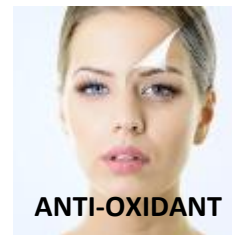
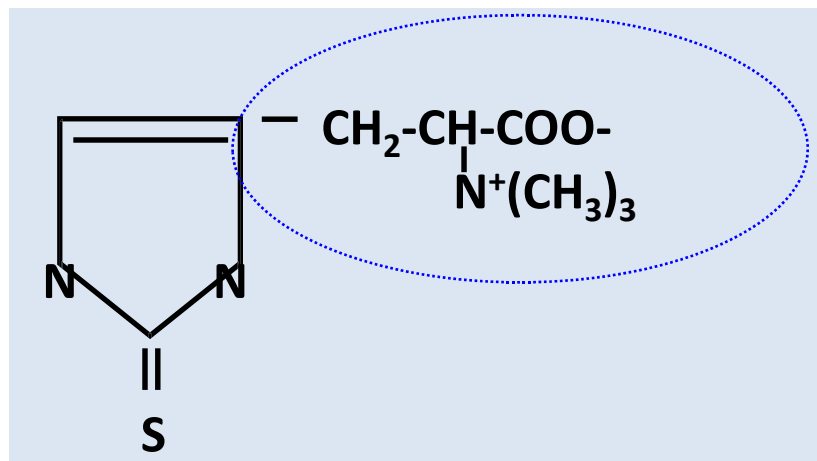


BARNET



THIOTAIN[®]



The Desirable Anti-oxidant

- Neutralizes Ozone
- Colorless – Odorless

CONCEPT

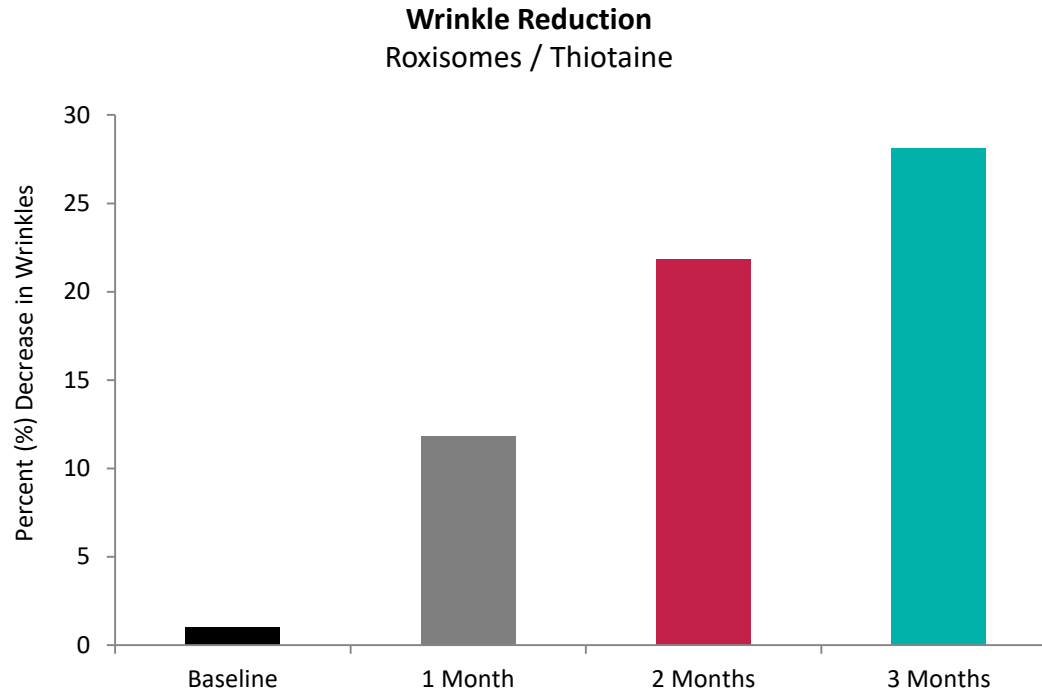
Cells need energy in the form of ATP. To create ATP mitochondria need fatty acids. With energy production come free radicals.

A car driving full speed without cooling fluid does not go far. Similarly, sparkles (in the form of free radicals) damage the mitochondrial membrane during ATP production. Cells need energy while quenching free radicals.

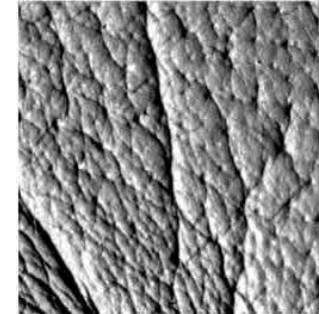
The solution is Thiotaine (Ergothioneine), a molecule with two functional groups: (1) to transfer fatty acids in the mitochondria, and (2) to act as a strong anti-oxidant with two extra characteristics.

- Thiotaine is odorless and colorless
- Thiotaine is desirable by the cells which have specific gates for this molecule.

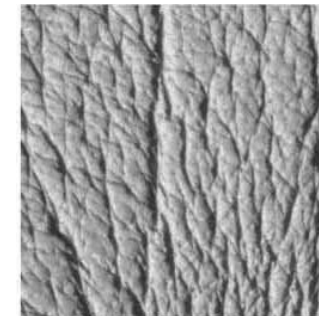
Effect of Roxisomes and Thiotaine on reducing skin wrinkles



Baseline



2 Months Treatment

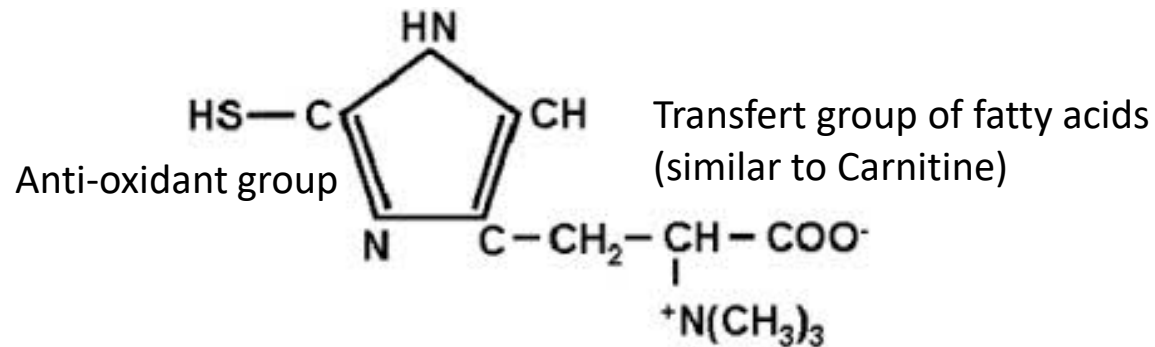


Protocol:

