glutathione which resulted in a significant increase in blood filtration, in addition to a significant decrease in blood viscosity and platelet aggregation. Consequently, Glutathione infusion was determined to be an effective method of decreasing blood viscosity while increasing blood filtration

Glutathione has dermatological properties: In a three-month study of female subjects, the women taking Glutathione showed significantly improved skin elasticity and amelioration of wrinkles compared to test subjects who received a placebo.

What is this medicine used for? Glutathione may:
Stimulate the immune function
Improve skin properties
Improve semen parameters
Decrease blood viscosity
Increase lower than optimal levels of glutathione in the body due to aging and environmental stressors

Side Effects & Safety

Glutathione is **POSSIBLY SAFE** for most adults when taken by mouth, by inhalation, or by injection into the muscle or into the veins. But the possible side effects are not known.

What are the precautions when taking this medicine? Nitric oxide could react with glutathione to create *s-nitrosoglutathione*, a molecule that can act as a vasodilator. Vasodilation can lead to lowered blood pressure. This side effect may not be safe for people who have hypotension

Special Precautions & Warnings:

Pregnancy **and breast-feeding**: Not enough is known about the use of glutathione during pregnancy and breast-feeding. Stay on the safe side and avoid use.

Asthma: Do not inhale glutathione if you have asthma. It can increase some asthma symptoms.

Lung disorders. Glutathione is an important extracellular antoxidant in the lung and high concentrations are found in lung epithelial lining fluid. A deficiency of glutathione may contribute to the epithelial damage that occurs in various lung disorders, and treatment with nebulised glutathione has therefore been investigated. Small studies have found beneficial biochemical results in patients with cryptogenic fibrosing alveolitis (idiopathic pulmonary fibrosis)1 and in cystic fibrosis,2 but the clinical effects of these changes are not clear. Another study in cystic fibrosis3 found no effect on oxidative markers after treatment for 2 weeks, but there was a small improvement in lung function. Benefit has also been reported4 in a patient with emphysema. However, in a study5 of patients with mild asthma, inhalation of glutathione solution was associated with bronchoconstriction, leading to cough or breathlessness in some patients, possibly due to sulfite formation.

Doses and Administration:

Intravenous glutathione

Due to the low bioavailability of oral glutathione, intravenous injections are being promoted to provide desired therapeutic levels in the blood and skin and to produce "instant" skin-lightening. Interestingly, intravenous injections of glutathione have been used for years but there is not even a single clinical trial evaluating its efficacy. Manufacturers of intravenous glutathione injections recommend a dose of 600–1200 mg for skin lightening, to be injected once to twice weekly. The duration for which they should be continued is not specified.

Intravenous administration is expected to deliver 100% bioavailability of glutathione, much more compared to that achieved by oral administration. However, there are no studies to support this hypothesis. Although intravenous glutathione delivers a much higher therapeutic dose that enhances its efficacy, it also provides a narrower margin of safety due to the possibility of overdose toxicity.

How is it best taken? Glutathione can be taken either orally, with a transdermal patch or by Intravenous /subcutaneous/ intramuscular injection. Studies show that the most effective way to increase glutathione levels is by injection.

Other potential adverse effects of glutathione

Since glutathione is a component of human cellular metabolism, the adverse effects seen with oral supplementation are expected to be mild, akin to high-dose vitamin supplements. The adverse effects of intravenous glutathione speculatively arise from the direct delivery of huge amounts of the molecule in the blood circulation. Other potential adverse effects of high dose and long-term glutathione supplementation include:

Lightening of hair colour: A logically expected effect since hair colour is dependent on the amount and type of melanin which may be altered by glutathione supplementation. This adverse effect has not yet been clinically reported

Hypopigmented patches, especially on sun-exposed areas have been observed after 10–12 doses of intravenous injection by practitioners (unpublished observations). Their experience suggested that the patchy hypopigmentation tended to resolve after 30-40 doses due to the evolution of a uniform skinlightening effect

Depletion of natural hepatic stores of glutathione: Hypothetically, long-term supplementation with any external synthetic compound may signal the body to stop its own production resulting in dependence on synthetic supplements. Depletion of liver glutathione levels (the site of glutathione storage) may be devastating to health. This hypothetical adverse effect, although not clinically reported until now, is analogous to the hypothalamic-pituitary axis suppression seen with long-term use of systemic corticosteroids.

Exacerbation of *Helicobacter pylori* associated peptic ulcers: *Helicobacter pylori* is known to feed on macrophages and neutrophils abundant at the site of inflammation caused by the ulcer. As glutathione can improve the numbers and activity of macrophages, peptic ulcers may be exacerbated

Increased susceptibility to melanoma: Theoretically, long-term administration of systemic glutathione switches eumelanin to pheomelanin, and may increase the susceptibility towards development of melanoma in the long run.

