

# thermostressine™

*No signs of stress in skin*



## Prevents skin from jet-lag



### Description

Tetrapeptide that increases HSP70 (Heat Shock Protein) levels in skin providing a protective shield, that confers cells a stress tolerance against everyday challenges and stressful stimuli. It helps skin to be more relaxed with a more vital appearance.

### Appearance

Transparent solution containing 0.05% active ingredient.

### INCI

Glycerin, Water (Aqua), Acetyl Tetrapeptide-22.

Preservative free.

### Properties

HSP may play a role in aging as a defense mechanism to maintain protein homeostasis. **thermostressine™** helps cells to fight stress and increasing HSP70 levels also prevents damage from further stress exposure.

### Applications

**thermostressine™** can be incorporated in cosmetic formulations such as emulsions, gels, serums to fight stress and treat fragile, tired and dull skin.

**Dosage** 2-5%

## Protects cells against daily stress

### Science

Stress is a very common situation in today's society and the skin suffers it as it is the foremost interface between the environment and the body. Cellular stress may originate from a variety of stressful situations including environmental (extreme weather, heavy metals, UV radiation, pollution), physiological (oxidative injury, metabolic and osmotic stress, lack of sleep, jet-lag) or psychological (daily stress and emotional shocks) stimuli.

Proteotoxic stress within the cell, which is the intracellular accumulation of abnormally folded proteins, can also come from transcriptional and translational errors together with a decreased capacity of the proteasome. Responses to stress are diminished with aging.

**thermostressine™** stimulates HSP70 synthesis and therefore Hsp72, which is the inducible form of the family. An increase in this protein enhances stress tolerance to the skin. Proteotoxic stress can be modulated and cellular damage prevented, especially when the skin is repeatedly challenged or when aging impairs the stress response of the skin.

### Solubility

Water soluble.



## In vitro efficacy

### 1. HSP70 EXPRESSION WITHOUT PRIOR STRESS

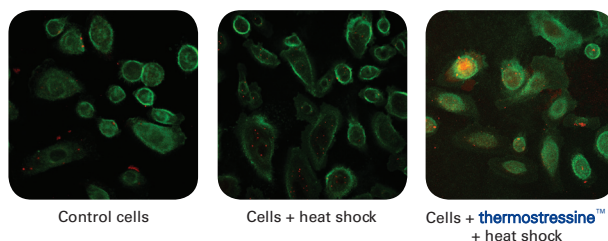
The ability of **thermostressine™** to induce the expression of HSP70 in human keratinocytes was determined by an ELISA assay. A thermal shock (44 °C, 30 minutes) and incubation with the proteasome inhibitor MG-132 were used as positive controls.

### 2. CELL PROTECTION AGAINST STRESSFUL STIMULI

#### • Thermal shock

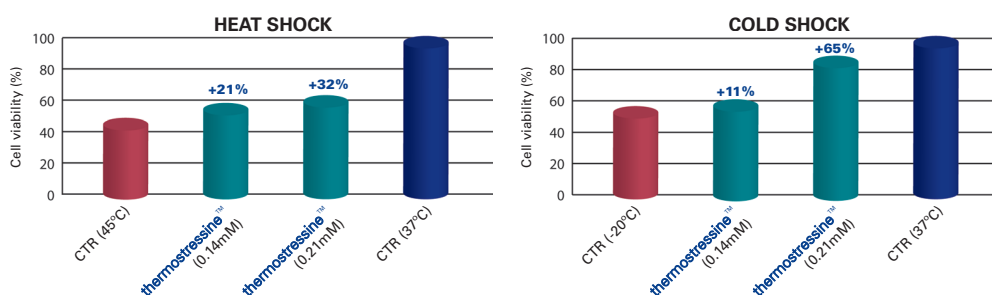
##### a) HSP70 induction

Human primary keratinocytes were incubated with 0.2mM **thermostressine™** and submitted to a 44 °C heat shock for 30 minutes. Immunocytochemistry was performed to evaluate HSP70 stimulation.



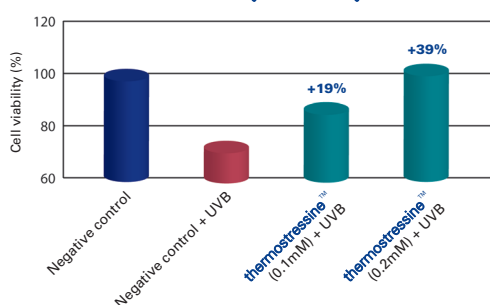
##### b) Cell viability

Cells were incubated with **thermostressine™** at different concentrations. Then, human keratinocytes were exposed either to a heat shock (45 °C, 2 hours) or a cold shock (-20 °C, 40 minutes). Cell viability was determined by the Neutral Red Uptake method.



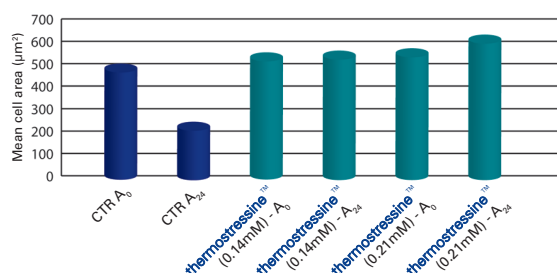
#### • UVB-induced damage

The photoprotection efficacy of **thermostressine™** was assessed in human keratinocytes after UVB irradiation. Cell viability was determined by the MTT method.



#### • Dehydration stress

The capacity of **thermostressine™** to maintain viability and size of skin cells exposed to a dehydration stress was determined by the Neutral Red Uptake method and cell area measurements. Human keratinocytes (A<sub>0</sub>) were incubated with **thermostressine™** and then introduced in a desiccator for 20 minutes. Cells were left to recover for 24 hours under standard culture conditions (A<sub>24</sub>).



**thermostressine™ induced HSP70 expression to a significant extent (+28%) without prior stress**

**HSP70 are increased after a heat shock, but stimulation is higher in presence of thermostressine™**

**Keratinocytes protection against heat and cold shocks is enhanced when treated with thermostressine™**

**thermostressine™ increased cell viability up to 100%, reaching levels similar to non UVB-irradiated cells.**

**thermostressine™ prevents cell desiccation**  
After dehydration, cell viability and cell size were maintained in keratinocytes treated with **thermostressine™**.