- 21 subjects (female), Age 30-65
 - Subjects contained visible wrinkles in their outer canthus area (crows feet around the eyes)
- Formula containing 1% Roxisomes and 1% Thiotaine
- Formula used on full face, twice a day
- 3 months
- Images of the outer canthus area captured using imaging system.
- Photographs analyzed for fine lines and wrinkles using image analysis software

THIOTAININE (ERGOTHIONEINE)

Two functional groups

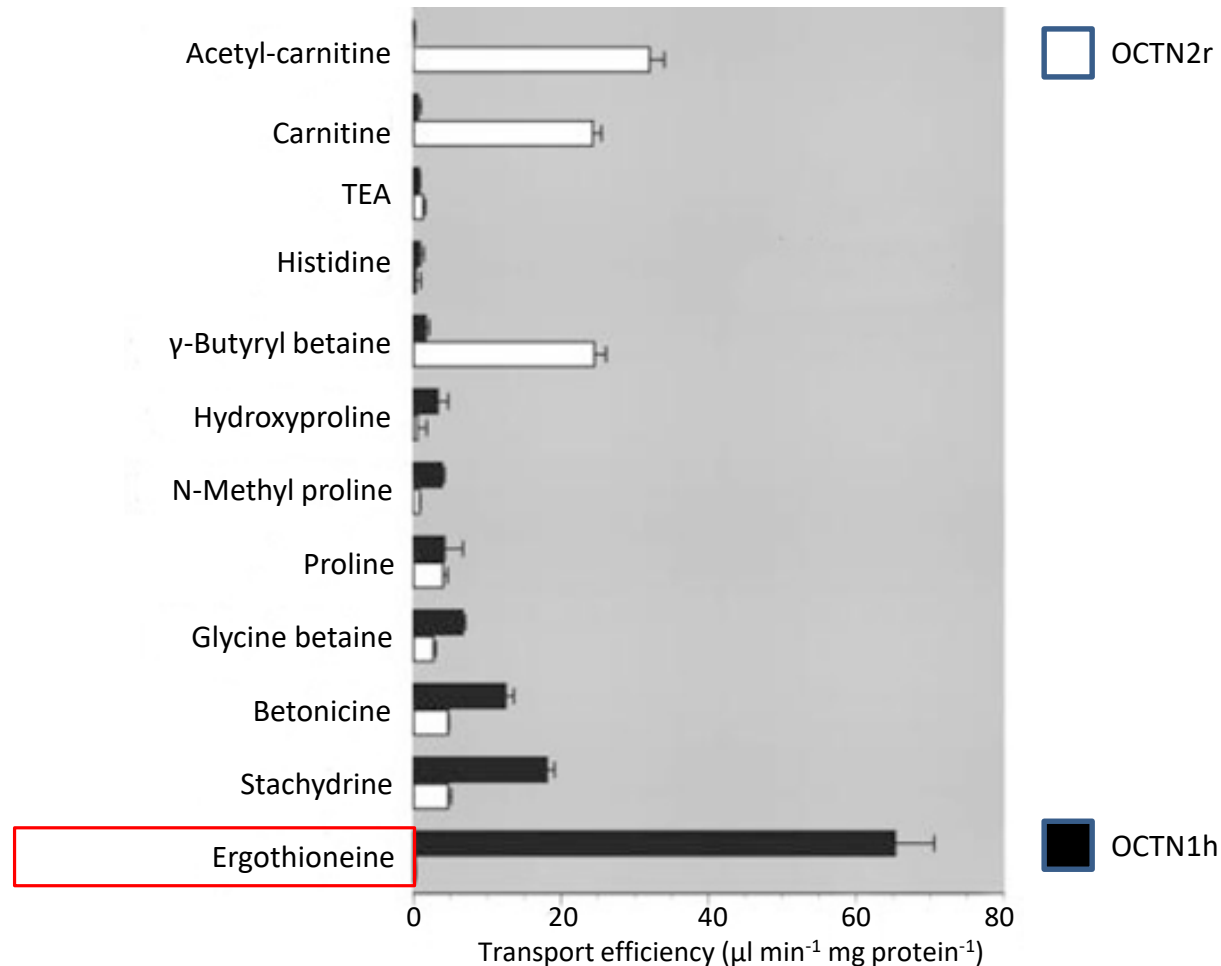


Ergothioneine is an amino acid which we eat from dietary botanicals such as grains or vegetables. It will concentrate in the eye, and in red blood cells to protect hemoglobin (the carrier of oxygen). Ergothioneine is unmetabolized and slowly excreted.

Resistant – Colorless - Odorless

ERGOTHIONEINE IS DESIRABLE TO HUMAN SKIN CELLS

There are transporters in the cell membranes called OCTN. Different types of OCTN transport different molecules. OCTN1 works for Ergothioneine.

