of biology, physics and bioengineering which focuses on how mechanical forces influence cell behavior. But more than 20 years ago, **mechanobiology** was born in 2 universities: Besançon and Geneva. A lot of research work have been done to understand the mechanism of wrinkle formation. Most cells have receptors able to sense mechanical signals. Stimulating the skin is enough to activate these «mechanical receptors» and activate the genes.

GOOD NUTRITION IS IMPORTANT

Our **vitamin C** needs are 1 gram per day. One orange should contain 400mg of **vitamin C**. This means that 2 oranges are enough to provide us the necessary daily dose. That was what our grandparents used to say: «You know, at Christmas we had an orange». It was something important.

Well, today it seems that there are 40 mg of **vitamin C** in an orange, so there is not enough vitamin C left. Instead of consuming 10 oranges, we use food supplements to supplement our diet. This is also the case for **vitamin B9**, **vitamin B12** and **vitamin D**, which must be provided from a certain age in the form of food supplements. Good skin health also means no exposure to the sun. The sun is very deleterious, it damages the skin, it makes the skin consume its protective factors which are the anti-free radicals.



THEREFORE YOU MUST PROTECT
YOURSELF FROM THE SUN,
A CAUSE OF AGING WHICH
IS KNOWN AS PHOTO-AGING

We eat far too much sugar. In a year we eat the amount of sugar our grandfathers ate in a lifetime! Which is considerable. Sugar is everywhere: cakes, ready meals. We must be careful because these sugars cause ageing inducing glycation. Sugars are deposited on collagen fibers which makes them brittle, rigid, they are no longer elastic, they are no longer flexible and when there is too much sugar on the collagen fibers, aging is almost inevitable. Sugar is a drug, as a result our pancreas makes too much insulin, which will store fat and give us appetite, we will eat more and store more... The intervention of a doctor who will block the secretion of insulin with a drug to stop that vicious circle is often needed.

TAKE CARE OF THE PSYCHE

Moral suffering is also to be taken into consideration. All my consultations end with the question «*Have you had any hard times in your life?*» Well, one out of two people will start crying and tell me their story. You must know that skin and central nervous system have the same embryological origin. Brain and skin are made from the same cell. Those cells sometimes differentiate into neurological cells and sometimes into epidermal cells. Therefore the skin has some neurological cell functions somewhere.

We know that keratinocytes, cells of epidermis, are capable of suffering from addiction. For example, someone who sunbathes will release endorphins from those skin cells, a bit like morphine. And if you tell that person to stop going out in the sun, the person will feel bad, there will be a lack. The process of taking care of the psyche is very important. Never tell a person «It's in your head».

Instead, say « Do you have any moral problems ? Have you lived painful events, a divorce, childhood violence, assaults, a fire in your house? »

At one time, around 1988, when I wrote the chapter of a book called «**From Depression to Immunodepression**», painful events were quantified. A lot of weight was given to the loss of a spouse. Today, it is certainly not as important. But all those events play a role in aging.

HOW TO PRESERVE OUR SKIN?

Above all you should know that genetics doesn't explain everything. There is also what is called epigenetics, everything that involves genetics such as diet, exposure to the sun, pollution, stress, and care of the skin. Anyone who takes care of his or her skin, who massages, who cleans properly with non-aggressive products, who uses the right cosmetics, who goes to the beautician from time to time to do skin care, those people look after their skin and that fights the effects of genetics.

Let's not be desperate when seeing our parents and thinking that we'll age like them. The fifty-year-old woman knows that she can take hormones for the menopause, which her mother or grandmother could not do. Nowadays there are natural hormones that are suitable for the menopause. We have now all the tools to fight and cope with aging.

We can also fight ageing very well with **endermologie®** which contains the word «dermis». By stimulating the skin, we heal it, we make new skin, we replace old skin with **new skin**, so of course we rejuvenate the skin.



A PHILOSOPHY OF LIFE

To feel good about yourself you have to feel mentally good. Unfortunately, we aren't all equal facing painful situations, facing ability to eat normally, facing illness.

Chronic diseases cause particular aging, a diabetic person will have to make extra efforts in order to protect his or her skin. Some professions - doctors, beauticians - can help those people, providing them with the needed supplement for their extra efforts thus, preventing them from aging too quickly. That is natural medicine, natural care, which means that we are far from injections, far from all those artificial things we may have to do. What is natural should be privileged at first, that's obvious. We don't want to over-rejuvenate, we just want to maintain a good state.



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