# Salmon Sperm Extract /Polydeoxyribonucleotide (PDRN)

# Features of this product

01 High content of nucleic acid DNA, sourced from pristine marine environments

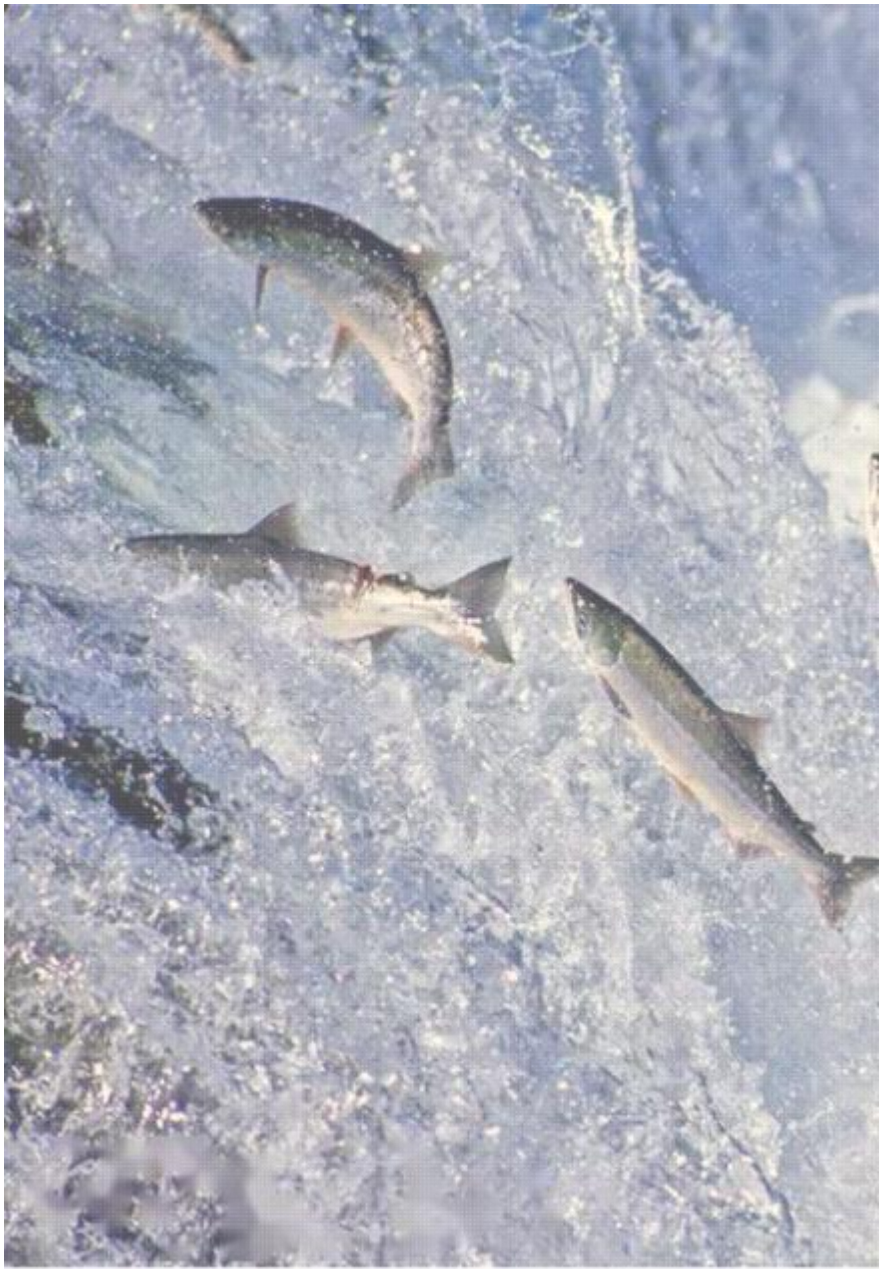
02 Protect against photoaging and improve barrier inflammation

03 Delaying endogenous aging and improving exogenous oxidative stress

04 It can improve crow's feet and forehead wrinkles.

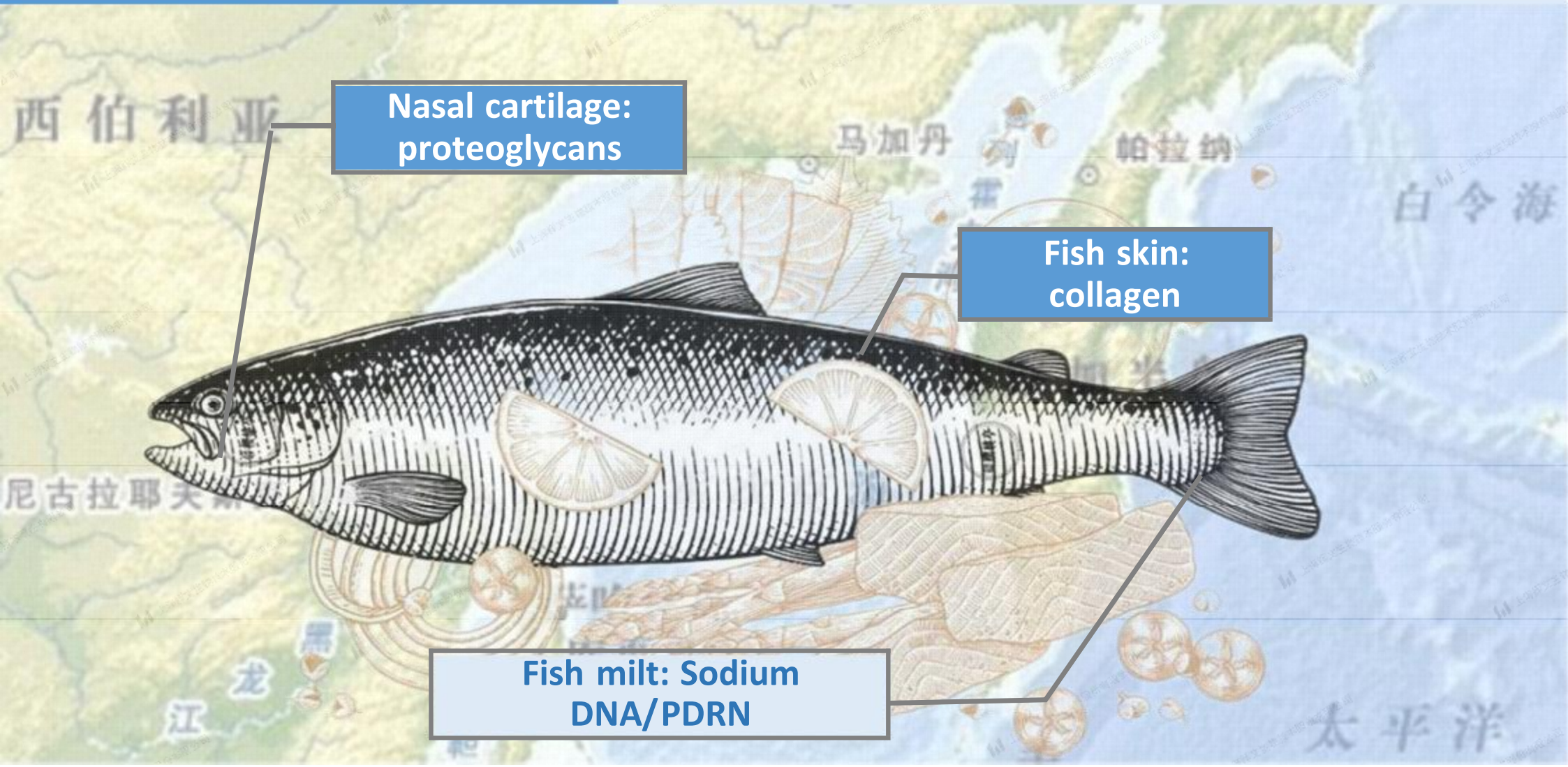
# CONTENT





**Salmon is a treasure from head to toe.**

**Dedicate your whole body to beauty and health**




- An inviolable mission
- A long and arduous journey of growth
- A tragic and legendary journey
- An epic story

The word "salmon" is a homophone for "returning fish." Life is a form of creation, and the life of a salmon is a story of fiery passion. The salmon's migration embodies the noble sentiment of returning to one's roots and sacrificing oneself for the sake of future generations.

**Genes that have overcome countless difficulties originate from powerful DNA.**

01

## Ingredient Source

ü DNA-NA is a substance obtained from fresh salmon sperm after removing water, proteins, and lipids.

02

## Ingredient Origin

ü Deep-sea salmon from the North Pacific Ocean.

03

## Main Component

ü The main component is high-concentration DNA. Salmon Sperm Extract contains more than 85% DNA-Na, which is 74 times that of sardines and 93 times that of beer yeast; 3.3 times that of the nucleus of the visceral cell and 2.5 times that of the thymus of an animal.

04

## Rareness

ü A salmon contains about 3 g of DNA, which is extremely valuable.

# Core Component——DNA

## Production Mechanism

- Hepatogenesis: Nucleic acids are produced from small simple compounds, starting with the synthesis of nucleobases (purines, pyrimidines), etc..
- Supplementation from exogenous sources: Synthesize nucleic acids by digestion and absorption of foods containing nucleic acids.

## Importance to the Human Body

ü The human body consists of 60 trillion cells, and nucleic acid is the basic component of cells.

ü The cellular metabolic cycle of the body is 120 days, and sufficient nucleic acid DNA can accelerate cellular metabolism, improve skin condition, and restore cellular vitality.