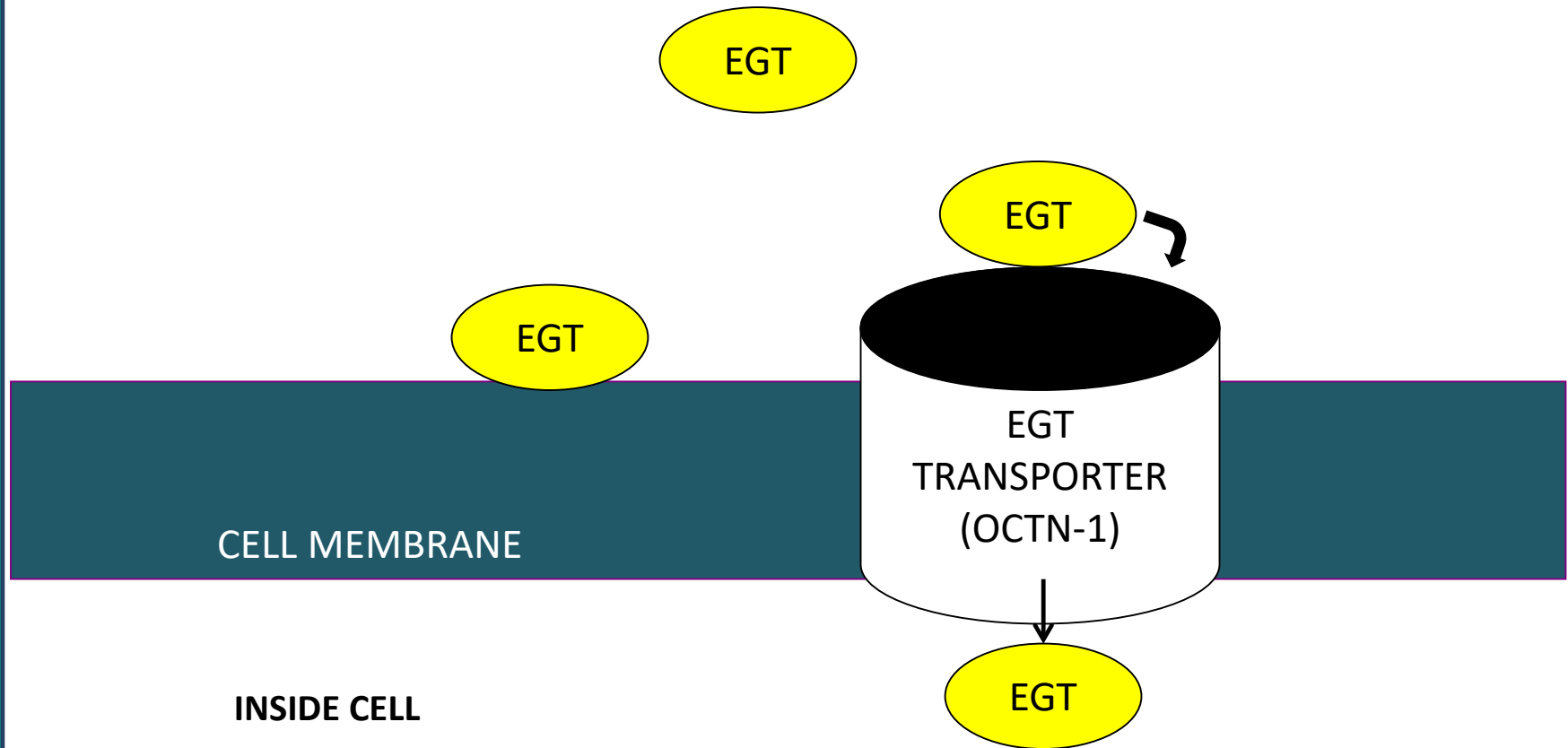


Gründemann D et al. PNAS 2005; 102:5256-5261

Markova et al., Free Radical Biology & Medicine 46 (2009) 1168-1176

OCTN1: THIOTAININE TRANSPORTER

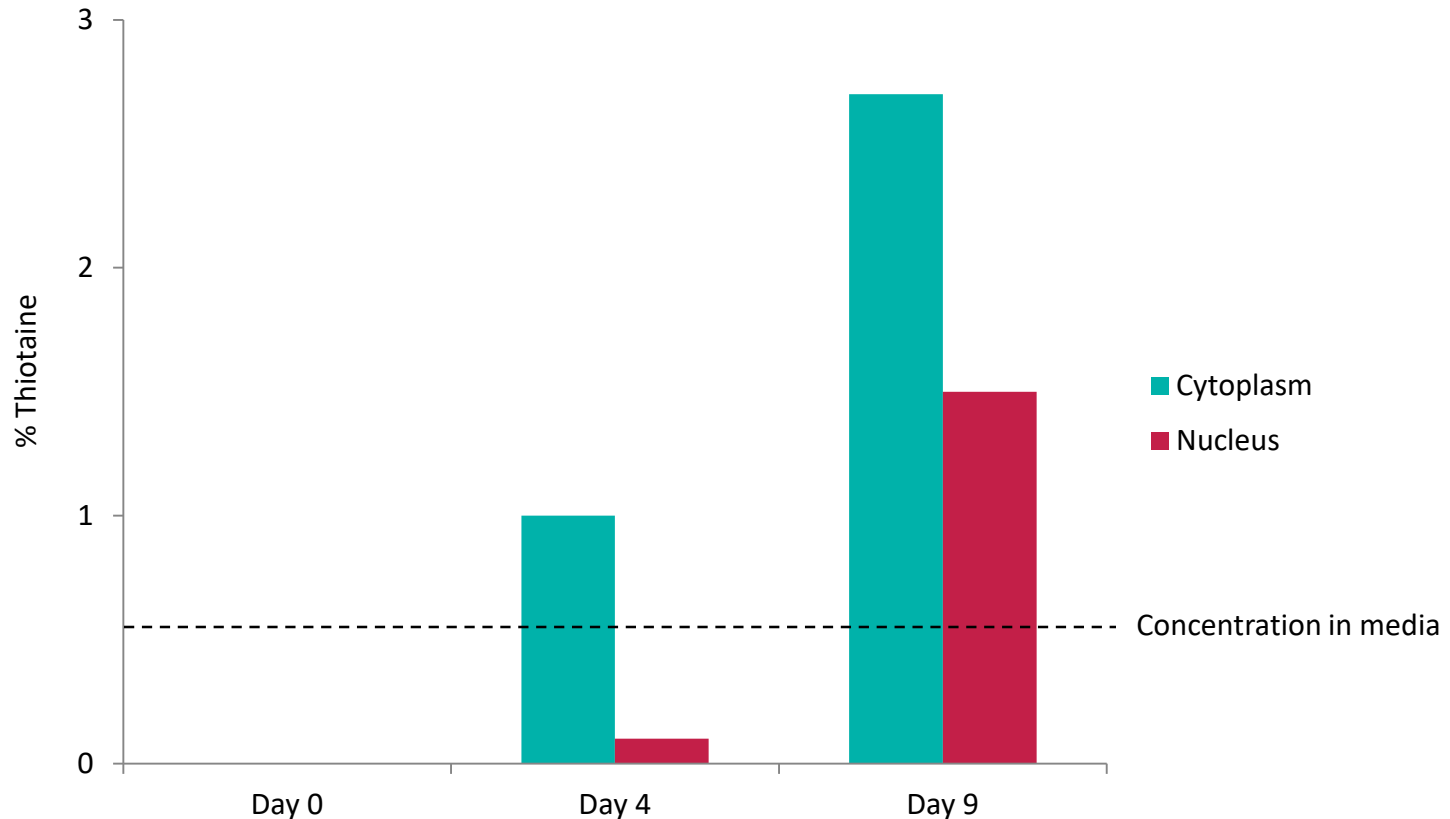
OCTN1 is in the membranes of fibroblasts, keratinocytes, melanocytes and in the mitochondria and the nucleus.



OCTN1 is the newly discovered transporter of EGT.

