

Pro-Niacin™ - The Molecule

Pro-Niacin™ is the patented molecule found in each of the NIA 24™ products. With its unique micronutrient delivery system, Pro-Niacin™ penetrates the skin, delivers Niacin to the skin cells and enables healing from within to promote healthier, more beautiful looking skin.

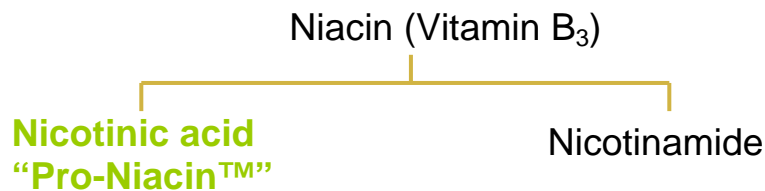
Just as its name suggests, Pro-Niacin™ is based from Niacin, also known as Vitamin B₃. Many are familiar with the oral form of Niacin, a water-soluble micronutrient found in a number of commonly eaten foods. As a nutritional supplement, Niacin aids in cholesterol reduction and energy metabolism, but more recently, it has emerged as a key factor in helping the skin protect and repair itself from sun damage and aging.

Structure

Pro-Niacin™ resembles Niacin (Vitamin B₃) but differs in several very important ways.

1. **Pro-Niacin™ is the form of Niacin known as nicotinic acid.**

Unlike nicotinamide, nicotinic acid stimulates the release of the hormone leptin, a natural repair hormone, that aids healing within the skin cells and aids in the reduction of hyperpigmentation.



Pro-Niacin™ - The Molecule (continued)

Structure (continued)

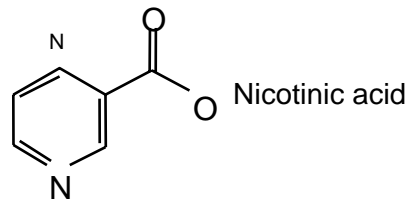
2. **Pro-Niacin™ contains what is known as a lipophilic tail.**

The natural form of Niacin is hydrophilic or “water loving” and therefore, cannot penetrate the lipophilic (fat-loving) stratum corneum. To be absorbed by the stratum corneum, the molecule must somehow be made lipophilic.

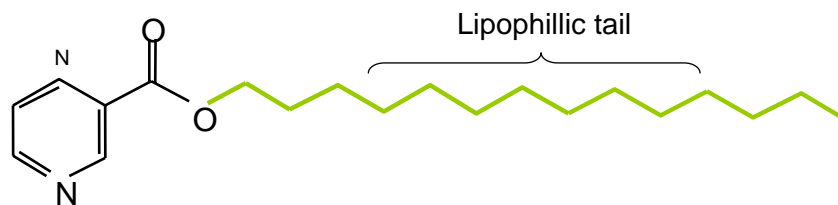
Niadyne scientists have developed the molecule, Pro-Niacin™ - a nicotinic acid molecule with an attached lipophilic tail, which as a lipophilic molecule, *CAN* penetrate the lipid-rich outer layers of the skin and diffuse into the sublayers of the epidermis where cellular regeneration and keratinization occur.

Pro-Niacin™

(Structure)



Pro-Niacin™



3. **Pro-Niacin™ does not cause vasodilation.**

The unique delivery system of Pro-Niacin™ slows the rate at which Niacin is absorbed into the skin, so that vasodilation does not occur.