ü Endogenous and exogenous sources of nucleic acids dominate the normal division, proliferation, and metabolism of human cells.

# Why choose Salmon Sperm Extract?

## DNA Damage

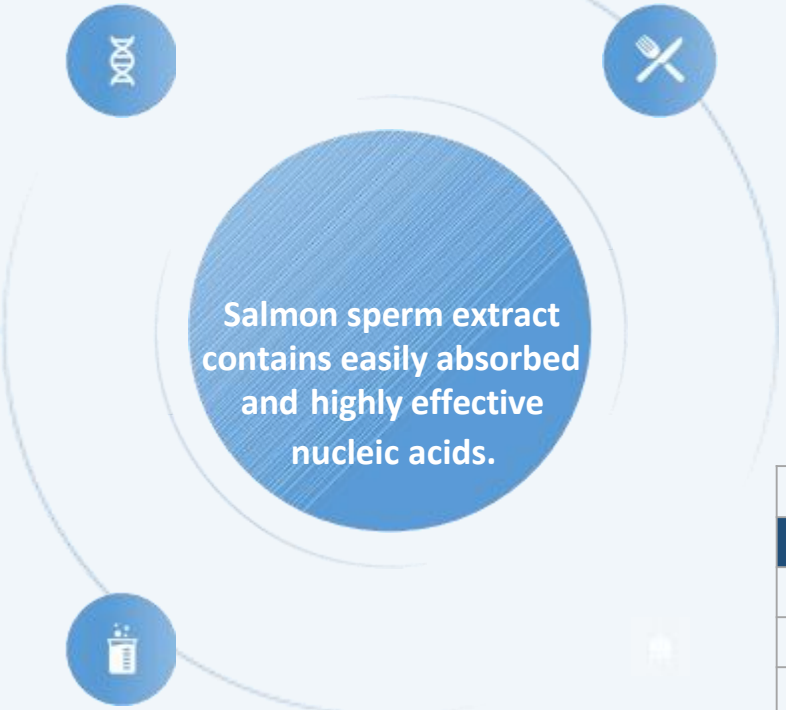
ü DNA damage caused by radiation, pollution, and chemical toxins in the environment

ü Decreased ability to synthesize nucleic acids due to the aging of the human body

**Aging & Wrinkling** | **Hair Thinning**

## Application History

As early as 1999, there was already a DNA nucleic acid supplement focusing on anti-aging in Japan, using salmon sperm extract as an ingredient.




## Exogenous supplementation

ü The number of nucleic acids metabolized by the The human body is within the range of 2-2.5 g per day, and the recommended daily intake of nucleic acids for normal adults is about 0.6-1.2 g, with a maximum of 2 g.

As shown in the table below, the content of nucleic acids in food is low, and overtaking can also cause a risk of cholesterol overload.

| Food | Nucleic acid content (mg/100 g) |
|---|---|
| Fish Sperm | 10000 mg/100 g |
| Sardine | 600 |
| Squid | 280 |
| Chicken Liver | 420 |
| Chicken Heart | 187 |
| Red Bean | 306 |
| Pea (Dried) | 173 |

# PDRN: Dual-Spin A2A™ Technology Gives products powerful efficacy

The double helix structure has better receptor specificity; namely, it activates the adenosine A2A2 receptor. 0.1% of this product activates A2AR+23.89%.

In vitro experiments show that it can significantly enhance the antioxidant and self-repair capabilities of skin tissue.

Antioxidant enzyme SOD↑ +98.67%

Catalase CAT↑ +200.35%

Human clinical trial:

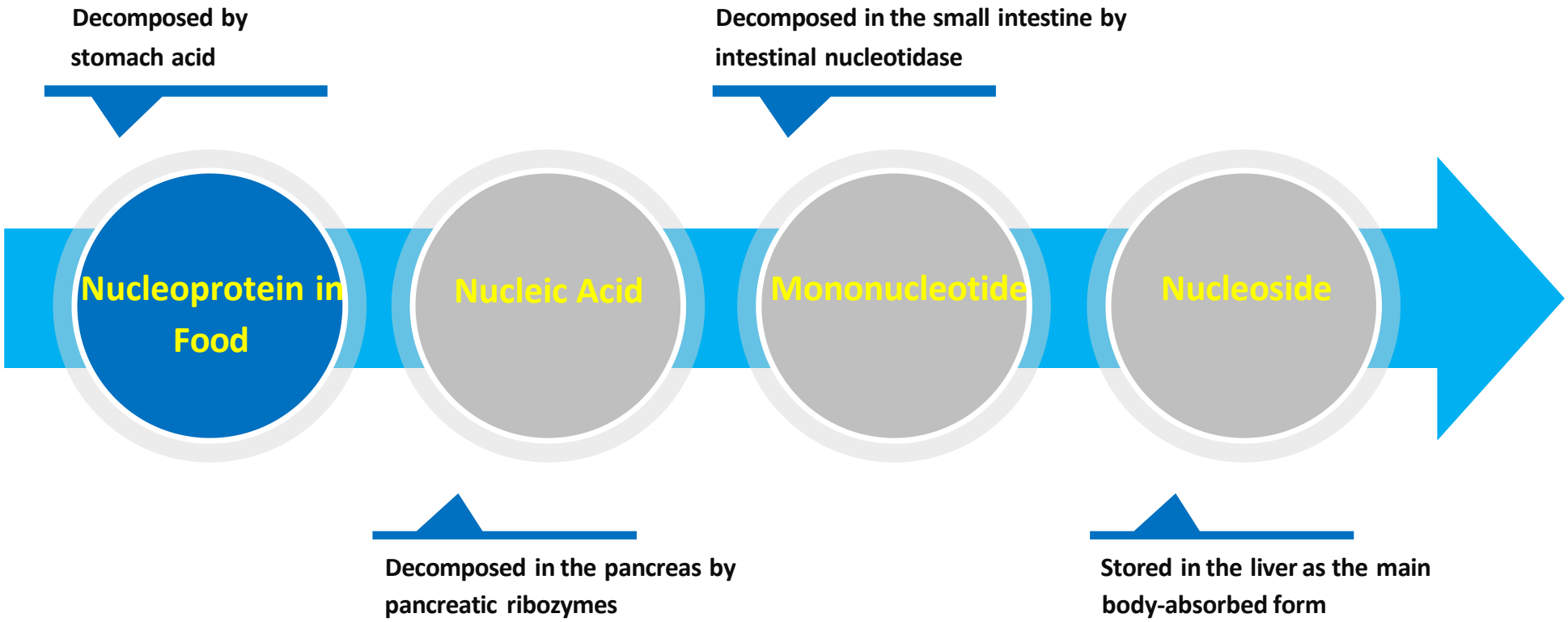
Dosage: 300 mg/day, once daily;

60 participants aged 30 – 50 years (two groups) Forehead wrinkle area decreased by -20.64%↓; dermal collagen density increased by +13.27%↑;

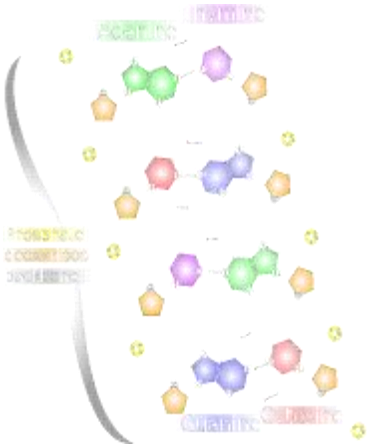
Skin radiance increased by +23.72%;

Stratum corneum moisture content increased by +24.38%↑

# Absorption of Nucleic Acids in the Body

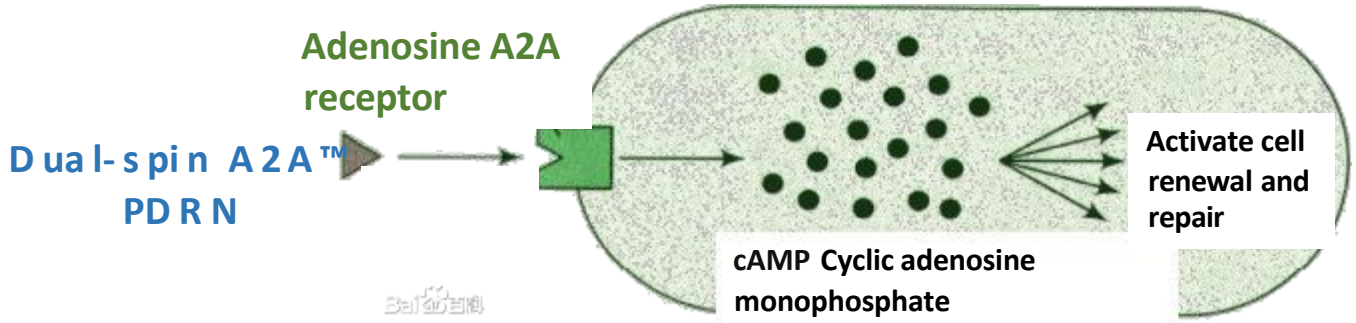


Mechanism **of action of dual-spin A2A™ PDRN**



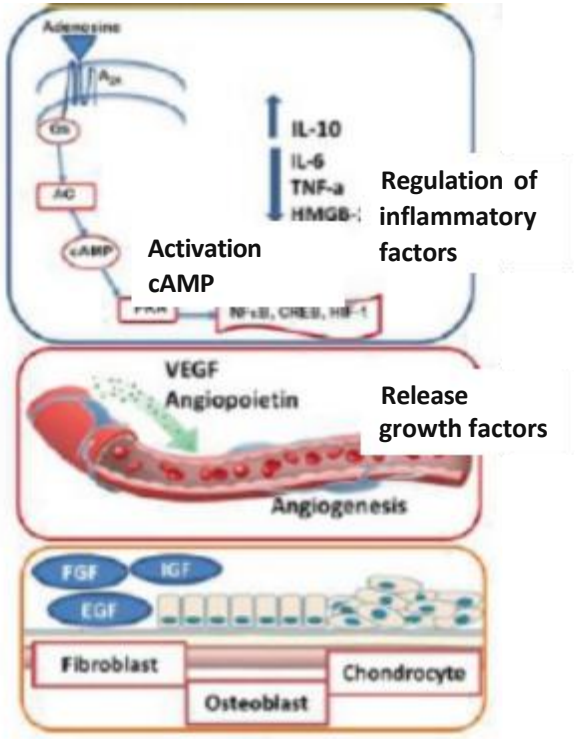
Adenosine A2A receptors belong to the G protein-coupled receptor family and are highly expressed on immune cells. They participate in inflammatory responses, immune regulation, and inflammation suppression, and cell renewal and metabolism by regulating immune cells.