ACCUMULATION IN CELLS

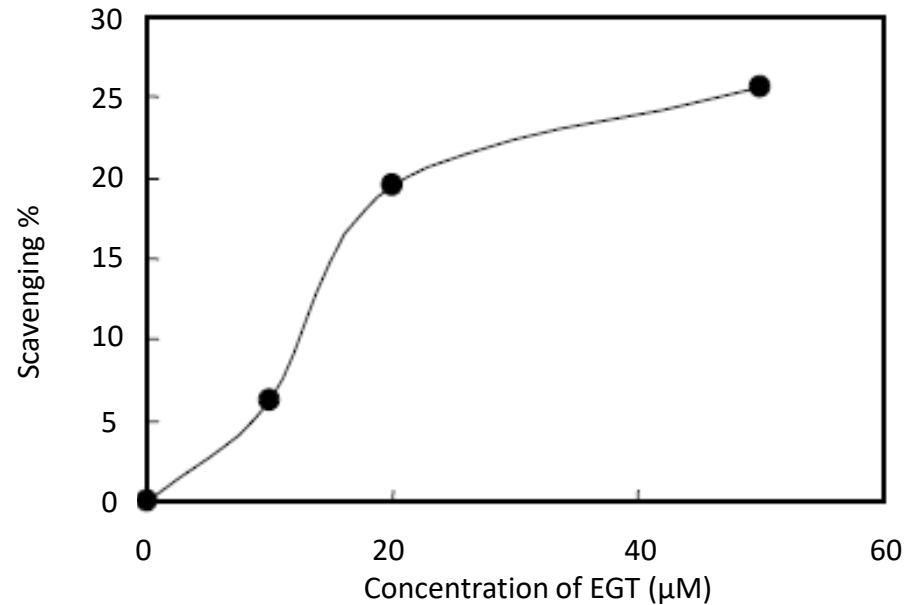
Normal human fibroblasts supplemented with 0.5% Thiotaine. Cells collected, separated into nucleus and cytoplasm and assayed for concentration.



The chart shows the assimilation of Thiotaine by the cells.
EGT can also accumulate in keratinocytes and melanocytes using OCTN1.

THIOTAININE = SUPER ANTI-OXIDANT

Superoxide Anion
From hypoxanthine-xanthine oxidase

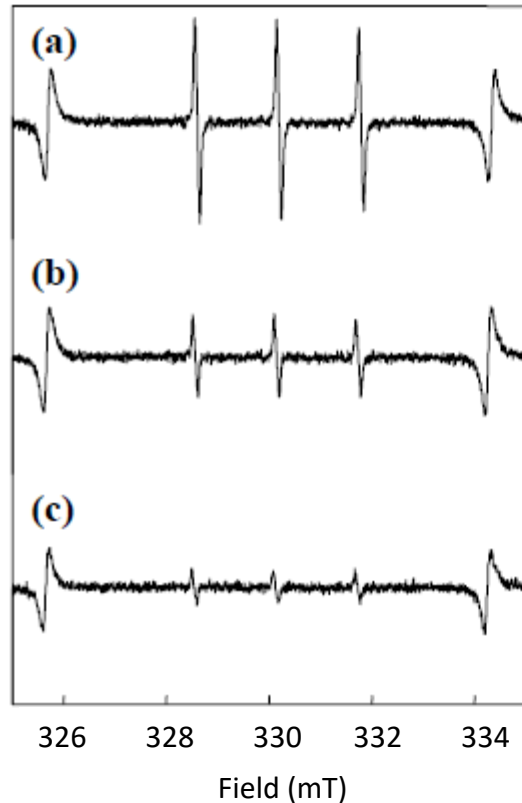


Obayashi et al., J. Cosmet. Sci. 56:17, 2005

With increasing concentration, EGT is increasingly efficient at catching the superoxide anion.

THIOTAININE = SUPER ANTI-OXIDANT

Singlet Oxygen Spin Trapping



Control

Singlet oxygen is free

EGT 10 mg/ml

EGT 20 mg/ml

A flat line means
that singlet oxygen
is trapped.

Obayashi et al., J. Cosmet. Sci. 56:17, 2005

THIOTAININE = SUPER ANTI-OXIDANT

Stronger than:

➤ Coffeeberry – ORAC score 4X higher

(61,000 v 15,000) Brunswick Laboratories

➤ Idebenone and CoQ10 Dong et al., J. Cosmet. Dermatol. 6:183, 2007

➤ Vitamin C

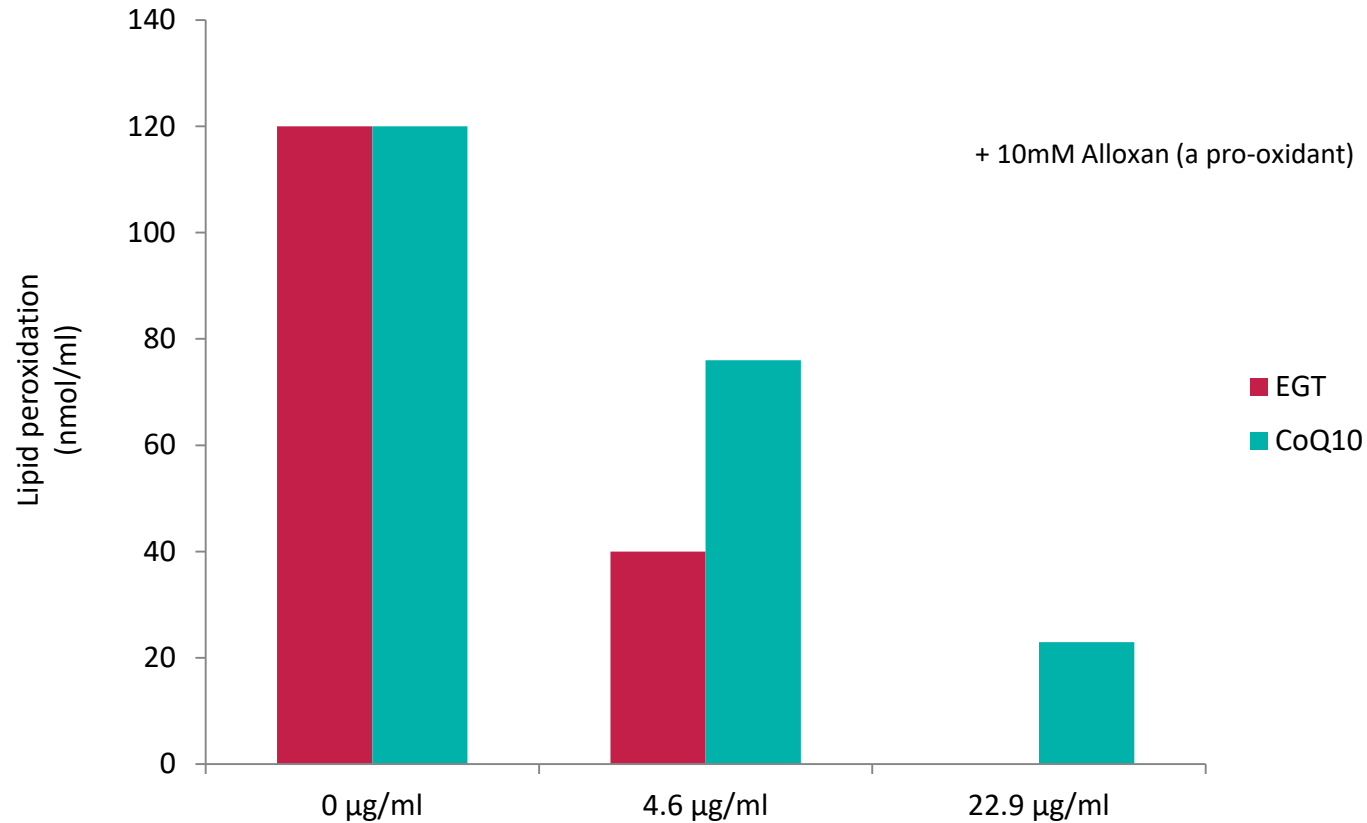
He et al., Skin Pharma Physiol. 18:183, 2004; Obayashi et al., J. Cosmet. Sci 56:17, 2005