Pro-Niacin™ - The Molecule

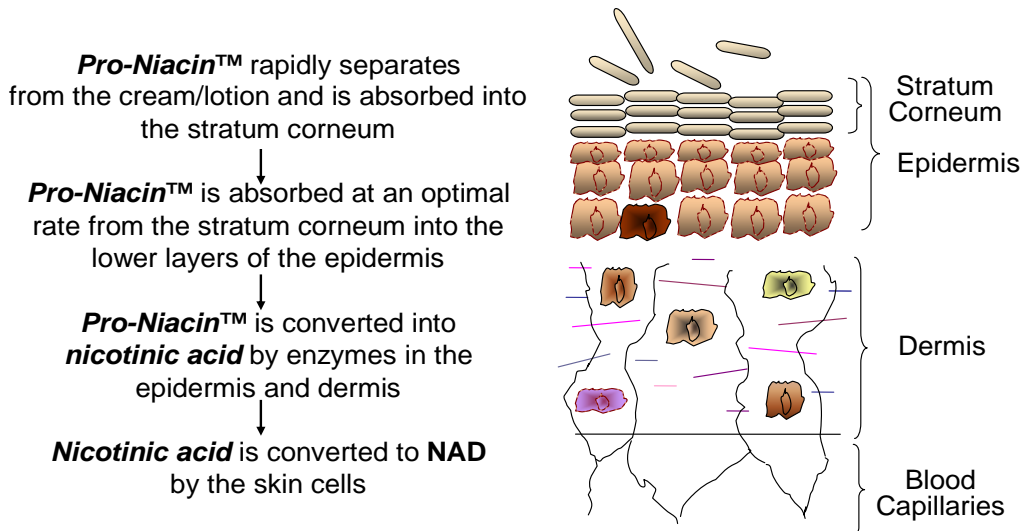
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Delivery

Delivery of active ingredients across the skin barrier is a major challenge for all cosmeceuticals. The skin is naturally resistant to absorbing topical substances as a defense against bacteria, pollutants and other environmental assaults.

As stated previously, the skin barrier is made up of pancake-like cells with a fatty or lipid matrix between the cells. In order to penetrate the lipid-rich stratum corneum and achieve the ultimate goal of reaching the substrata of the epidermis, the Pro-Niacin™ molecule, with its lipophilic tail, crosses the skin barrier and slowly diffuses at an optimal rate into the sub-layers of the epidermis. As natural enzymes within the skin cleave the lipophilic tail, Pro-Niacin™ is converted back into nicotinic acid. Nicotinic acid is then bioconverted into the active molecule, NAD, which enters the skin's cells and aids in various biochemical reactions. Because of the slow rate at which Niacin is absorbed into the lower epidermal layers, vasodilation is avoided.

Delivery of Pro-Niacin™ to the Skin



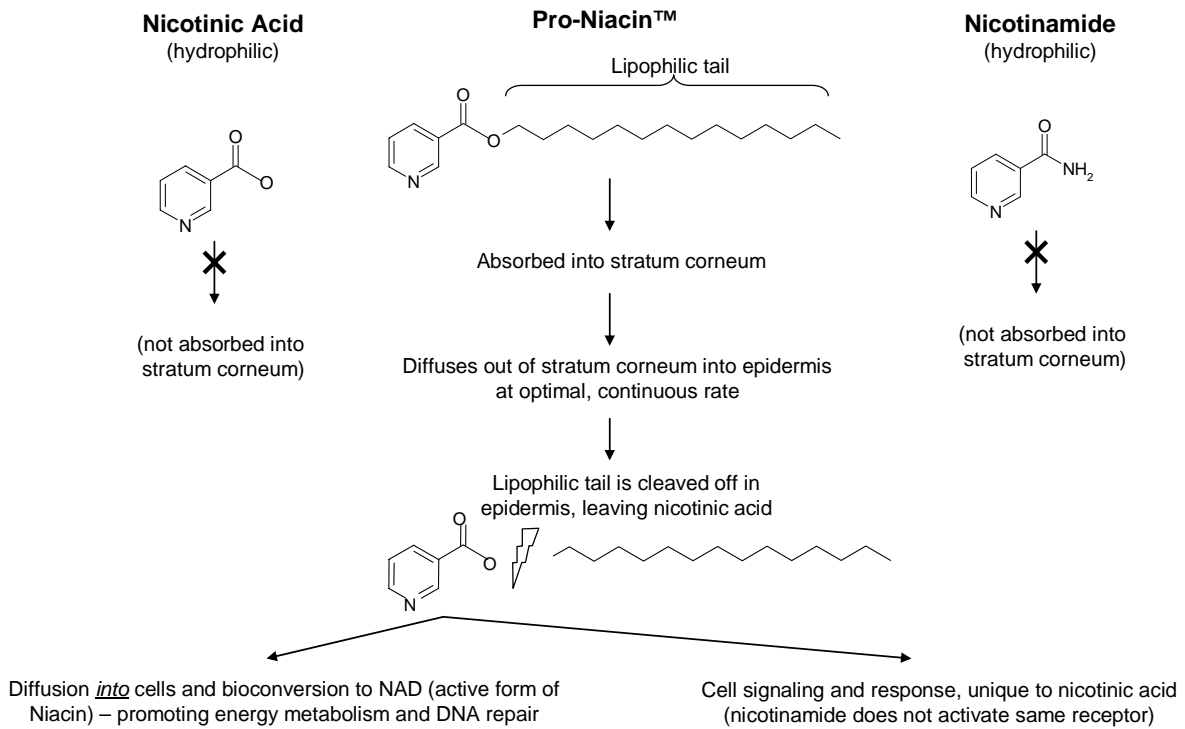
MicroNutrient Delivery allows ingredients known to be beneficial to the skin to go beyond topical application, penetrating the epidermis in a slow, continuous release, allowing time for the molecule to bio-convert to its working form.