The mechanism by which salmon DNA participates in the adenosine A2A receptor pathway ultimately leads to epidermal renewal and repair.




Dual-spin A2A™ PDRN

Adenosine A2A receptor




Epidermal tissue renewal and repair

Delay aging

Adenosine A2A receptor: an important molecule in the body's immune regulation, Dai Shuangshuang, Zhou Yuanguo, 2009. Journal of Trauma Surgery

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# Mechanism verification: PDRN-C activates the adenosine A2AR receptor

Experimental Model: Fibroblast proliferation model

Experimental Method: Except for the control group, the corresponding test samples were added to the cell culture medium and incubated for 24 h.

Experimental Concentration: 0.05%, 0.1%

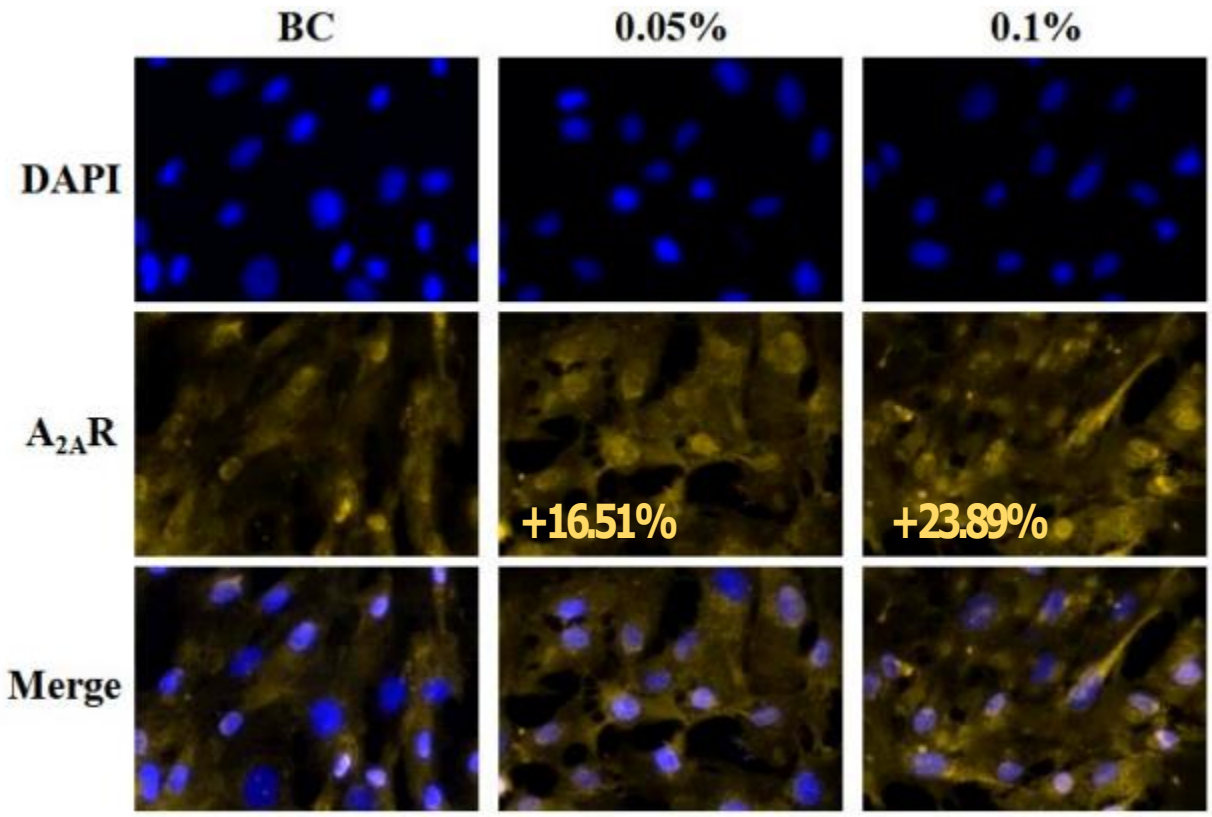
Detection Instrument: Inverted fluorescence microscope

Detection Index: A2AR content

Detection Method: Image-Pro Plus 6.0 image analysis software

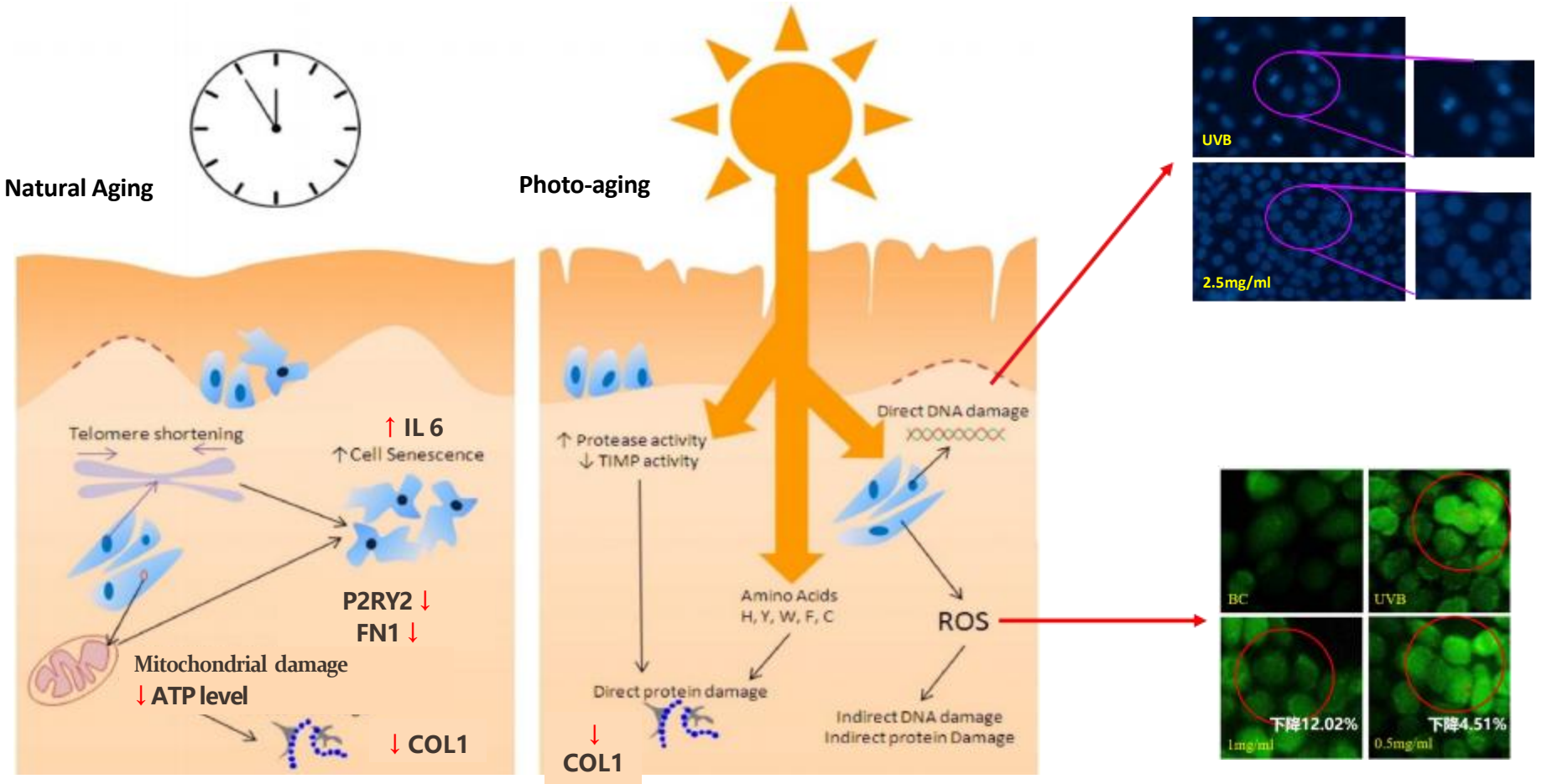
Activation of A2A receptors can reduce inflammatory infiltration, promote endothelial cell proliferation and migration, reduce VEGF production, and stimulate fibroblast differentiation and maturation, thereby accelerating the repair process.

**Experimental conclusions: 0.05% and 0.1% of the di-swirl A2A™ PDRN can activate adenosine A2AR receptors, with activation rates of 16.51% and 23.89%, respectively.**




Note: BC is the blank control group; blue marks the cell nuclei, yellow marks A2AR, and the brighter the yellow fluorescence, the higher the A2AR content.

