For Educational Purposes only

REJUVENATION — NUTRIENTS — WHITENING CARE

GLUTANEX TAB

MEDICINE GRADE GLUTATHIONE TABLETS

Powerful Antioxidant

❄

Drug Detoxification

❄

Excellent Whitening

NEXUS PHARMA

GLUTANEX TAB

MEDICAL GRADE GLUTATHIONE TABLETS

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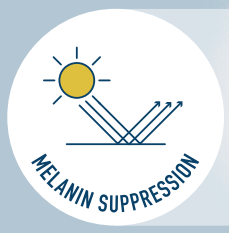
Glutanex Tab 100mg Efficacy

Intaking Gluatanex Tab for rejuvenation, nutrients and for whitening care

Anti-Aging
Wrinkle Improvment



Skin Whitening
Improves Pigmentation

Chemical Detox
Chronic Liver Disease
Aids Against Cisplatin
Caused by
Chemotherapy Disease

CLINICAL INFORMATION

Synthetic biological research prospect & Glutathione mass production yeast cell Factory development status

Various Physiological Functions and Industrial Applications of Glutathione

Glutathione (GSH) is widely distributed in animal cells, plants, microorganisms, etc. and is present at high levels (0.2-10 mM), while being the most commonly present organic sulfur compound in cells.

It is in the form of a tripeptide in which three amino acids, glycine, glutamine, and cysteine are combined, and **exists in the body in two forms: reduced glutathione (GSH) and oxidized glutathione (GSSG). Under normal circumstances, the ratio of reduced glutathione to oxidized glutathione is nearly 98%**, but the ratio tends to decrease in patients with neurodegenerative diseases such as Parkinson's disease and Alzheimer's disease and thus can serve as a direct signal related to one's health.

Reduced glutathione (GSH), which exists in a relatively high proportion, is mainly distributed in the liver and skin cells of the human body, and plays an important role in the antioxidant function of decomposing/removing reactive oxygen species while inhibiting melanin production.

In addition, it not only contributes to immunity enhancement by influencing the immune system, but also participates in the removal of exogenous compounds such as toxic substances through enzyme action. Based on these features and effects, glutathione is being commercialized in various ways.

Ref) Center for Design and Synthesis of Intelligent Biosystems

Notice

Glutathione exists in two forms: reduced glutathione (GSH) and glutathione (GSSG). When reduced glutathione molecules exert an antioxidant effect in the presence of active oxygen, they are oxidized and converted into oxidized glutathione. Since reduced glutathione acts as an antioxidant, users must intake reduced glutathione, not oxidized glutathione. Products recommended for use include those with over 50% of glutathione content using high purity and highly-concentrated ingredients.