Pro-Niacin™ - The Molecule (continued)

Delivery (continued)

The 24-hour continuous micronutrient delivery system is unique to the Pro-Niacin™ molecule and is what distinguishes the NIA 24™ products from other products containing Niacin.

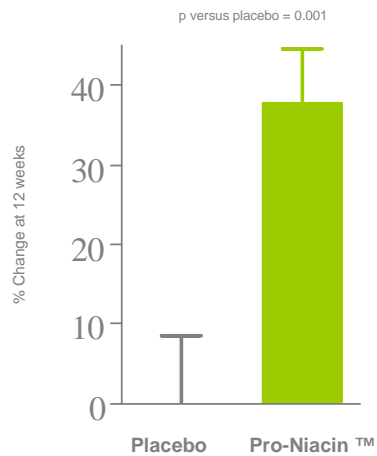
Niacin vs. Pro-Niacin™ (Structure, Delivery and Function)



Pro-Niacin™ - The Molecule (continued)

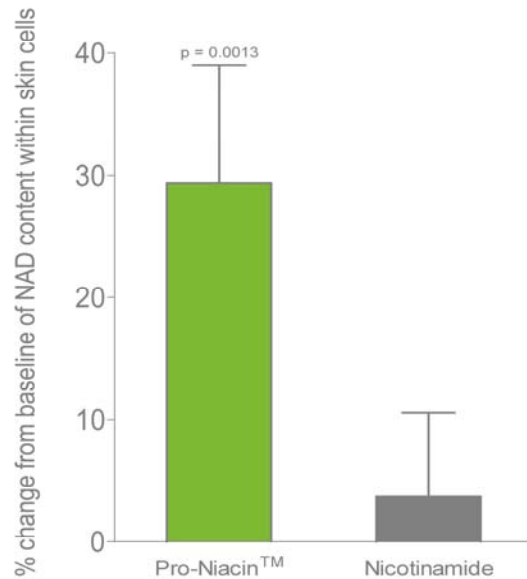
Function

By enabling Niacin to penetrate the skin through its unique patented delivery system, Pro-Niacin™ increases the amount of Niacin or NAD (active form of Niacin) within the skin cells.



Jacobson, M.K., Jacobson, E.L., Kim, H., Kim, M., Rizer, R.L. and Trookman, N.S., Enhancement of human skin barrier integrity by nicotinic acid derivatives. (2004) Journal of Investigative Dermatology, Vol. 122: No. 3, A58.

Pro-Niacin™ increases NAD content within skin cells more significantly than the other form of Niacin, nicotinamide.



From Jacobson, E.L., et al., Manuscript in preparation

Pro-Niacin™ - The Molecule (continued)

Function (continued)

Increased levels of Niacin affect 4 major biochemical processes. The result of these biochemical processes affected by the Pro-Niacin™ molecule is the generation of healthier skin cells from the inside-out. The skin barrier is strengthened as a result of these improvements in the biochemical processes well below the skin's surface.