# Efficacy Mechanism of DNA-Na



## Protection against UVB damage

Increased keratinocyte survival rate and reduced apoptosis rate; decreased ROS content.

## Improve inflammatory response

Significantly inhibits IL-6 and enhances fibroblast viability.

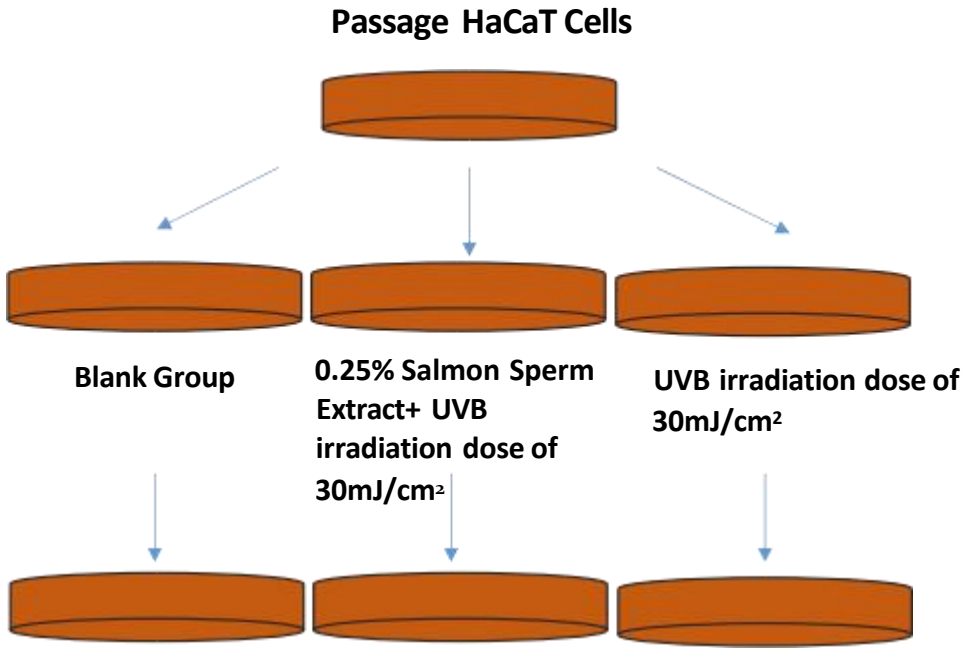
## Delaying endogenous aging

Promoting type I collagen, ATP significantly enhances SOD and CAT activity.

## Visualization enhances youthfulness. energy

Completely eliminate crow's feet and forehead wrinkles; improve skin radiance and elasticity.

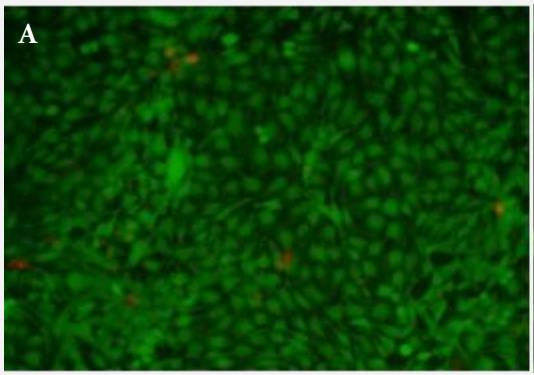
## Salmon Sperm Extract Protects Against UVB Damage—IN VITRO

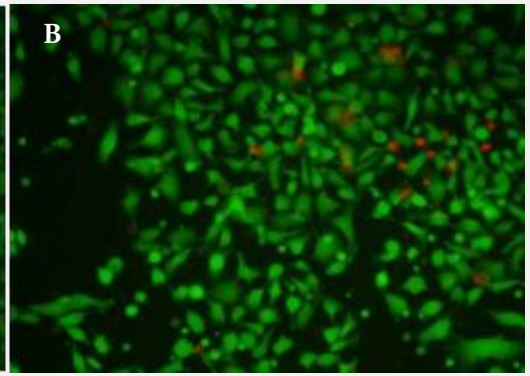


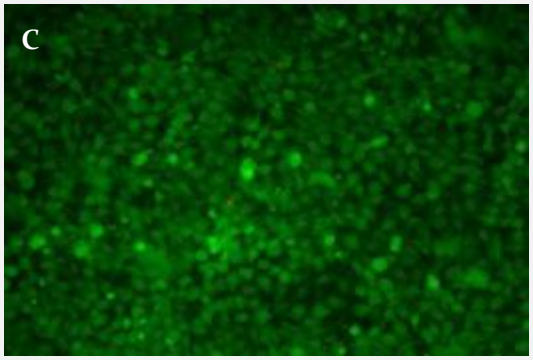

Detection of cell survivability by CCK-8, cell viability and apoptosis by fluorescent staining with Calcein-AM/PI and Hoechst 33342

- 0.25% salmon sperm extract increased the survival of UVB-injured keratinocytes by 63%; reduced the rate of apoptosis by 70%; and reduced the nuclear damage of keratinocytes by 75%!

## Salmon Sperm Extract Protects Against UVB Damage - IN VITRO



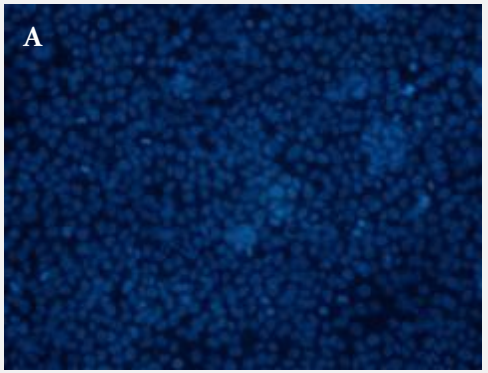



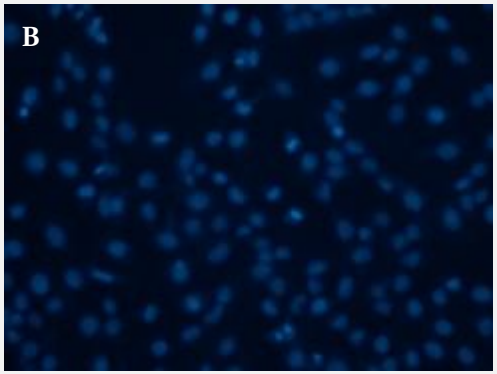



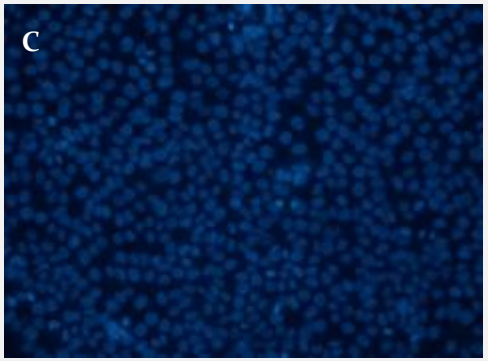

**Images of Calcein-AM/PI double-stained cells**

A: Blank Control Group
B: 30mJ/cm² UVB Irradiation Group
C: 0.25% Salmon Sperm Extract+30mJ/cm² UVB Irradiation Group

In Picture B, the proportion of red fluorescence in stained cells is high with unclear cell contour and many apoptotic cells.



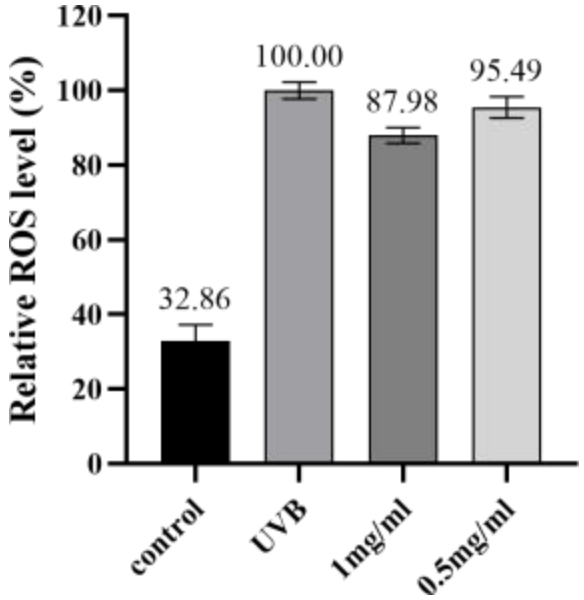




**Images of Hoechst 33342 fluorescent stained cells**

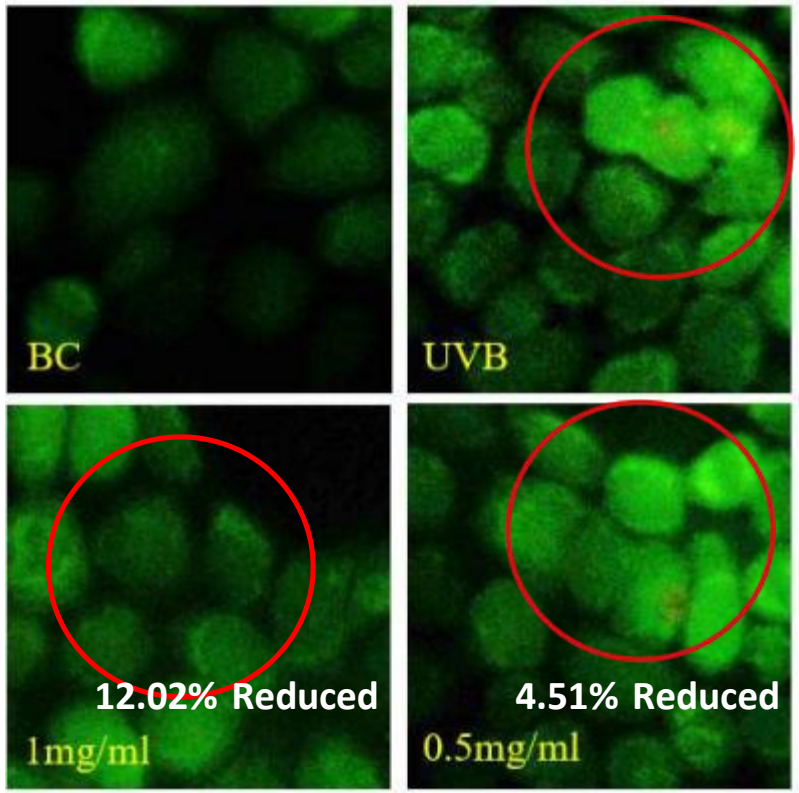
A: Blank Control Group
B: 30mJ/cm² UVB Irradiation Group
C: 0.25% Salmon Sperm Extract+30mJ/cm² UVB Irradiation Group

In picture B, the cell nuclei have a deeper color, many fragments, and more damage.