Ingredients

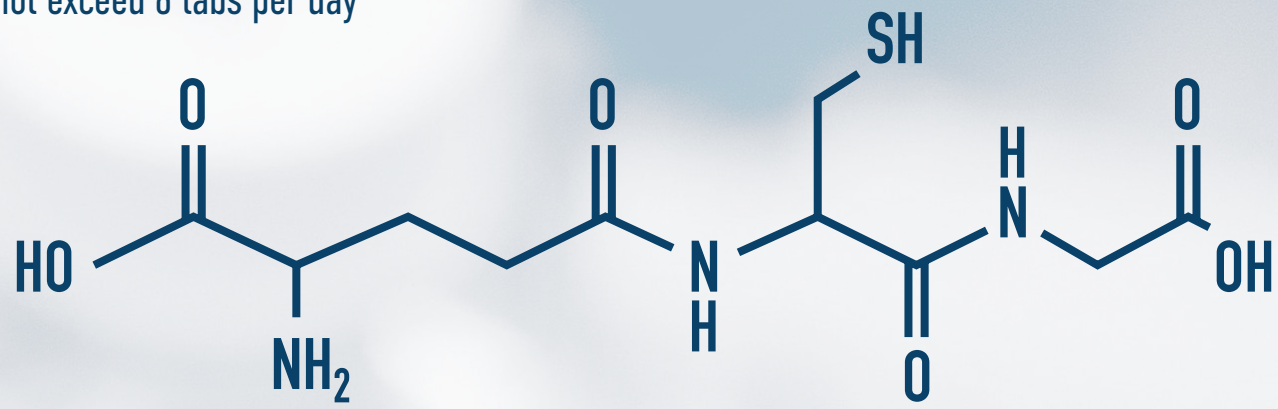
ANTIOXIDANT
Most Powerful Antioxidant

SKIN WHITENING
Melanin Suppression

ANTI AGING
Internal Health / Skin Health

SKIN PIGMENTATION
Melanin Suppression

Do not exceed 6 tabs per day



CLINICAL INFORMATION

Glutathione and its antiaging and antimelanogenic effects

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- **Background:** Previous studies showed that supplementation of reduced form of glutathione (GSH, 500 mg/d) has a skin-lightening efficacy in humans. This study was designed to evaluate the influences of both GSH and oxidized form (GSSG), at doses lower than 500 mg/d, on improving skin properties.
- **Patients and methods:** A randomized, double-blind, placebo-controlled, parallel, three-arm study was conducted. Healthy female subjects were equally randomized into three groups and took GSH (250 mg/d), GSSG (250 mg/d), or placebo orally for 12 weeks. At each visit at baseline and for 12 weeks, skin features including melanin index, wrinkles, and other relevant biophysical properties were measured. Blood samples were collected for safety monitoring.
- **Results:** In generalized estimating equation analyses, melanin index and ultraviolet spots of all sites including face and arm when given GSH and GSSG tended to be lower than placebo. At some sites evaluated, subjects who received GSH showed a significant reduction in wrinkles compared with those taking placebo. A tendency toward increased skin elasticity was observed in GSH and GSSG compared with placebo. There were no serious adverse effects throughout the study.
- **Conclusion:** We showed that oral glutathione, 250 mg/d, in both reduced and oxidized forms effectively influences skin properties. Overall, glutathione in both forms are well tolerated.
- **Keywords:** glutathione, melanin, pigment, aging, wrinkle, whitening

TABLE 1 (GEE analysis)

Variables	Placebo vs. GSSG		Placebo vs. GSH	
	Mean difference	P-value	Mean difference	P-value
VISIO (age > 40 years)				
Sun-exposed face, right	-0.8735	N.S.	0.5056	N.S.
Sun-exposed face, left	0.1897	N.S.	1.3635	N.S.
Sun-exposed arm, right	-0.1998	N.S.	1.3337	N.S.
Sun-exposed arm, left	0.4910	N.S.	2.1052	0.043*
Sun-protected arm, right	1.6827	N.S.	0.8387	N.S.
Sun-protected arm, left	0.2899	N.S.	2.5568	0.066

Note: *P<0.05.
Abbreviations: GEE, generalized estimating equation; N.S., not significant; GSSG, oxidized glutathione; GSH, reduced glutathione.

Melanin index

In all subjects with an age range between 20 and 50 years, GEE model showed that melanin index and UV spots of all sites including face and arm from GSSG and GSH groups tended to be lower than placebo group (Table 1) but were not statistically significant (P > 0.05). There were no significant differences between GSSG and GSH groups. The subgroup analysis of middle-aged individuals showed that the melanin index of sunexposed right forearm of subjects aged >40 years who received GSH (N = 7) was significantly lower than the index of those who received placebo (N = 10, P = 0.031). Melanin index measured at the sun-exposed left forearm from those receiving GSH was also lower than those receiving placebo. However, this did not reach statistically significant level (P = 0.057).

Ref) This article was published in the following Dove Press journal :
Clinical, Cosmetic and Investigational Dermatology 27 April 2017
Number of times this article has been viewed

CLINICAL INFORMATION

Metabolic basis and clinical evidence for skin lightening effects of thiol compounds

TABLE 2 (Clinical trials on the skin lightening efficacy of glutathione and glutathione disulfide.)