Increased levels of Niacin affect 4 major biochemical processes

1. Stimulates the repair of DNA.

DNA is your cell's genetic code, which determines what the cells will become and do. When your cells suffer damage from the sun or other environmental factors, this DNA can become altered. Pro-Niacin™ helps stimulate the repair of DNA so your skin cells can undo some of the damage caused by the sun, creating healthier skin through a natural repair process.

2. Enhances energy metabolism and skin cell turnover.

Healthy skin cells need energy. The active form of Niacin, NAD, plays a crucial role in the energy metabolism of cells. Thus, by providing Niacin to the skin, healthy energy metabolism is promoted and skin cells can undergo proper cell turnover.

3. Promotes the release of leptin, a natural repair hormone.

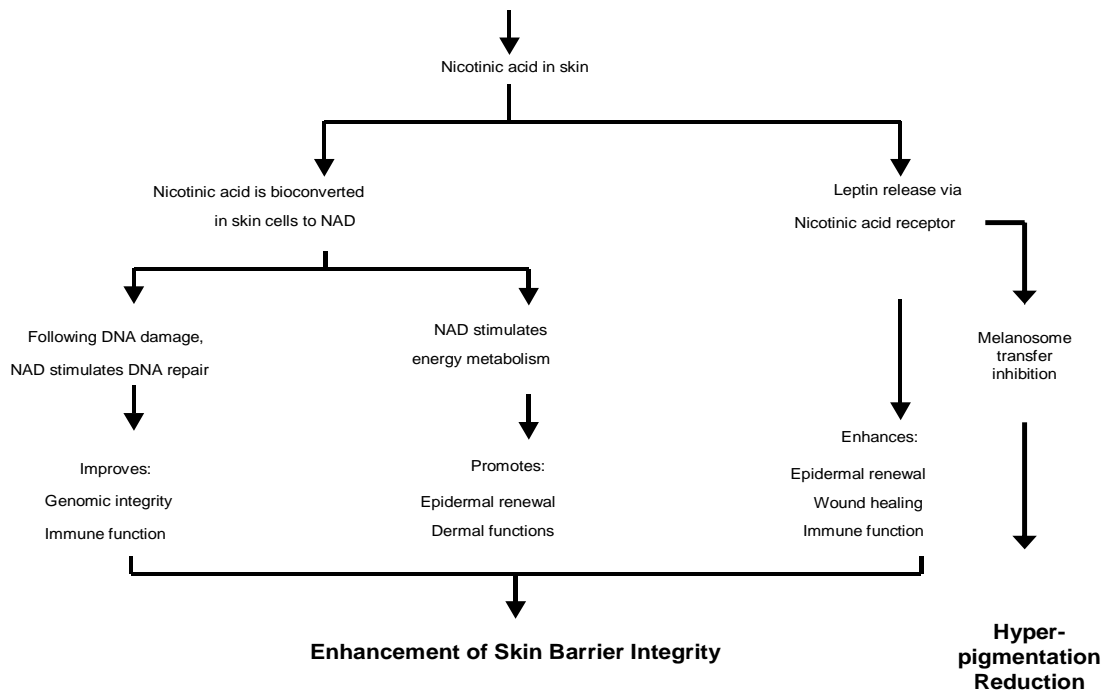
Unlike its counterpart nicotinamide, nicotinic acid stimulates release of the hormone leptin, a natural repair hormone that promotes healing of skin cells through wound repair and improved immune response as well as helps to reduce hyperpigmentation through melanosome transfer inhibition.

4. Stimulates a receptor that decreases hyperpigmentation.

Nicotinic acid stimulates a signaling cascade that inhibits the transfer of melanin from the melanocytes (cells that produce melanin) to the surrounding keratinocytes (other skin cells) such that hyperpigmentation is reduced.