## Salmon Sperm Extract Protects Against UVB Damage - Reduction of ROS Content



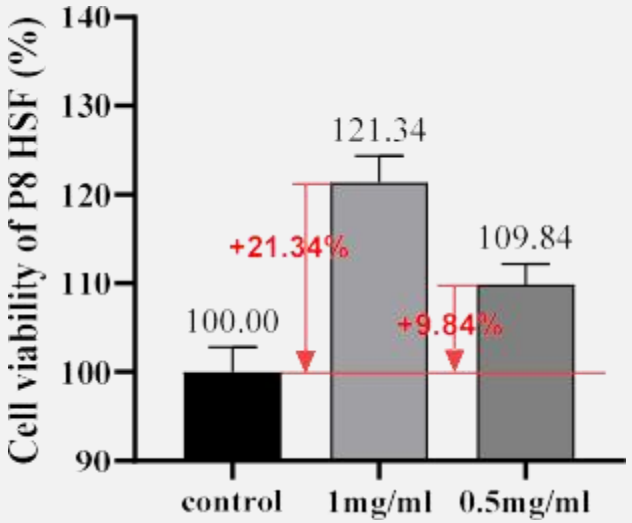

**Effect of salmon sperm extract on ROS production by keratinocytes after UVB induction**



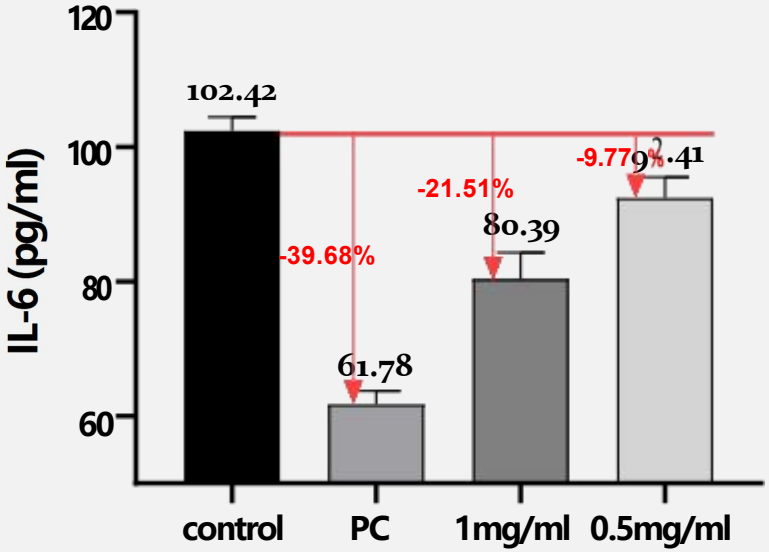

**Note: ROS is marked in green. If the mark is brighter, the content is higher, and the oxidative damage to the cell is more severe.**

## Improve inflammatory response—Significantly inhibits IL-6

**Effects on human primary fibroblasts (P8) viability (CCK8)**

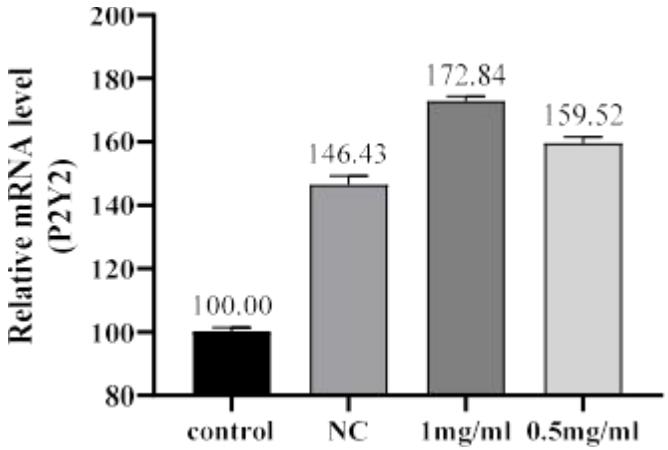



**Effects on IL-6 secretion in human primary fibroblasts (P8)**




**Dual-Swirl A2A™ PDRN can enhance fibroblast activity, inhibit IL-6 secretion, and have anti-inflammatory effects.**

## Promote fibroblast proliferation



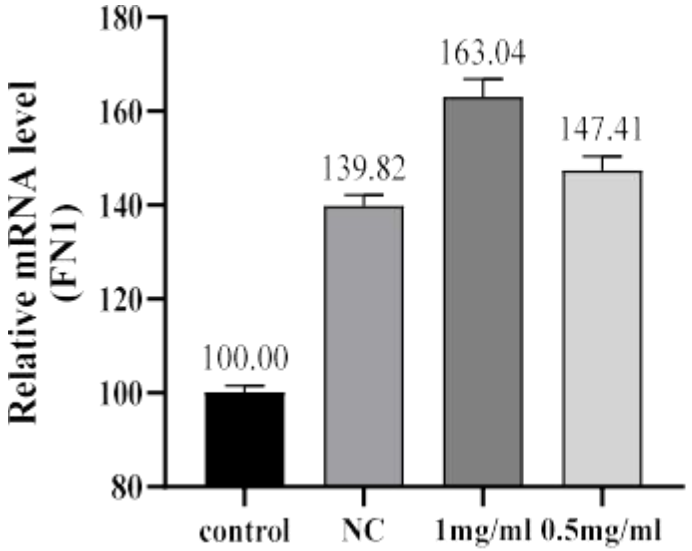

Effects of double-helix A2A™ PDRN on P2RY2 gene transcription in mechanically damaged fibroblasts

Compared with the NC group

- 0.5 mg/ml → ↑
- 8.94% 1 mg/ml →
- ↑18.04%

### P2RY2

Belonging to the P2 receptor family, it is activated by extracellular nucleotides, activates the phosphatidylinositol calcium second messenger system, and promotes fibroblast proliferation, fusion, and secretion of extracellular matrix.




Effects of double-helix A2A™ PDRN on FN1 gene transcription in mechanically damaged fibroblasts

Compared with the NC group

- 0.5mg/ml → ↑5.43%
- 1mg/ml → ↑16.61%

### FN1

**Encoding fibronectin**

Fibronectin participates in cell adhesion and migration, and plays an important role in maintaining the normal structure of the extracellular matrix.

## Promote type I collagen

**Objective: anti-aging**

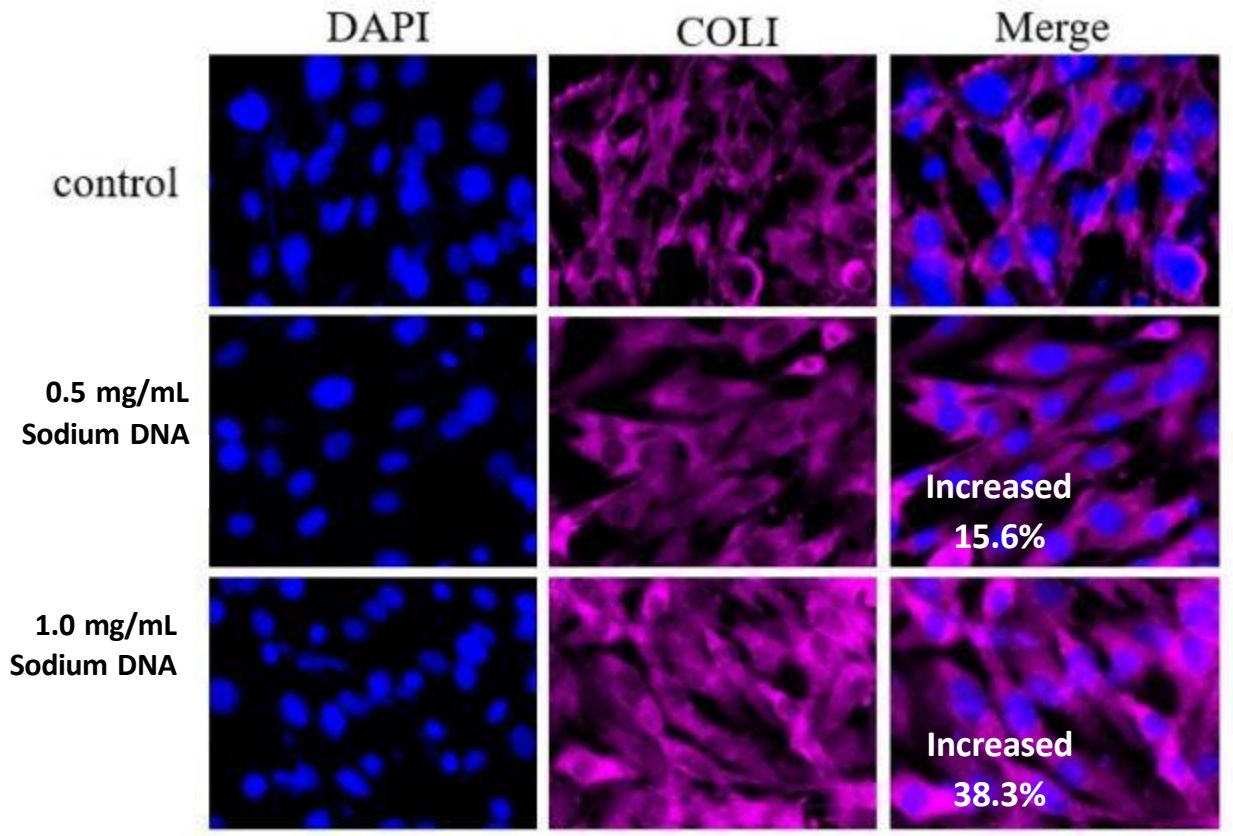
**Cell: human primary fibroblasts (P8)**