➤ Trolox (Vitamin E) Franzoni et al., Biomed. Pharmacother. 60:453, 2006

➤ Glutathione Aruoma et al., Biochem. Biophys. Res. Comm. 231:389, 1997

THIOTAIN: BETTER THAN CoQ10

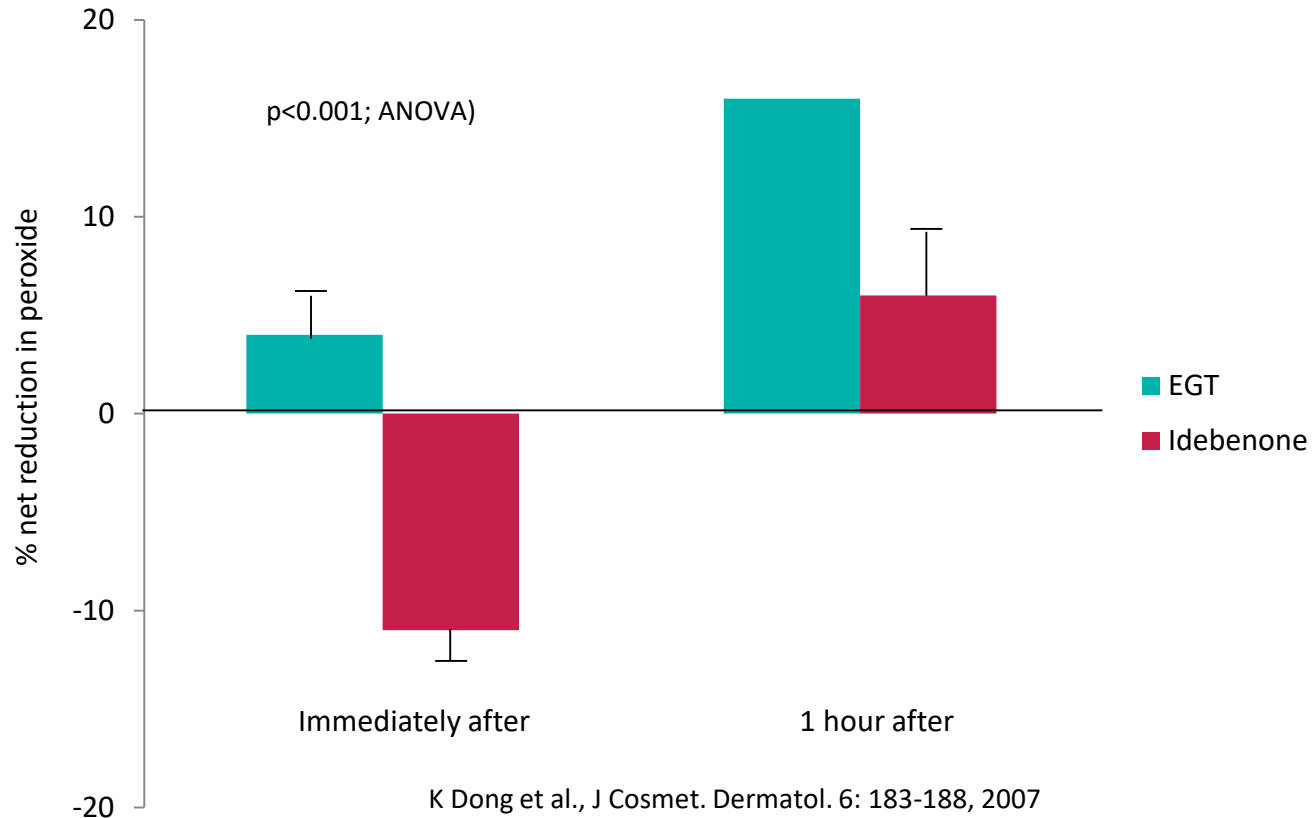
Peroxidation of empty liposomes with Alloxan



EGT at 22.9 µg/ml stops peroxidation. CoQ10 does not.

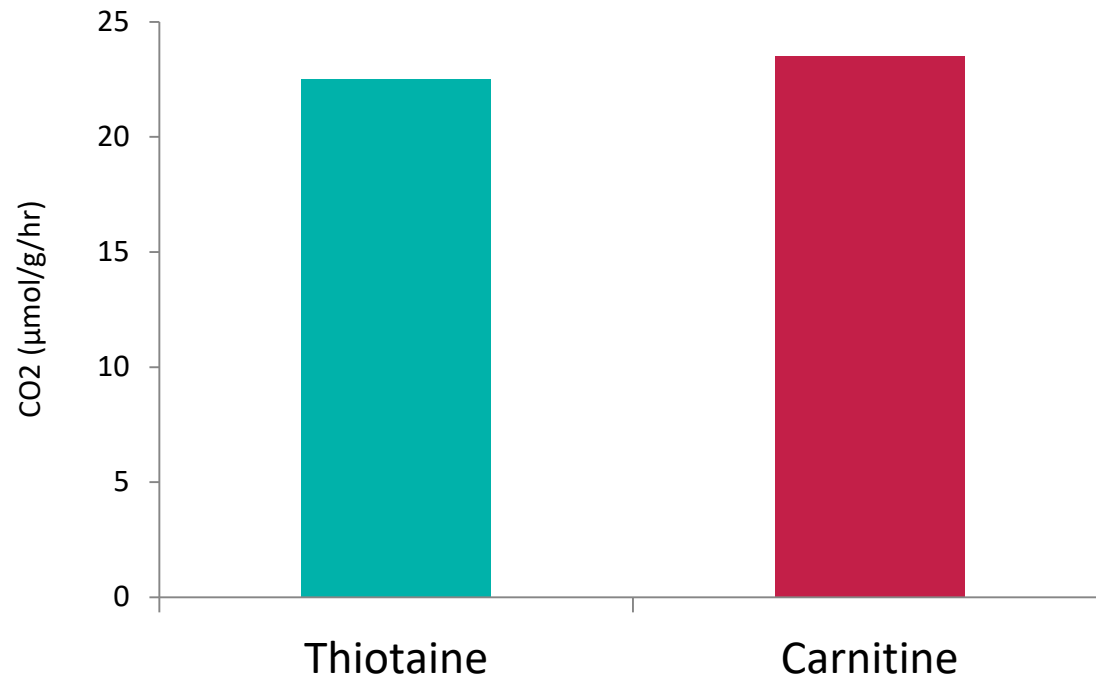
THIOTAININE: BETTER THAN IDEBENONE

Oxidation of Rhodamine 123 in fibroblasts irradiated
with Solar simulating UV (100 Kj/CM²).
10 µm of EGT or Idebenone