Pro-Niacin™ - The Molecule (continued)

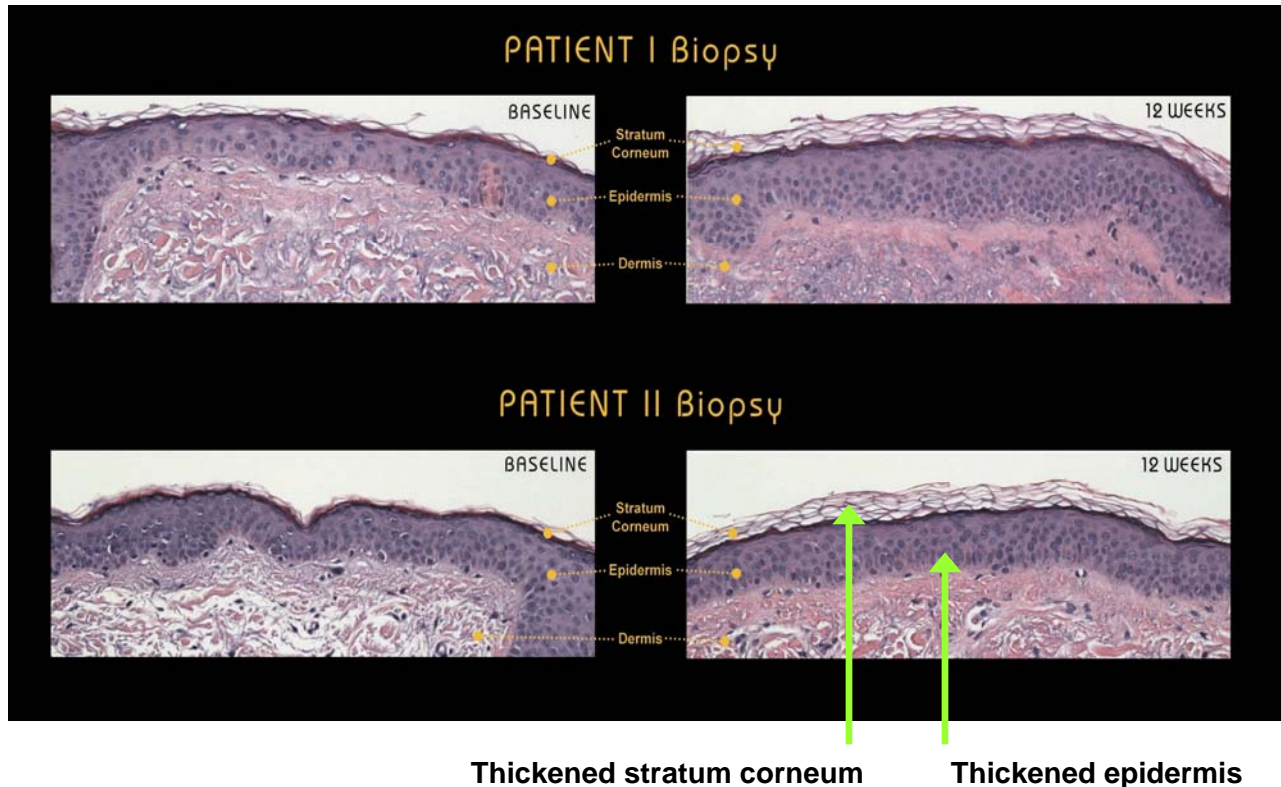
Biochemical Mechanisms Enhanced by Pro-Niacin™



Pro-Niacin™ - The Molecule (continued)

The Results

Double-blinded, placebo-controlled trials show that Pro-Niacin™ strengthens the Skin Barrier.



Skin biopsy analysis of patients' cheek shows a dramatic thickening of the stratum corneum and epidermal layers of Pro-Niacin™ which result in improved skin barrier and integrity. In addition, the lower dermal layer shows a healthier, tighter cellular matrix after 12 weeks of Pro-Niacin™.

In a seven-site, physician-directed trial, 140 patients with mild to severe sun damage used Pro-Niacin™ daily. The following changes observed by physicians represent the percent of patients who experienced improvement:

- 90% reduced their in hyperpigmentation
- 82% improved skin texture
- 81% improved skin tone
- 80% increased skin smoothness
- 68% reduced their fine lines and wrinkles
- 53% improved firmness

In a separate clinical trial, Pro-Niacin™ increased the thickness of the stratum corneum by 60% and the thickness of the underlying, living layers of the epidermis by 25%.

Of note, The National Cancer Institute recently chose the Pro-Niacin™ molecule for development as a potential skin cancer prevention agent.