**Instrument: inverted fluorescence microscope**

**Test Sample: Double helix A2A ™ PD RN**

**Test groups: Blank, Experimental**

**Test indicator: COL I fluorescence intensity**




**Note: Blue labeling represents cell nuclei, while purple labeling represents type I collagen (COLI).**

## Promote ATP production.

**Objective:Anti-aging efficacy of test samples**

**Cell: human primary fibroblasts (P8)**

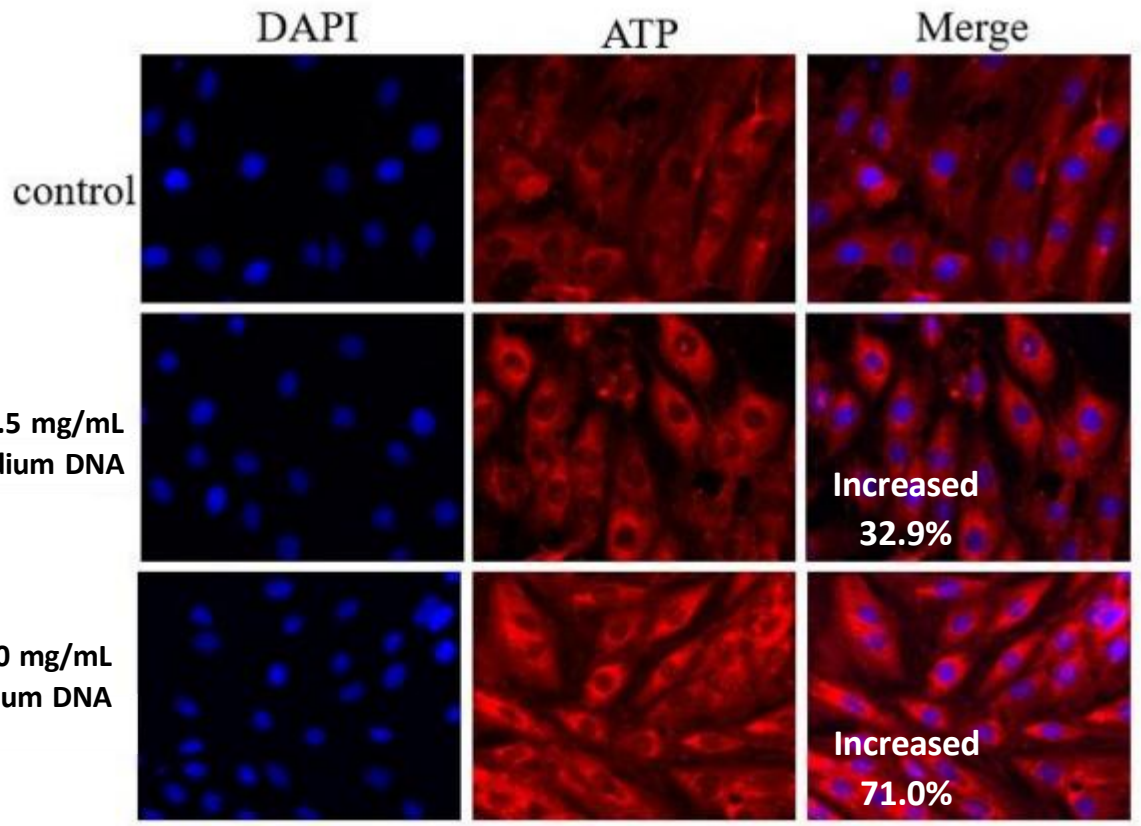
**Instrument: inverted fluorescence microscope**

**Test Sample: Double helix A2A ™ PD RN**

**Test groups: Blank, Experimental**

**Test indicator: ATP fluorescence intensity**

**The brighter the red color, the more ATP it contains, and the stronger the cell repair function.**




**Note: Blue labeling represents cell nuclei, while red labeling represents ATP.**

Reducing exogenous **oxidative stress damage**

## Zebra fish experiment

**Objective:Anti-aging efficacy of test samples**

**Cell： acrylamide-induced zebrafish embryos**

**Instrument： Stereo microscope**

**Test Sample: Double helix A2A ™ PDRN**

**Experimental groups: Blank group, model group, sample group, control group**

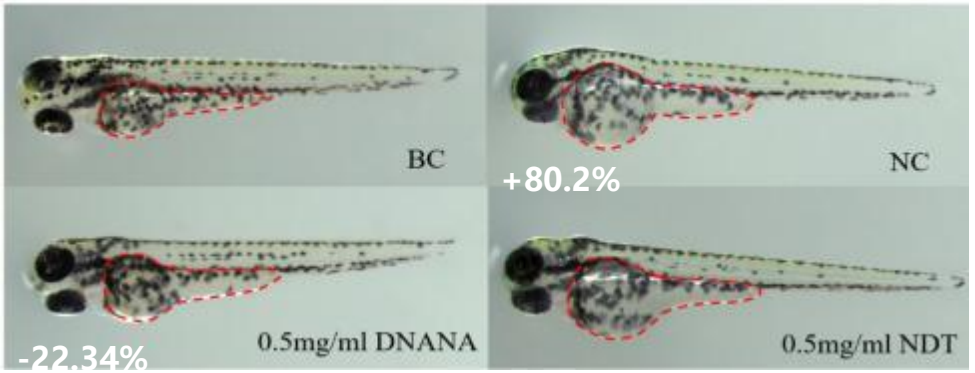
**Detection indicators: Hatching rate, yolk sac area**

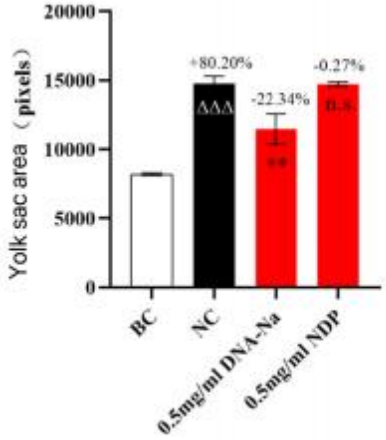
| Experimental Groups | Dosage | 54h Hatching rate (%) | 72h Hatching rate (%) |
|---|---|---|---|
| BC | / | 73.33 | 93.33 |
| NC | / | 16.67 | 56.67 |
| Double helix A2A™ PDRN | 0.5mg/ml | 40.00 | 83.33 |
| Deoxynucleotides(NDP) | 0.5mg/ml | 20.00 | 60.00 |

54h ↑ 140%

72h ↑ 47%

**BC is the blank group, NC is the model group.**




Acrylamide can cause oxidative stress damage to the body, leading to delayed growth and development in zebrafish embryos. By using acrylamide to induce oxidative stress damage in zebrafish embryos, we can explore the effect of the sample on improving the delayed growth and development of zebrafish embryos caused by oxidative stress damage.