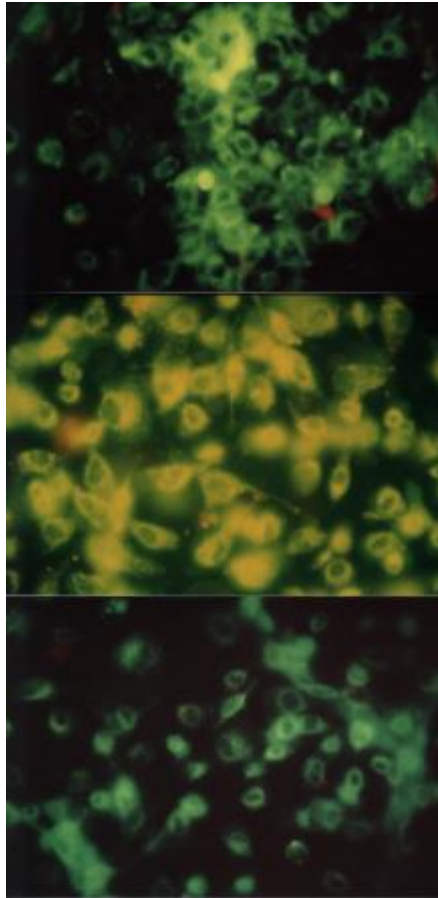
The chart shows the superiority of EGT over Idebenone for UV protection.

SKIN ENERGY SUPPLEMENT: “CARNITINE-LIKE”

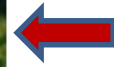


Both Carnitine and Thiotaine can supply fatty acids into mitochondria. The fatty acids are burned by oxygen to release CO₂ and ATP. This graph shows that they are equivalent. However, only Thiotaine controls the free radicals and protects the mitochondria.

THIOTAINES PROTECTS THE MITOCHONDRIA



Keratinocytes stained with mitochondrial dye JC-1 are green.



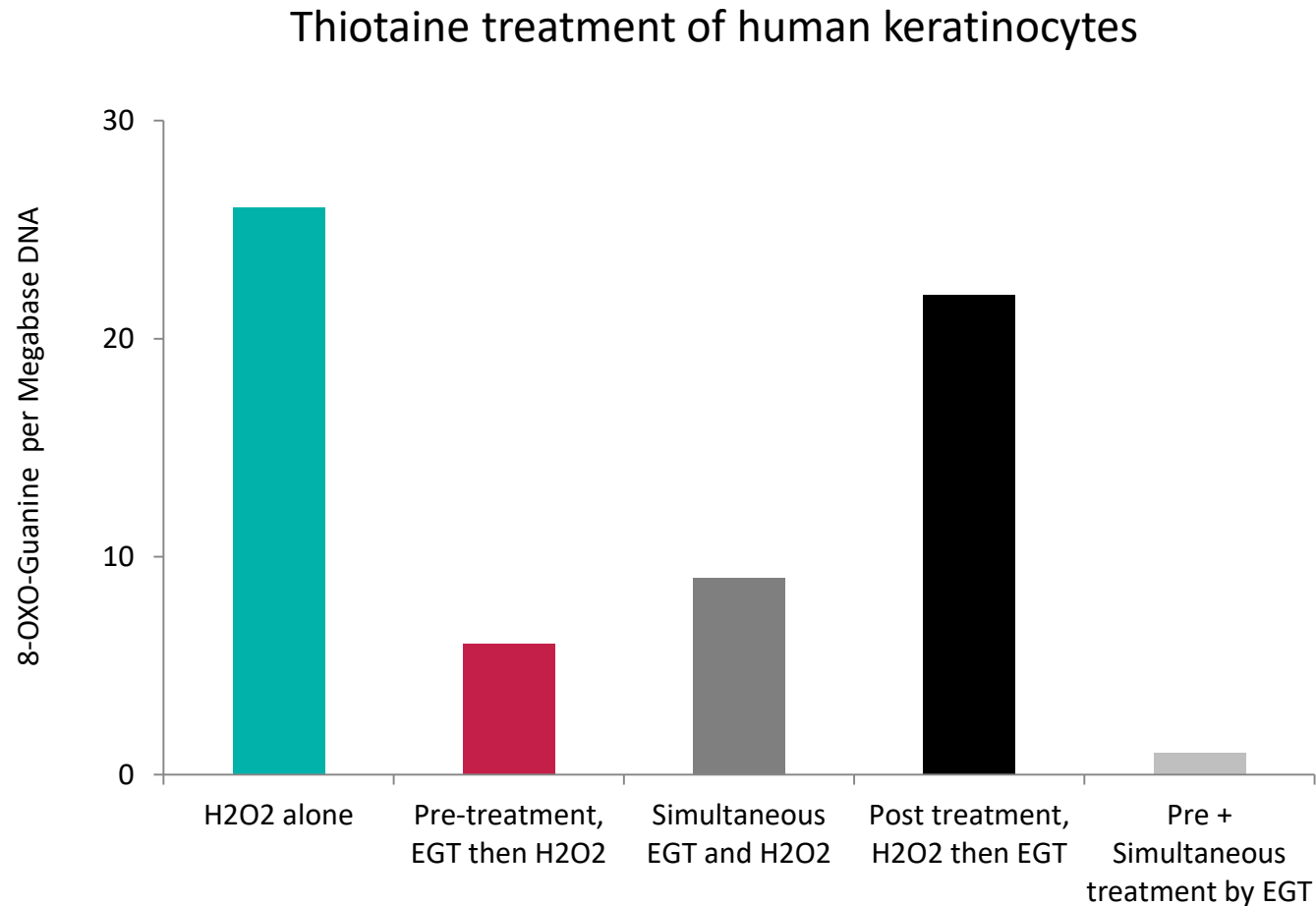
Cells treated with alloxan, killing mitochondria with oxygen radicals, turn the dye yellow.



