

Ultra Low Molecular、Hydrolyzed Marine Collagen
less than 1000 molecules (Dalton)



RM Enterprises Inc.

Quality and efficacy of marine collagen

1. Collagen is composed of 19 different types of amino acids. The collagen. Importantly, the amino acid rich collagen which are more absorbent to the body, is referred as high quality collagen. Also a low weighing collagen is often referred as low molecule collagen. (weighing less than 10,000 molecule weight or Dalton) Our project focuses on this ultra low molecule collagen weighing less than 1000 Dalton or less.
 - In a 1000 Da or less collagen products, there between 17% to 22% of collagen weighing less than 500 molecular weight (Da).
2. Efficacy of our collagen (General Benefits)
 - ❑ Skin beauty. Toning of the skin
 - ❑ Stronger bones, and helps rebuilds cartilage in joints.
 - ❑ Other benefits such as hair growth, stronger nails, etc.,
 - *Although Collagen uses has been identified in some medical uses, These statements have not been evaluated by the Food and Drug Administration and are not intended to diagnose, treat, cure or prevent any disease.*

Production of Ultra Low Hydrolyzed Marine Molecule Collagen

1000 molecule weight or less (1000da or less)

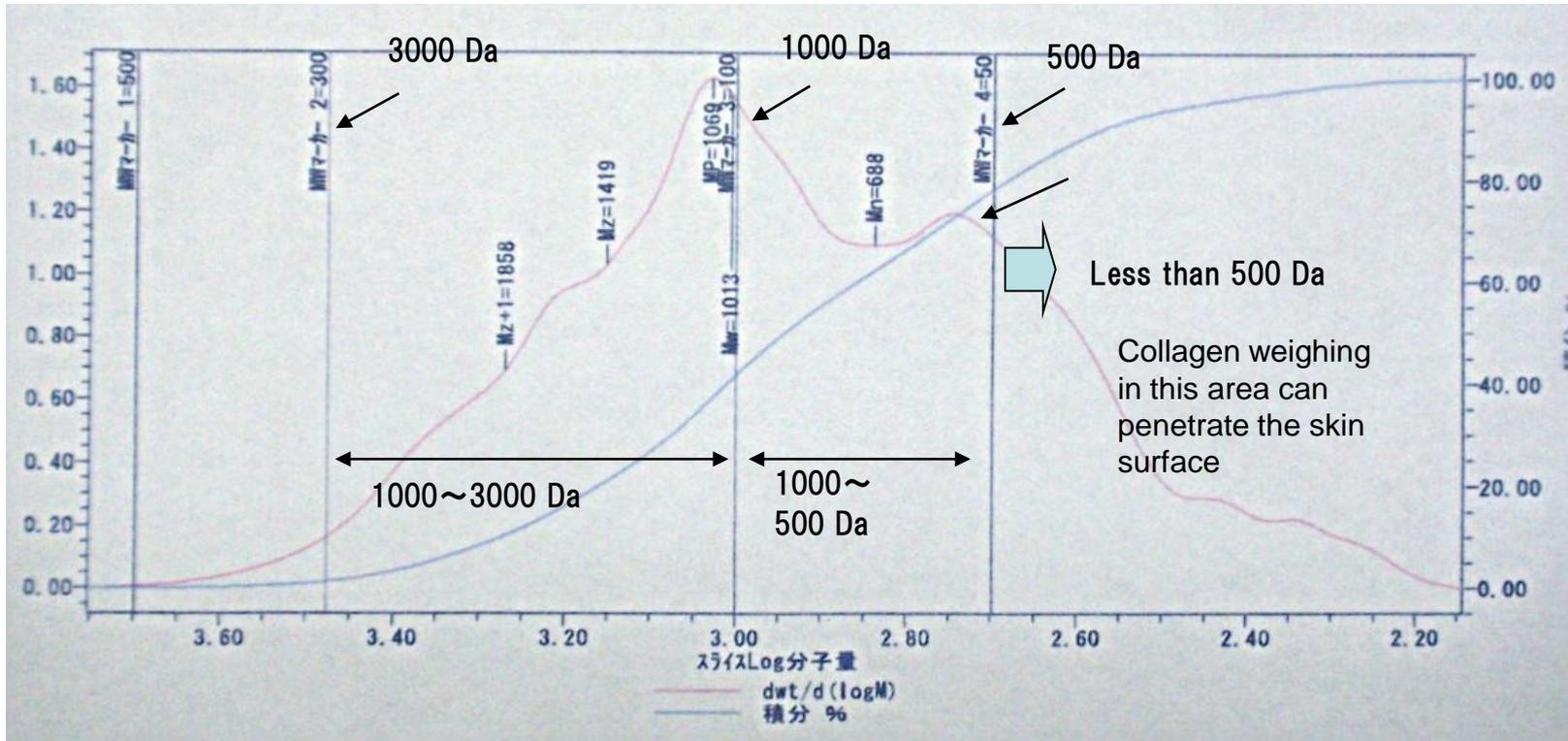
- Low temperature hydrolysis process
- Using the low temperatures helps sustain without damaging the original quality of the collagen during the breaking down process of the molecules. As the raw material is placed in the tank, it is processed from 30 to 90 days. It then becomes gelatinous form in which it is then repeatedly filtered and to separate the oil, from the dermis layer, through this enzymatic degradation process. This repeated process produces the low weight molecules. Then all moisture is removed to produce the powder form.