## Reduce exogenous oxidative stress damage
## Significantly enhances cellular SOD and CAT activity

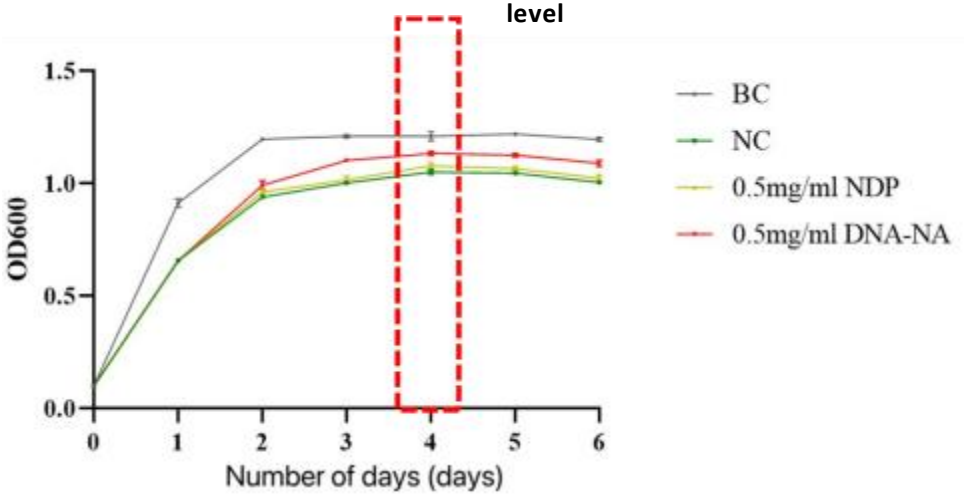
Model: Yeast cells modeled with hydrogen peroxide

Detection instrument: ELISA reader

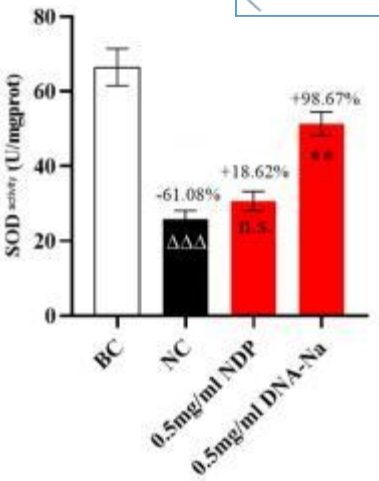
Experimental groups: blank group, model group, sample group, control group

Detection indicators: SOD, CAT activity

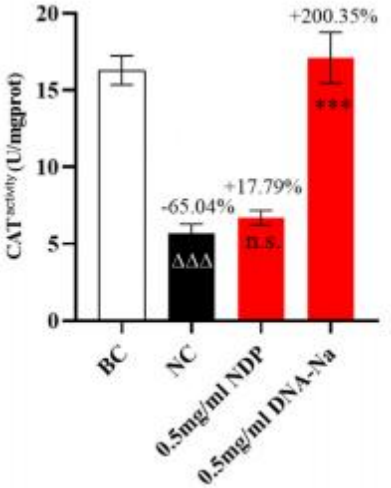
Salmon extract powder group - peak activity level




**SOD ↑ +98.67%**




**CatalaseCAT ↑ +200.35%**



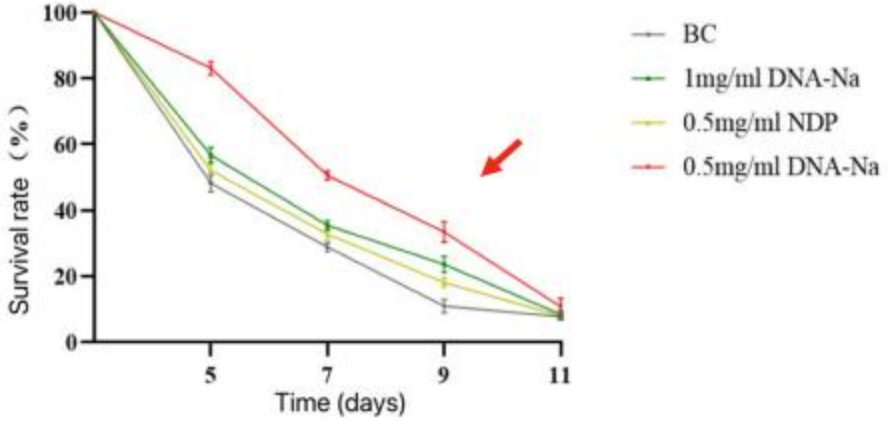
## Extending the chronological lifespan of yeast cells and delaying endogenuous aging.

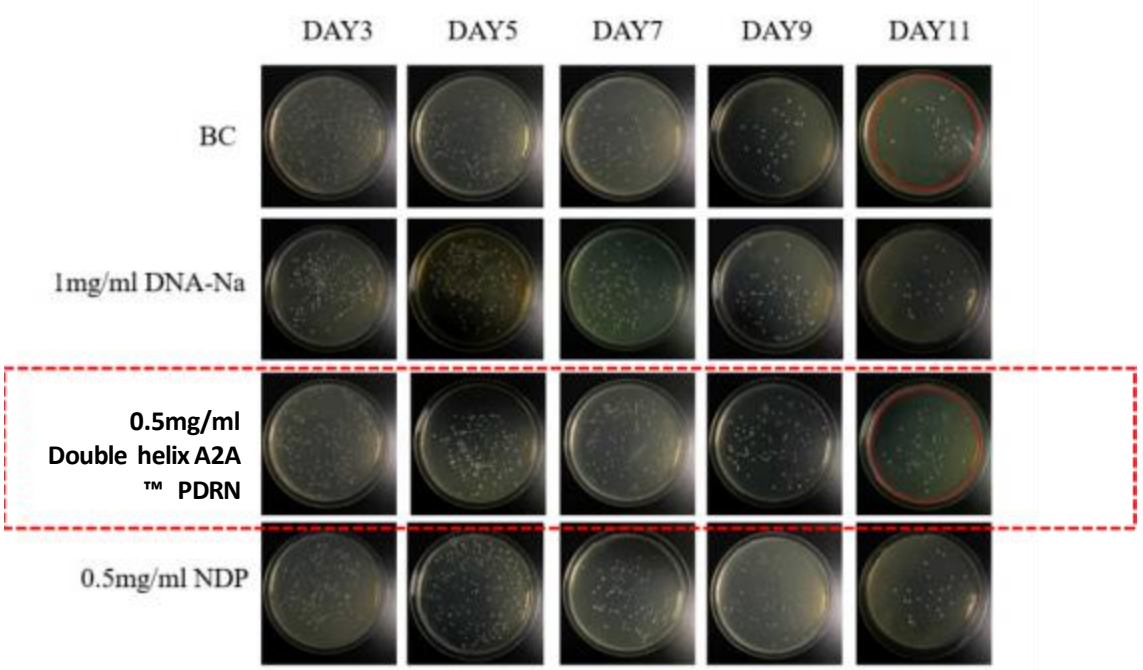
Model: Time-series lifespan analysis of naturally aging yeast

Experimental groups: Blank group, model group, sample group, control group

Detection method: Plate coating method

Detection index: Yeast cell survival rate



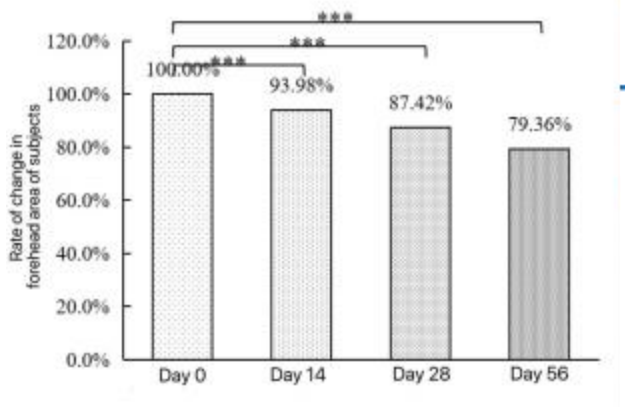



# Human EfficacyTest

**Test method**

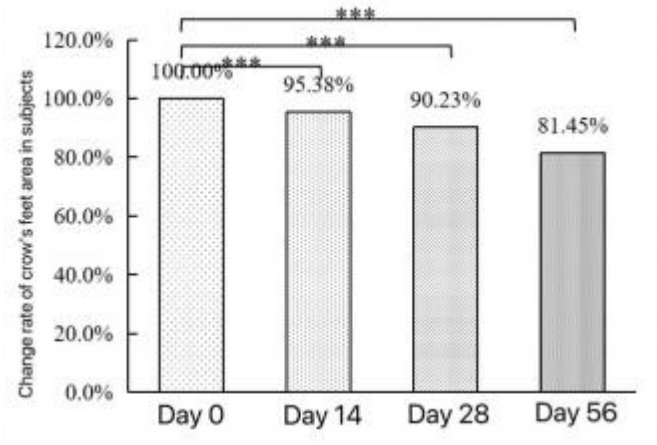
1. Select 30 participants aged 30 – 50 with obvious wrinkles around the eyes, regardless of gender. Brew one tube with warm water daily according to the usage method and use it continuously for 56 days.
2. Detect facial skin moisture retention, glossiness, elasticity, wrinkle resistance, and dermal density
3. 5 g per serving, dual rotation A2A ™ PDRN dosage: 300 mg/part

| Testing Equipment | | Detection Parameters | Inspection Site |
|---|---|---|---|
| Facial Image Analyzer | VISIA-CR | Wrinkle area and proportion wrinkle area (crow's feet, forehead wrinkles) | Face |
| CK Multi-Probe Skin Testing System | Corneometer CM825 | Water content of stratum corneum | |
| | Tewameter TM300 | Transdermal dehydration | |
| | Colorimeter CL400 | Gloss (ITA) | |
| | Cutometer MPA580 | Elasticity (R2) | |
| Skin Ultrasound Diagnostic Device | Ultrascan UC22 | Dermal density | |