Cells treated with Thiotaine and alloxan are protected and remain green.

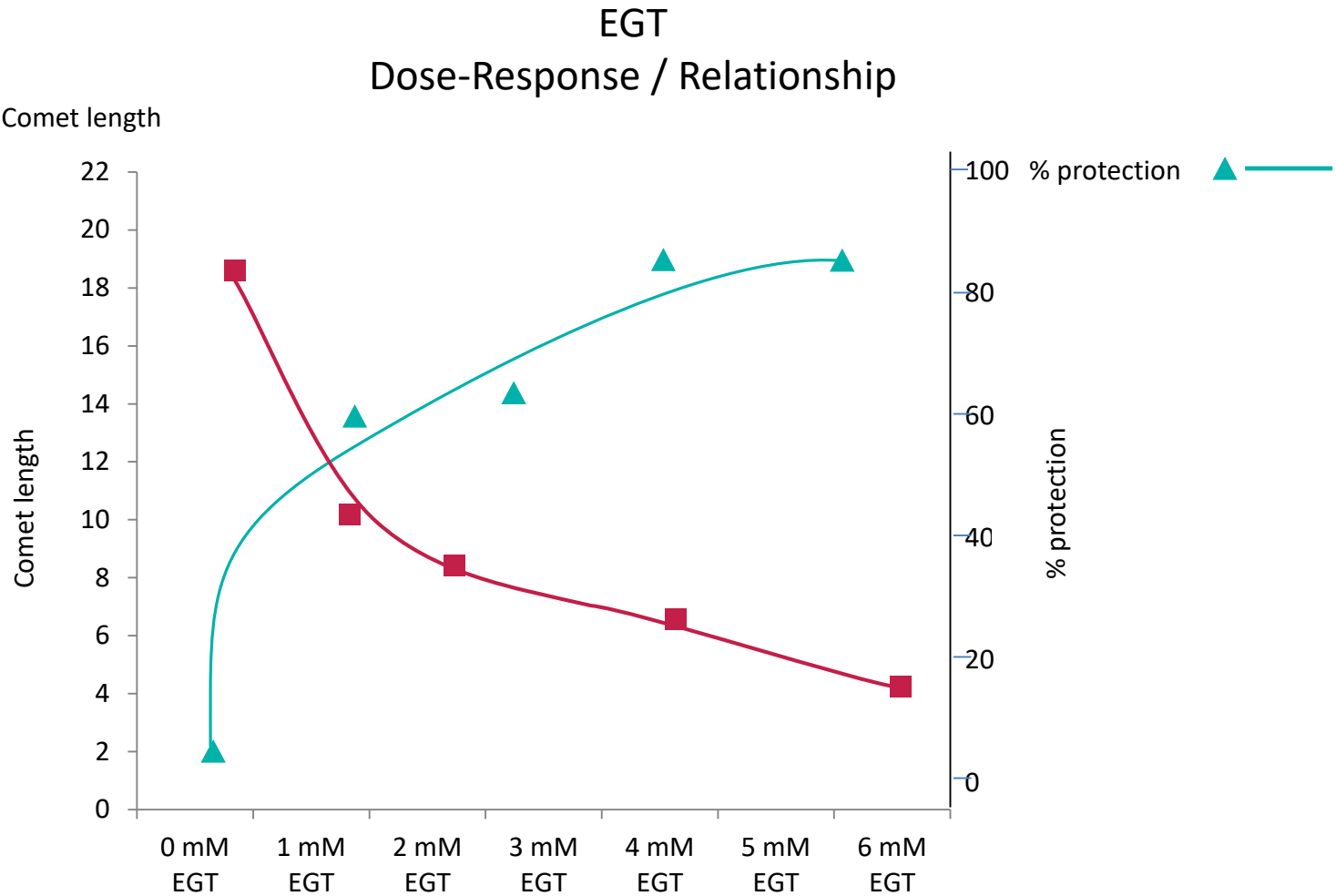
Thiotaine, an energizing molecule, protects the membrane integrity of mitochondria against free radicals induced by alloxan.

THIOTAININE PROTECTS AGAINST OXIDATIVE DNA DAMAGE



8oG is a damage on DNA, increased by pollution.