Purified Powder > enzymatic degradation <> filtration process > tank hydrolysis

- By repeating the filtration process and the enzymatic degradation can produce desired quality, thus producing the pure purified powder form.

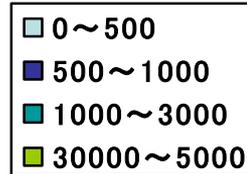
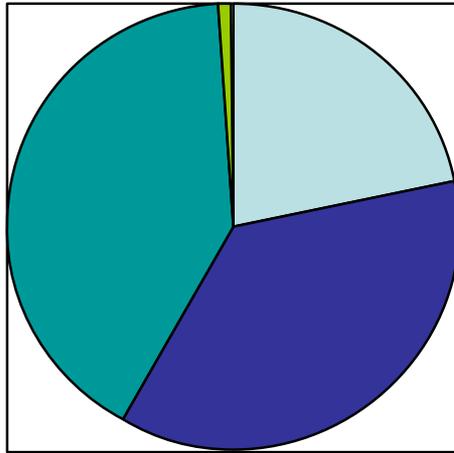
Molecular weight distribution chart

1000 (Da) molecular weight collagen does not necessarily consist of all collagens weighing 1000 (Da) molecular weight. It consists of collagen in various different weights. The average is of 1000 (Da) molecular weight. The diagram below shows the distribution of the molecular weight of the collagen.



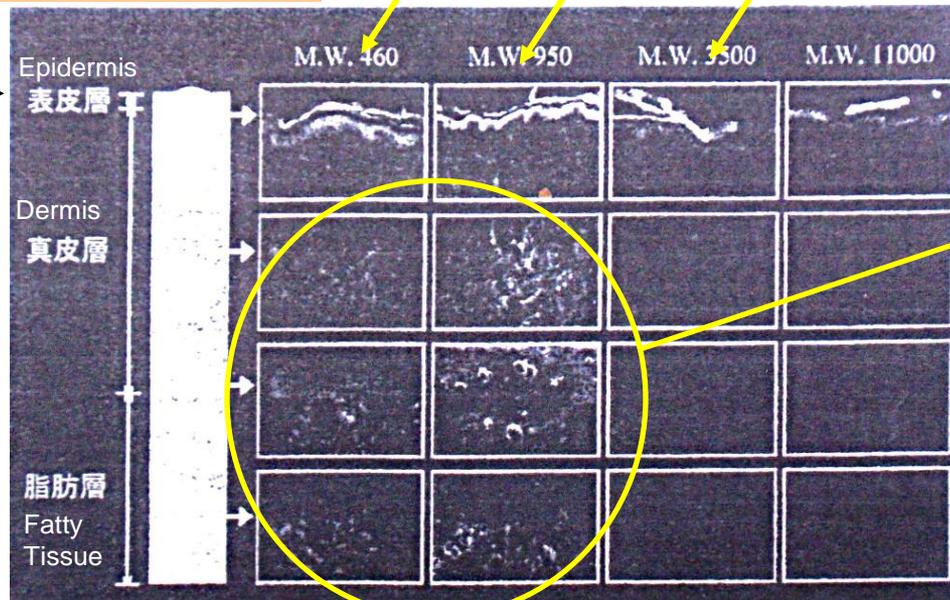
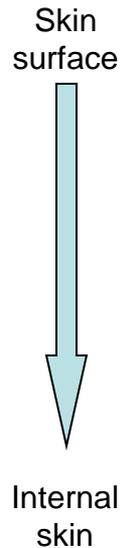
In this chart, the larger molecule weighs 1000 Da up to 3000 Da. Whereas the smaller molecule is distributed under 200 Da. In weight.

