

DNA: The Fascinating Molecule

By Céline Gudit

Located in the cell nucleus, DNA represents 70-90% of its dry weight. Associated with specific proteins—histons, DNA makes up the chromosomes. DNA is, therefore, the carrier of genetic characteristics. DNA also determines synthesis of protein, large molecules that represent one-third of human dry weight. They constitute almost all cell structures and play an important part in every biological reaction,.

History

At the end of the 19th century, Friedrich Miescher, a Swiss biochemist, isolated a substance from the cell nucleus while he was studying salmon spermatozoon. It was called “nucleon.”

In 1944, three American biologists, Avery, MacLeod and McCarthy, identified the chemical essence of hereditary matter. Even though this substance was thought to be a protein, these researchers established it to be an acid—deoxyribonucleic acid or DNA. In 1953, Watson, from the USA and Crick, from Britain, laid out a pattern of representation of the DNA molecular structure. In 1962, they received the medical and physiology Nobel Prize for their discovery. In fact, DNA hasn't been studied that long; researchers

started from scratch and have studied gene therapy only about 50 years.

A Lifetime

The lifetime of proteins is rather short; they wear out quickly and must be replaced regularly. When a protein synthesis is required, a process is initiated using the contents of DNA. However, because it's located deep in the nucleus, DNA uses an intermediate molecule: ribonucleic acid or RNA. The chemical structure of RNA and DNA are quite similar to each other. When a protein must be synthesized, DNA opens itself on a given length, corresponding to the information required by protein synthesis. (Note: DNA molecules are very long, about one meter in humans.) RNA then transfers the information from DNA. DNA takes back its initial shape, while RNA migrates to a ribosome where the synthesis of proteins takes place. The role of RNA is to carry information out of the cell nucleus.

As DNA rules all protein synthesis, it also rules vital metabolisms, which enable a cell to develop and survive. Aging and worn by external stress—especially radiation, DNA fibers deteriorate and their informative power decreases. The cell activity consequently diminishes, and gradually it is unable to protect itself

against environment.

Cosmetology Connection

Various clinic observations and the pursuing therapeutic applications took place prior to any use of DNA in cosmetics. Such a peculiar molecule should be active, as far as pharmacology is concerned. At least, this was the opinion of U.S. researchers Wilczok and Mendecki, as early as 1964. Their research clearly showed that DNA could restore rats' irradiated skin tissues. At the same time, research was conducted on several DNA types, proving that the radiation restoration capability doesn't depend on the origin of the molecule but on the molecular weight and, above all, on the DNA highly polymerized characteristics. In a New York cancer institute, patients treated by radiotherapy radiation were given DNA, which significantly diminished the incidence of the lesions, and the DNA capability of skin tissue radiation restoration was established.

DNA HP (highly polymerized) is also used in clinical dermatology. If applied as an absorbent gel, DNA proved to be very effective on leg-ulcer cicatrization, scabs and also on accidental or pathological wounds of the skin tissue. It's used on severely burnt patients as well. Besides, it makes quicker and better cicatrization after surgery. Recent

clinic studies have shown DNA immunity modulating characteristic, ensuing new applications in arthritis treatment, too. Physicians from the Pasteur Institute established DNA energizing capability.

A well-known Swiss cosmetic brand, working together with a private clinic, used wild salmon milt as a raw material, a substance containing young cells with a big nucleus and high-grade DNA. This is why wild salmon milt proves to be a biological raw material, which is particularly suitable for the extraction of a high-quality and biologically active DNA.

At first, its structure is very close to human tissue, which guarantees perfect compatibility and affinity. When extracted from wild salmon milt, DNA is more resistant to heat.

Physical and Chemical Characteristics

Among all the DNA physical, chemical and biological characteristics, some of them account for its therapeutics. These have led to use DNA in cosmetics, too.

UV absorption spectrum. As any complex biological molecule, DNA has an ultraviolet absorption spectrum. Skin tissue cellular DNA is damaged by sun UV exposure.

DNA application makes it possible to catch harmful UV rays and protect skin tissue cell nuclei.

Moisturizing capability. At the cell level, DNA jells with a volume of aqueous solution, which represent over than 10,000 times its own volume. Mixed with water, DNA HP forms a gel and not a solution. This characteristic is due to the highly polymerized characteristic of DNA. Because of its water retention characteristics, DNA HP has a highly moisturizing effect.

Antioxidant. Studies have established that DNA has antioxidizing characteristics in synergy with E vitamin, meaning that it scavenges free radicals generated by various factors—sun, pollution, stress, smoking—that also cause skin tissue damage.

Biological characteristics. Clinical and pharmacological observations (restoring tissues, cicatrizing and energizing effect) prove a positive effect of DNA on cell metabolism. Its biological characteristics make up a source of energy and nutrition, which is absolutely necessary to the cell function. In short, DNA has a general revitalizing effect on the skin tissues facing sun rays, life environment stress and age.

An Original Mixture

Extracted from animal tissue, DNA is bigger and purer than when extracted from plant tissues, yeast or bacteria cultures. Therefore, up to now, pure DNA HP hasn't been obtained from plant tissues.

RNA activity is lower when it's directly dependent on DNA physical structure. On the contrary, owing to its lower size, RNA is biological nutrition for cells that will be bio-available rapidly. When obtained by biotechnology processing from beer yeast, RNA reinforces and completes perfectly DNA action; therefore, it's interesting to mix both molecules in a single formula. It will be the perfect stimulation for cellular renewal, and the utmost nutrition for newborn cells (DNA + RNA). Owing to DNA HP and RNA properties, such cosmetic products aim to maximize cellular activity and restore balanced function of skin tissues (skin tissue rehabilitation); balanced function may be disturbed by various factors damaging beauty and health of skin tissues.

Proposing efficient products that guarantee visible and long-lasting results, companies can win the loyalty of demanding customers who expect actual effect from such skin care products. **PMPR**

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PMPR Cosmetic Forecast 2003/2004

*presents with the same enthusiasm
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