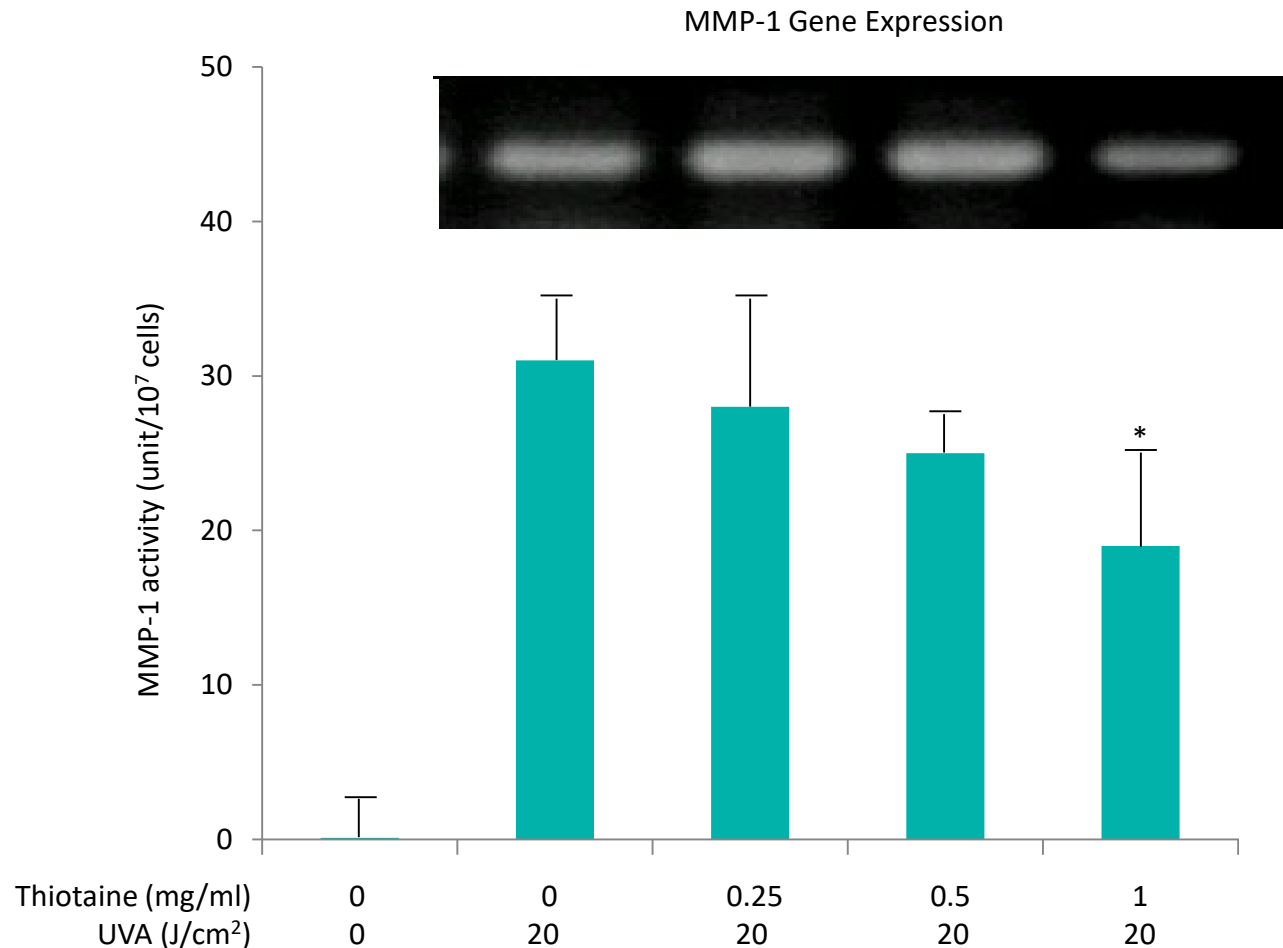
THIOTAIN PROTECTS DNA AGAINST UV-A



Graph inspired by Decome et al., J. Photochem. Photobiol. 79:101, 2005

The more EGT is used, the more the DNA is protected.

THIOTAININE REDUCES MMP-1 EXPRESSION INDUCED BY UV-A

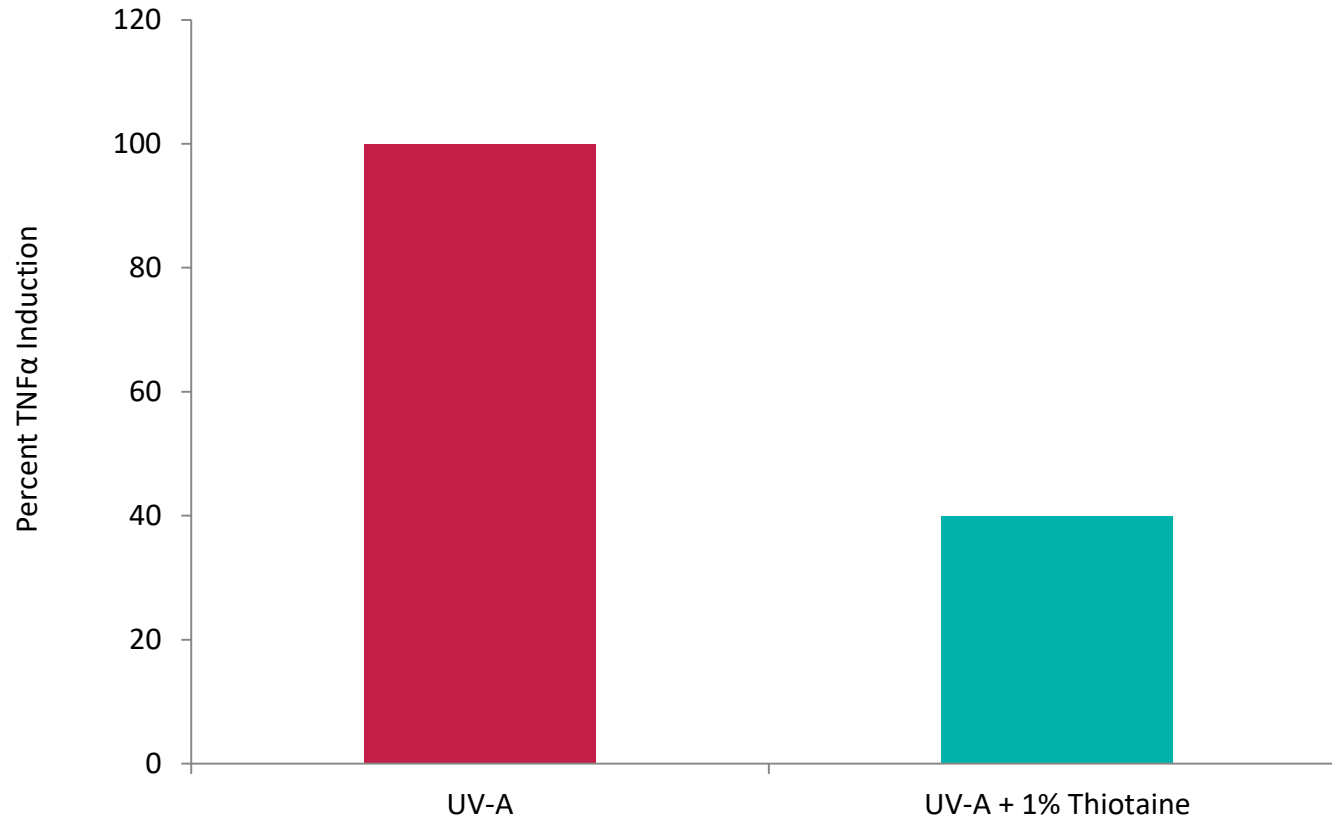


Thiotaine reduces MMP-1 expression in a dose dependent manner.

Human fibroblasts + UVA (20 J/cm²) + Thiotaine
MMP-1 activity assayed after 24 hours, in quadruplicate
Significance: *p<0.05, **p<0.01

THIOTAININE REDUCES STRESS SIGNALS

Photoaging: UV → TNFα → MMP-1 → Wrinkles



Obayashi et al., J. Cosmet. Sci. 56:17, 2005

Thiotaine reduces the release of the stress signal TNF-α.

CONCLUSION

Thiotaine:

- Is colorless and odorless
- Is a super anti-oxidant
- Protects mitochondria
- Shields against ozone
- Protects against oxidative stress and pollution
- Protects DNA against UV-A
- Reduces MMP-1
- Reduces stress signals

THIOTAININE[®]

INCI Name: Water (and) Ergothioneine

Preservative: Phenoxyethanol

Suggested Use Level: 1.00%

Formulation Guidelines: Thiotaine is a colorless, clear liquid with a characteristic odor. Thiotaine is water soluble and should be added to the cooling phase. The recommended pH range is 4.0-7.0.

Global Compliance and Product Features:

For additional information please contact technical@barnetproducts.com.

COUNTRY	COMPLIANCE
AUSTRALIA	Exempt
CANADA	Listed rICL
CHINA	Listed IECIC
EU	<1 MT Exempt