Diagram of the 1000 (Da) Molecule weight



Molecule Weight	Content Ratio(%)
0~500	22
500 ~ 1000	36
1000 ~ 3000	41
3000 ~ 5000	0.99

Skin Penetration Test 1000 Da image



500 Da or less collagen

500 to 1000 Da collagen

1000 to 3000 Da collagen

As it shows, only the collagen weighing 1000 or less Da penetrated the skin and localized in the Dermis and the fatty tissue area.

Collagen weighing more than 1000 Da is concentrated only above the surface of the skin.

Skin penetration of the Ultra low molecule Hydrolyzed Marine Collagen

- **Surface of Skin**

- When you look closely at the surface of the skin, at an angle, you can see minor grooves. You will notice patterns of regular or irregular squares or triangles in which these gaps are referred as “skin grooves” which are surrounded by raised areas call skin ridges. The shape of the grooves and ridges can significantly affect the appearance of the skin. We refer to this as the texture of the skin. When the skin groove is shallow, and the ridges line up closely, the skin looks beautiful due to the reflection of the light. Skin with this texture is referred as having resilient skin



Structure of the skin

Looking at a cross-sectional structure of a human skin, Human skin is shown as it is on the following figure(next page)

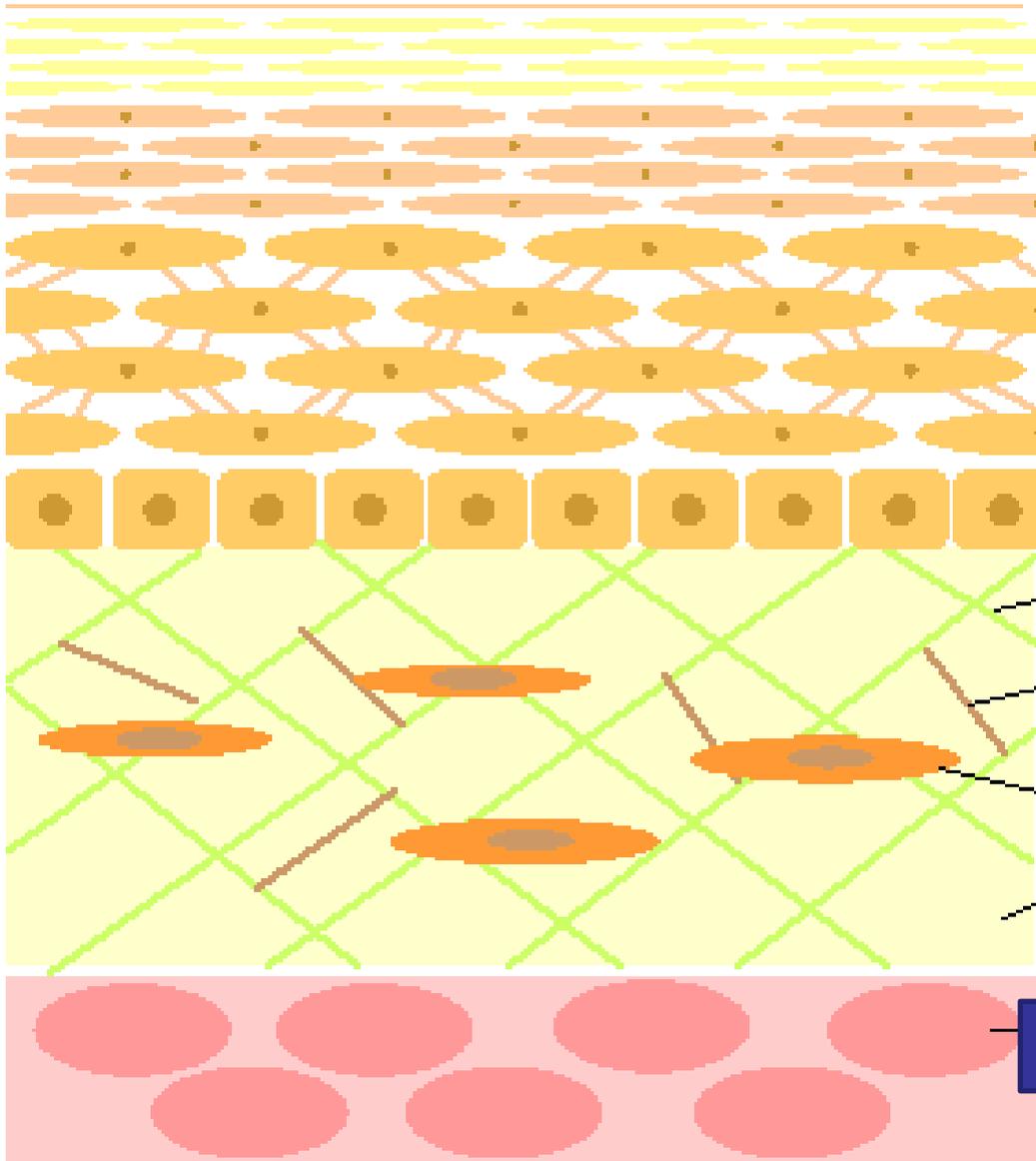
The skin is composed of two layers of skin. The outer skin closes to the surface is called epidermis and deeper skin below it is called dermis. The epidermis and the dermis together form the epithelial tissue membrane (Cutaneous membrane). Below the dermis is the subcutaneous tissue, within the subcutaneous tissue is the layer of fat called the subcutaneous fat.

The combination of the two, epithelial and the subcutaneous tissue makes up the human skin tissue. The skin tissue covers the entire human body as it functions as a protective barrier against hostile environment. The human body contains water (60%), and skin helps to sustain the water within our body.

Each structure has the following features and roles.

★To maintain as well as to rejuvenate your skin, it is most effective for the collagen to infiltrate the human skin into the dermis layer.

SKIN STRUCTURE



Cutaneous Membrane
(Stratum Corneum)

(Granular Cell layer)

EPIDERMIS

(Stratum Spinosum)

(Basal Layer)

(Collagen)

(Elastin fibers)

(Fibroblast)

(Substrates)

DERMIS

(Subcutaneous fat)