Study Format	No. of Subjects	Tested Materials	Treatment	Key Findings
A double-blind, randomized, placebocontrolled study	30	Placebo capsules	The capsules were orally taken twice daily for 4 weeks.	Compared to the baseline values, the melanin indices and the number of ultraviolet (UV) spots at all six skin sites decreased consistently in subjects who received glutathione for 4 weeks. The reductions were statistically significantly greater than 30 those receiving placebo at some skin sites.
	30	Glutathione 250 mg capsules		
A randomized, double-blind, matched-pair, placebo-controlled study	30	A placebo lotion	Subjects applied test lotion to one side of the face and a placebo lotion to the other side twice daily for 10 weeks.	The skin melanin index was significantly lower with GSSG lotion treatment compared with placebo lotion treatment from the first week after the start of the trial through to the end of Glutathione disulfide the study period (10th week).
		Glutathione disulfide 2% lotion		
A randomized, double-blind, placebo-controlled, parallel, threearm study	20	Glutathione 250 mg capsule	A capsule was orally taken daily for 12 weeks	Melanin index and UV spots were reduced in the glutathione group and the glutathione disulfide group compared to the placebo group.
	18	Glutathione disulfide 250 mg		
	19	Placebo capsule		
A placebocontrolled study	16	Placebo	Patients were given 2 intravenous injections (glutathione 1200 mg, ascorbic acid, hydrolyzed collagen, NaCl, and aqua) per week for 6 weeks	After 12 injections of glutathione, 6 of 16 (37.5%) subjects showed significant improvement in skin tone, whereas 3 (18.7%) subjects improved with placebo. After stopping thetreatment, this improvement was gradually lost in most 16 Glutathione 1200 mg patients in 6 months.
	16	Glutathione 1200mg		
An open-label, single-arm clinical trial	30	Glutathione 500 mg lozenges	Subjects put one lozenge in the mouth against the inner cheek (buccal mucosa) until completely dissolved every morning for 8 weeks.	There was a significant decrease in melanin indices from baseline to end that became evident as early as 2 weeks. The skin lightening effect was observed both in sun-exposed and sun-protected skin.
A randomized, double-blind, parallel-group, benchmark- and placebo-controlled trial	32	Placebo	Subjects ingested tablets or capsules daily or twice daily for 12 weeks in a blinded format.	Oral supplementation of cystine plus glutathione induced a significant skin lightening after 12 weeks. This combination also induced a significant reduction in the size of facial dark spots after 6 and 12 weeks. The changes were significantly bigger than those obtained not only with placebo but also with cystine alone or glutathione alone.
	31	Glutathione 250 mg		
	30	Cystine 500 mg		
	31	Cystine 500 mg plus glutathione 250 mg		

Ref) Antioxidants 2022, 11, 503

CLINICAL INFORMATION

Glutathione as an oral whitening agent: A randomized, double-blind, placebo-controlled study

Objective

To determine whether orally administered glutathione, 500 mg per day for 4 weeks, affects the skin melanin index, when compared with placebo.

Methods

This randomized, double-blind, two-arm, placebo-controlled study was set in the King Chulalongkorn Memorial Hospital, Bangkok, Thailand, a teaching hospital affiliated with a medical school. Sixty otherwise healthy medical students were randomized to receive either glutathione capsules, 500 mg/day in two divided doses, or placebo for 4 weeks. The main outcome was mean reduction of melanin indices measured at six different sites. Several secondary outcomes, including UV spots, were recorded by VISIA™. Efficacies of glutathione and placebo were compared by ANCOVA with baseline values as co-variates.

Results

Sixty participants enrolled and completed the study. At 4 weeks, the melanin indices decreased consistently at all six sites in subjects who received glutathione. The reductions were statistically significantly greater than those receiving placebo at two sites, namely the right side of the face and the sun-exposed left forearm (p-values = 0.021 and 0.036, respectively). This was similarly reflected in the changes in the number of UV spots, as measured by VISIA™. Both glutathione and placebo were very well tolerated.

Conclusion

Oral glutathione administration results in a lightening of skin color in a small number of subjects. However, long-term safety has not been established and warrants more extensive clinical trials.

Figure 1.
Changes in melanin indices
(negative numbers denote decrease in melanin indices).