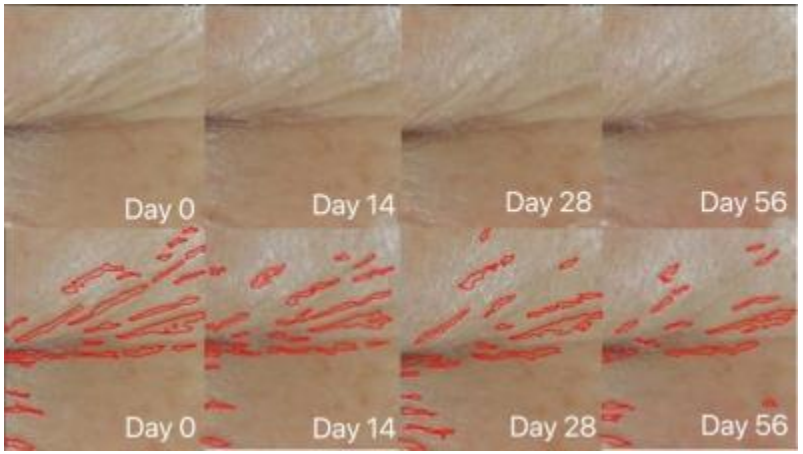


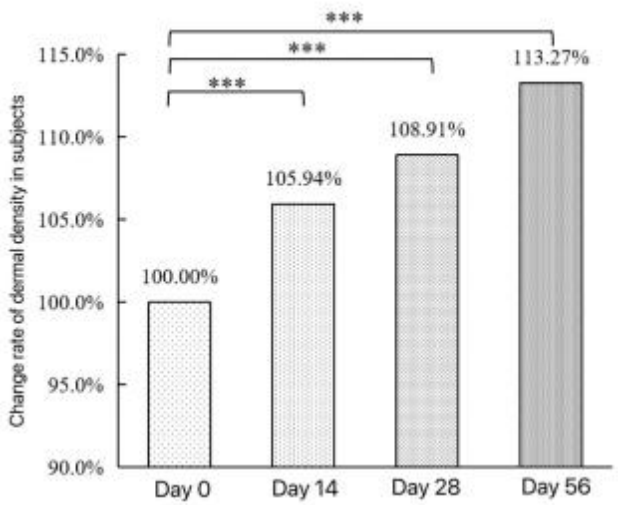

The area ratio **of the crow's feet decreased by 18.55%↓**

**The area ratio of forehead wrinkles decreased by 20.64%↓**

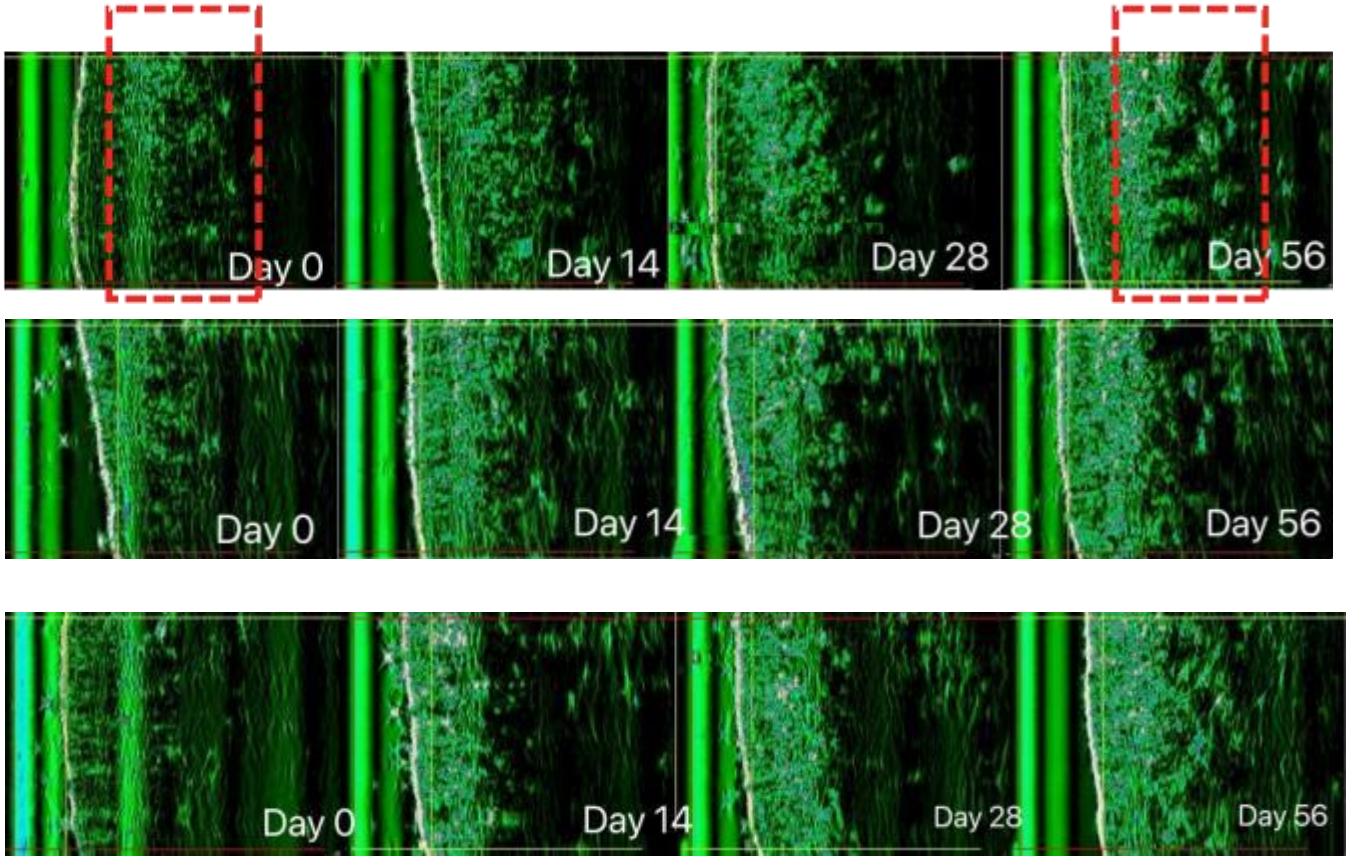









**The collagen density in the dermis increased by 13.27%↑**



# K Summary of Testing Items and Results

| Test Parameters | Point in Time | Rate of Change | Significance Analysis (Compared to before taking) | Parameter Description |
|---|---|---|---|---|
| Water content of stratum corneum | Day 14 | +6.09% | *** | An increase in the measured value indicates an improvement in the moisture content of the stratum corneum of the skin. |
| | Day 28 | +11.39% | *** | |
| | Day 56 | +24.38% | *** | |
| Transdermal dehydration | Day 14 | -8.77% | *** | The decrease in measurement value indicates an improvement in transdermal dehydration of the skin. |
| | Day 28 | -10.79% | *** | |
| | Day 56 | -15.31% | *** | |
| Gloss (ITA°) | Day 14 | +5.24% | *** | An increase in measurement value indicates an im sk in gplisn (Ti°) |
| | Day 28 | +12.16% | *** | |
| | Day 56 | +23.72% | *** | |
| Elasticity (R2) | Day 14 | +6.01% | *** | An increase in measurement value indicates an improvement in skin elasticity (R2) |
| | Day 28 | +13.89% | *** | |
| | Day 56 | +18.68% | *** | |

## FORDAYS Natural DNA Collagen Jelly

| | |
|---|---|
| Ingredient | sugar (sucrose), hydrolyzed collagen (derived from fish scales), salmon milt extract (containing DNA), torula yeast extract (containing RNA), shark cartilage extract (containing chondroitin) etc. |
| Key Ingredient Addition | Salmon Milt Extract 250mg (DNA 72mg) per sachet (15g) |


- Natural DNA Collagen (Nucleic Acid Drink) is the main product of Fordays, with a total sales volume of more than 70 million sachets. The product focuses on nucleic acid, a nutrient that exists in human cells and is beneficial to health and youth, and since its launch in December 1999, after nine improvements, it has been the No. 1 seller of nucleic acid supplements in Japan for more than 10 consecutive years, with a market share of 93.5%.


## Kobayashi – DNA Tablet

| | |
|---|---|
| **Ingredient** | salmon milt extract (containing DNA ), yeast extract (containing RNA), etc. |
| **Key Ingredient Addition** | Each tablet contains approximately 0.28 g of DNA, 3 tablets per day |


## DHC - Nucleic Acid (DNA) Tablet

| | |
|---|---|
| **Ingredient** | salmon milt extract (containing DNA ), yeast extract (containing RNA), etc. |
| **Key Ingredient Addition** | Each tablet contains approximately 0.2 g of DNA, 3 tablets per day |


## Melaleuca DNA Nucleic Acid Beverage

| | |
|---|---|
| Raw material | Salmon milt extract (containing DNA), yeast extract (containing RNA), GABA, etc. |
| Key ingredient addition amount | Each cup contains approximately 1 g of DNA; one cup daily. |


## Vita More Nucleic acid fucoidan solid beverage

| | |
|---|---|
| Raw material | Salmon milt extract (containing DNA), seaweed extract fucoidan, etc. |
| Key ingredient addition amount | Each sachet contains approximately 0.5 g of DNA. Take one sachet daily. |

| Specifications Items | Specifications |
|---|---|
| Appearance | White to pale yellow powder |
| Loss on drying | Below 7.0% |
| Nitrogen content (on a dry basis, %) | ≥12 |
| Phosphorus content (on a dry basis, %) | ≥8 |
| DNA content | ≥80% |
| Methyl mercury (mg/kg) | < 0.5 |
| Inorganic Arsenic (mg/kg) | < 0.1 |
| Aerobic Plate Count (CFU/g) | < 1000 |
| Coliforms (MPN/g) | < 0.3 |

Shelf life: 2 years. Raw material used: Dual-spin A2A™ PDRN

| Test | Conclusion |
| --- | --- |
| High temperature test | A 0.5% salmon extract powder solution is stable at 88°C for 30 minutes. |
| Ion stability | A 0.5% salmon extract solution is stable for Ca, Zn, Na, and Mg ions; however, it causes a color change, solution stratification, and the formation of a yellow-brown flocculent precipitate when exposed to Fe ions. |
| pH stability | A 0.5% salmon extract powder solution is stable at pH 4 – 8, but becomes turbid at pH 2 – 3. |

Shelf life: 2 years. Raw material used: Dual-spin A2A™ PDRN