SUBCUTANEOUS TISSUE

Structure of the skin

- **Epidermis:** The epidermis is the outer layer of the skin. Epidermis is approximately 0.2mm in thickness. It contains several layers. The basal cell layer, the spinous cell layer, the granular cell layer, and the stratum corneum. The cells in the in the epidermis are called keratinocytes. It is made from layers of cells with a basal layer, which is always forming new cells through cell division. The new cells gradually move towards the surface. As they move up they gradually die, become flattened and develop keratin and the outermost layer of flat dead cells is being continually worn away by friction. The keratin and oil from the sebaceous glands help to make the skin waterproof.
- **Basal Layer:** The deepest layer of the epidermis is the basal cell layer. Here cells divide to produce new skin cells. These cells move towards the skin surface, pushed upward by the dividing cells below them. Blood vessels in the dermis — which is below the basal cell layer — supply nutrients to support this active growth of new skin cells. Dead skin cells are continually shed from the skin's surface. This is balanced by the dividing cells in the basal cell layer to produce a state of constant renewal. Also in the basal cell layer are cells called melanocytes that produce melanin. Melanin is a pigment that is absorbed into the dividing skin cells to help protect them against damage from sunlight (ultraviolet light). The amount of melanin in your skin is determined by your genes and by how much exposure to sunlight you have. The more melanin pigment present, the darker the colour of your skin.

Stratum corneum

- The Stratum corneum is the outermost of the five layers of the epidermis — the top layer of the skin. Also known as stratum corneum epidermidis, horny layer, keratin layer, and corneal layer, the stratum corneum is responsible for providing a protective barrier against environmental damage from sun, penetration, toxins, and microorganisms, and by retaining moisture and lubricants. The stratum corneum is composed of corneocytes, corneodesmosomes, keratinocytes, enzymes, lipids, and natural moisturizing factor , and plays a complicated and critical role in the health of the skin.
- Mainly, the stratum corneum consists of dead or dying keratin-containing cells. It generally is responsible for the look, feel, and health of the skin. Strength of the stratum corneum comes from layers of corneocytes, which are brick-shaped cells made of layers of keratin mesh that trap water.
- Keratin is made in cells called keratinocytes, which make up 90 percent of skin cells. As these cells mature, they push toward the surface of the skin, dry out, and slough off. Keratin is a strong fibrous protein that gets its strength from the component cysteine disulphide — a compound that allows keratin to form disulfide bridges. The number of disulfide bridges formed determines whether the keratin layer is hard like a hoof or soft like skin.

Dermal layer

The Dermis, which is located beneath the basal layer of the epidermis is approximately 2mm thicker than the epidermis.

The dermis tissues are mainly filled with fiber and protein substances.

Most of the protein fibers are made of fibers called **collagen**.

Collagen is a fibrous and elastic that gives the skin its flexibility and strength. It also supports the elastin which gives the the skin its ability to snap back.

Elastin fibers which consists only about 2% of the protein fibers allows the skin its elasticity. Between the collagen and the elastin fibers which bonds the two together is a jelly-like component called mucopolysaccharides and proteoglycans hold water in the skin and are the true skin moisturizers. Also, but few in numbers, the fibroblasts are cells which plays an important role, help produce and deposit collagen and elastin fibers of the dermis as required for growth or to repair wounds.

For this the quantity and quality of the collagen is determined by the fibroblasts. However, fibroblasts are weak on UV damage, and may affect the quality of the collagen and elastin it produces.

Dermis contains nerve endings which help carry nutrients and oxygen. This nerve also passes through the epidermis.

Although it is not in the diagram, the dermis also contains sweat glands and sebaceous glands.

The sweat glands produce sweat in response to heat and stress. Sweat is composed of water, salt, and other chemicals. As sweat evaporates off the skin, it helps cool the body.

The sebaceous glands secrete sebum into hair follicles. Sebum is an oil, that keeps the skin moist and soft and acts as a barrier against foreign substances.

Collagen with a molecule weight which can penetrate into the dermis layer

- Skin plays an important role which prevents most bacteria, viruses, and other foreign substances from entering the body. However this is true in a case when the substance weight is of 1000 or more molecule weight. **If the weight is of 500 or less molecule weight, it will penetrate the epidermis and will reach the dermis.**
- ★It is said that the mesh of the skin (epidermis) is of 500 molecules. (However not all substances although may be less than 500 molecules can penetrate the skin. Depending on the nature of the scientific substance it is made of, it may at times be repelled by the skin.
The greater in volume, it is know to have a better percutaneous absorption, but however, it also depends on the temperature, and the concentration, as well as where is the location of the skin the substance is in contact with.)