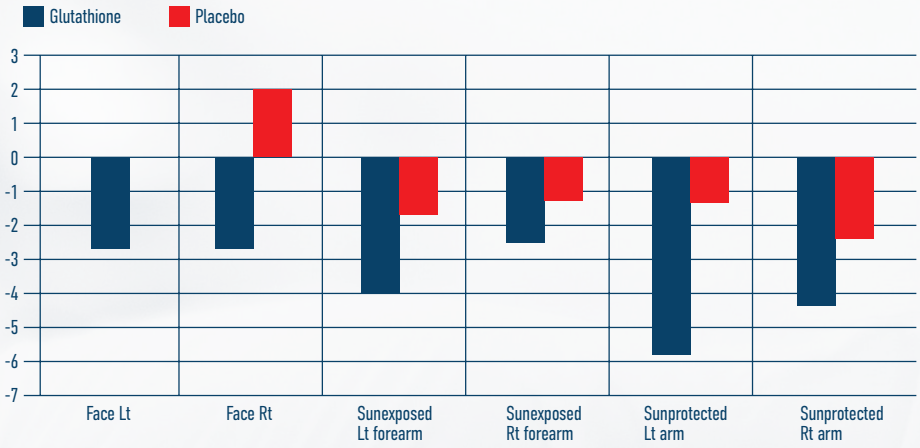

Figure 2.
Digital photography comparing baseline (left) with 4 weeks of glutathione treatment (right).

Ref) Journal of Dermatological Treatment. 2012; 23: 97–102

CLINICAL INFORMATION

Role of glutathione in cancer: from mechanisms to therapies

Abstract

Glutathione (GSH) is the most abundant non-protein thiol present at millimolar concentrations in mammalian tissues. As an important intracellular antioxidant, it acts as a regulator of cellular redox state protecting cells from damage caused by lipid peroxides, reactive oxygen and nitrogen species, and xenobiotics. Recent studies have highlighted the importance of GSH in key signal transduction re-actions as a controller of cell di erentiation, proliferation, apoptosis, ferroptosis and immune function. Molecular changes in the GSH antioxidant system and disturbances in GSH homeostasis have been implicated in tumor initiation, progression, and treatment response. Hence, GSH has both protective and pathogenic roles. Although in healthy cells it is crucial for the removal and detoxification of carcino-

gens, elevated GSH levels in tumor cells are associated with tumor progression and increased resistance to chemotherapeutic drugs. Recently, several novel therapies have been developed to target the GSH antioxidant system in tumors as a means for increased response and decreased drug resistance. In this comprehensive review we explore mechanisms of GSH functionalities and different therapeutic approaches that either target GSH directly, indirectly or use GSH-based prodrugs. Consideration is also given to the computational methods used to describe GSH related processes for in silico testing of treatment effects.

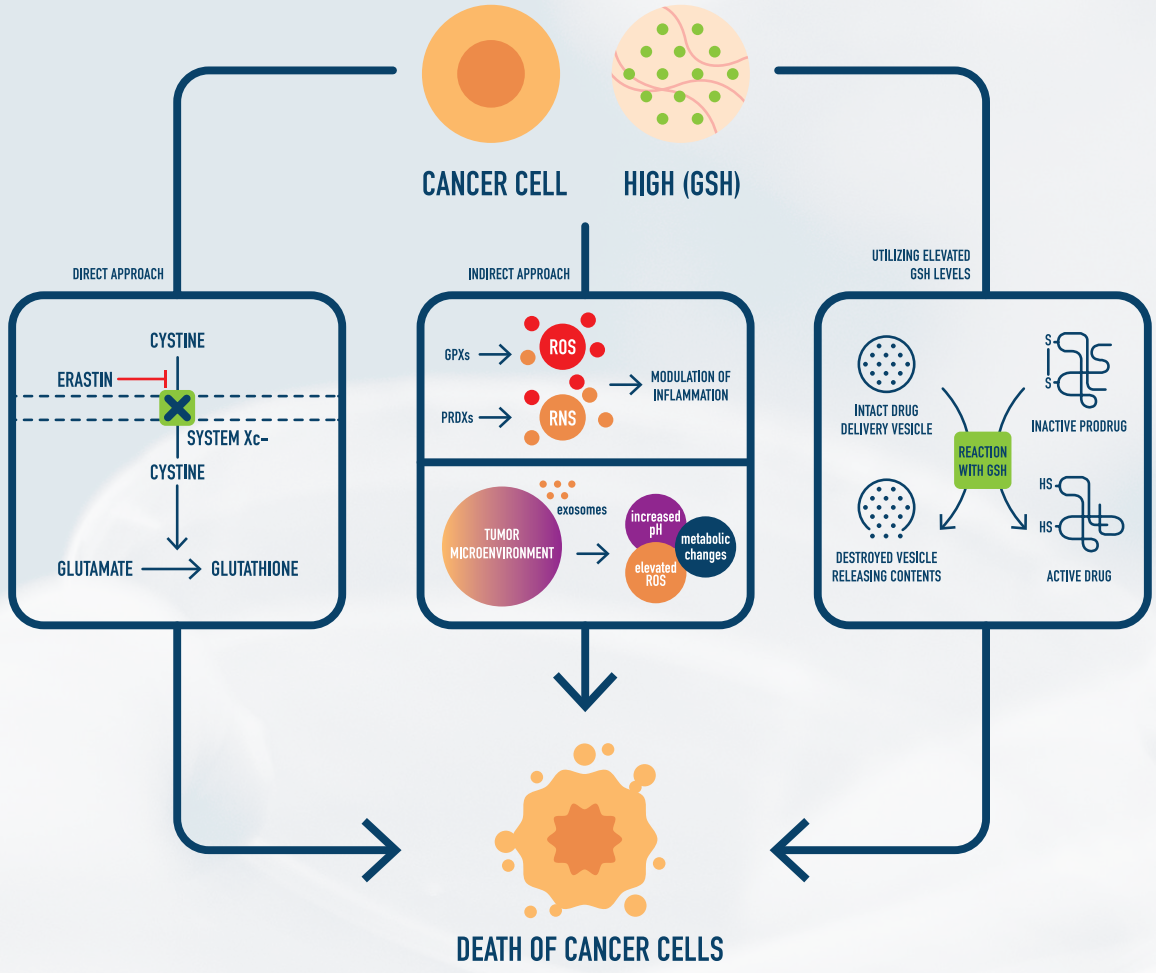

Figure 1.

Different approaches for cancer therapy related to glutathione functions. High levels of glutathione (GSH) observed in the majority of tumors combined with its role in tumorigenesis, inflammation response and tumor microenvironment properties are explored for different therapy approaches. Direct approaches are aimed at blocking synthesis of GSH leading to ferroptosis of cells or more effcient chemotherapy; indirect methods target inflammation response or tumor microenvironment in order to make tumors more susceptible to the response of the immune system as well as immunotherapies; elevated levels of GSH and possibly other active molecules in tumor cells are used in the prodrug approach, where the drug is only activated after entering tumor cells utilizing GSH in the activation reaction or neutralizing it following activation with other factors.

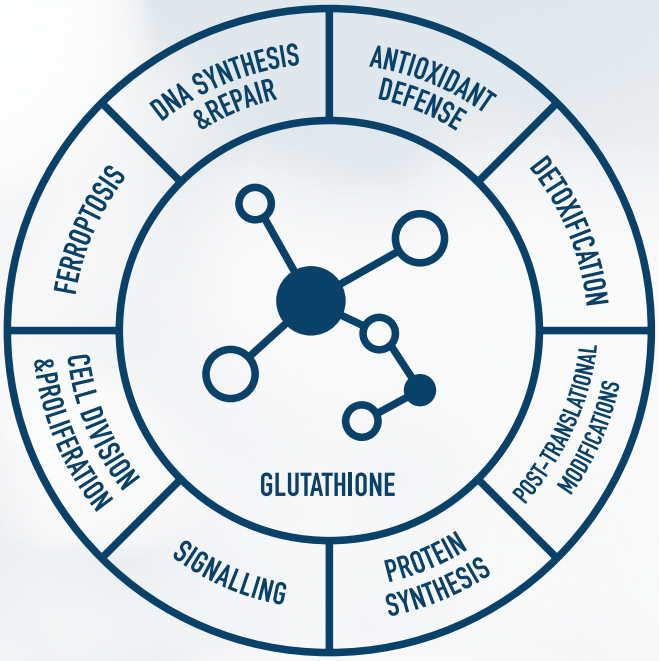

Figure 2.

Glutathione has a number of critical roles in healthy and tumor cells, in both cases supporting cell metabolism and survival. Several glutathione functionalities are directly or indirectly regulated by oncogenes.

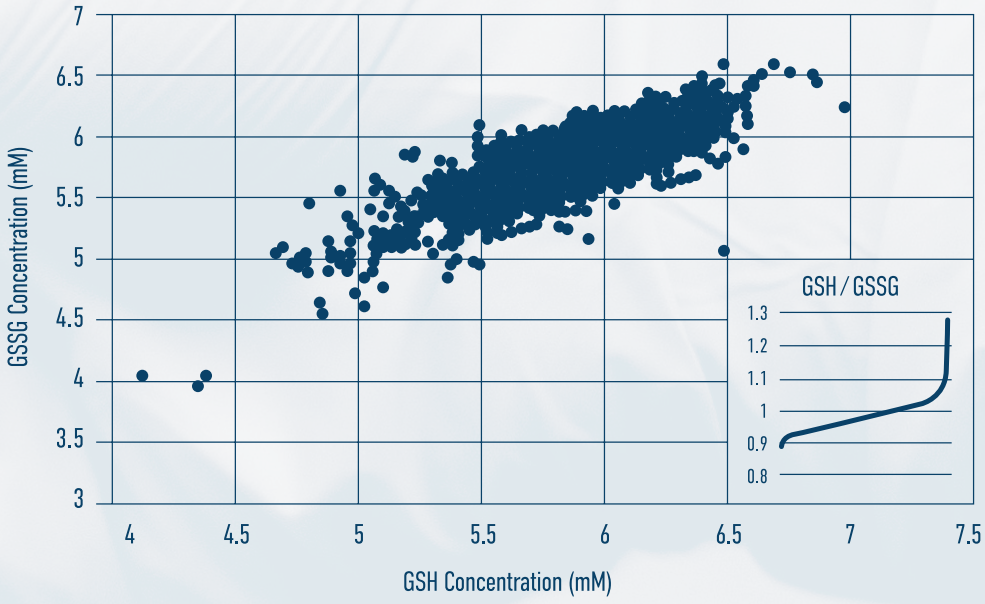

Figure 3.

Relative GSH and GSSG concentrations vary slightly across cancer cell lines (data presentedby Li et al., and obtained from https://portals.broadinstitute.org/ccle). Figure shows concentration of GSSG as a function of the concentration of GSH in the same cell line (concentrations shown in mM). Insert plot shows differences in the ratio of GSH/GSSG across 928 cell lines

Ref) Biomolecules 2020, 10, 1429

Glutanex Tab Information

100% Medical Grade Glutathione

[Per 299mg tablet]

100mg of Glutathione (reduced) (KP) / 100 tab per bottle.

[Serving Size]

1 to 3 tabs. Do not exceed 6 tabs per day. Take as recommended by your physician.

[Storage]

Keep sealed, in room temperature (1~30˚C)

[Caution]

If rash, vomiting, stomachaches occur, stop use immediately and consult with your doctor.

Medical Grade vs Food Supplement Grade

MEDICAL GRADE GLUTATHIONE

Tested and approved by MFDS (KFDA)

High potency ingredient for medical use

Pure Glutathione *10PPM impurity limit

Ministry of Food and Drug Safety

식품의약품안전처
MINISTRY OF FOOD AND DRUG SAFETY

의료기기 제조 및 품질관리기준 GMP MINISTRY OF FOOD AND DRUG SAFETY

FOOD SUPPLEMENT GLUTATHIONE

Unregulated and untested by government bodies

Untested ingredient quality

10 times more impurities *average of 100PPM of impurities

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