Storage:- Store Below 25^{0}C Protected from Light.
Improper Storage may deteriorate the product
Medicine:- Keep out of reach of children.
Presentation:- Each pack contain 600 mg of Glutathione for injection in a glass vial and 10 ml ampoule of sterile water for injection IP

Manufactured by:
AMERICAN REMEDIES ©
Care & Cure with Research
American Remedies Healthcare Pvt. Ltd.
(An ISO 9001-2015 Certified Company)
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For the use only of a Registered Medical Practitioner of a Hospital or a Laboratory

Glutathione For Injection

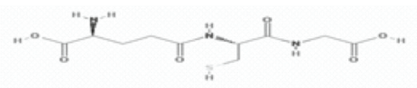
AMERICAN
GLUTACAN
Injection

600 mg

Composition :-
Each Vial Contains:-
Glutathione 600 mg
Excipient q.s
Direction for use: - Dissolved the contains of vial with sterile water for injection.IP

Molecular Structure and function of Glutathione

Glutathione (γ-glutamyl-cysteinylglycine) is a small, low-molecular weight, water-soluble thiol-tripeptide formed by three amino acids (glutamate, cysteine and glycine). It is a ubiquitous compound with a biologically active sulfhydryl group contributed by the cysteine moiety that acts as the active part of the molecule. This sulfhydryl group allows for interaction with a variety of biochemical systems, hence the abbreviation "GSH" for its active form. Glutathione is one of the most active antioxidant systems in human physiology.



(Glutathione). A white or almost white, crystalline powder freely soluble in water; very slightly soluble in alcohol and in dichloromethane.

Profile

Glutathione is an endogenous peptide with antioxidant and other metabolic functions. Glutathione and glutathione sodium are used to prevent neurotoxicity associated with cisplatin or oxaliplatin; they have also been used to prevent other adverse effects of antineoplastic and radiation therapy, as well as in a wide range of other disorders including poisoning with heavy metals and other compounds, liver disorders, corneal disorders, and eczema. Glutathione has also been tried in idiopathic pulmonary fibrosis and peripheral vascular disorders.

Antineoplastic toxicity. Glutathione has been reported to reduce the incidence of neurotoxicity induced by cisplatin therapy. In a double-blind, randomised trial 1 in 50 patients receiving cisplatin
For advanced gastric cancer, glutathione significantly reduced the incidence of neuropathy assessed within one week of completing cisplatin therapy. There did not appear to be any reduction in cytotoxic activity. Similar benefit was observed in a randomised, double-blind, placebo-controlled trial involving 52 patients receiving oxaliplatin.2

1. Cascinu S, *et al*. Neuroprotective effect of reduced glutathione on cisplatin-based chemotherapy in advanced gastric cancer: a randomized double-blind placebo-controlled trial.
2. Cascinu S, *et al*. Neuroprotective effect of reduced glutathione on oxaliplatin-based chemotherapy in advanced colorectal cancer: a randomized, double-blind, placebo-controlled trial.

HOW DOES IT WORK?

Glutathione is involved in many processes in the body, including tissue building and repair, making chemicals and proteins needed in the body, and for the immune system.

Glutathione and immune function: Glutathione plays a significant role in immune function. It encourages the T-cell function that's essential for a healthy immune system and protects from environmental toxins.
Additionally, glutathione is essential in a broad range of metabolic processes:
Glutathione acts to neutralize a toxic metabolic by product: *Methylglyoxal*
Glutathione is involved in the protein disulfide bond rearrangement that is necessary for the synthesis of one third of the body's proteins
It protects the body from the oxidative damage caused by glutathione peroxidase by acting as a helper molecule for certain enzymes
The liver uses Glutathione to help detoxify fats before the gallbladder emits bile, supporting healthy digestion

Glutathione to remove and detoxify carcinogens: Glutathione may also be crucial in the removal and detoxification of carcinogens, and according to recent studies alterations in this metabolic pathway, can influence cell survival profoundly. Glutathione may be responsible for several vital roles within a cell besides
antioxidation:
Maintenance of the redox state (chemical reactions in which the oxidation state of atoms are modified)
Modulation of the immune response
Detoxification of foreign bacteria and viruses

Glutathione and chronic disease: Research has demonstrated that glutathione deficiency may be a factor in many chronic conditions; HIV/AIDS, Alzheimer's, Parkinson's disease, asthma, different cancers, cataracts, macular degeneration, open angle glaucoma, diabetes, and many diseases of the liver, kidneys, lungs, and digestive system.

Glutathione depletion due to aging and alcohol consumption: Glutathione plays a major role in the detoxification of ethanol (consumed as alcoholic beverages) and people who routinely drink will experience Glutathione depletion. Aging is another factor; as the body ages glutathione levels may drop below the level necessary to maintain healthy immune function (among other processes).

Glutathione depletion is also caused by other factors: Besides alcohol consumption and the aging process, there are other factors that can deplete levels of Glutathione:
Acetaminophen
Aspartame
Benzopyrenes (tobacco smoke, fuel exhaust, etc.) Many household chemicals (detergents, fabric softeners, air fresheners, mothballs, cleaners, bleach, etc.)

Glutathione for male fertility: In a study of eleven infertile men, suffering from dyspermia associated with various andrological pathologies - Glutathione was observed to exert a significant effect on sperm motility.
Glutathione appeared to have an observable therapeutic effect on certain andrological pathologies that cause male infertility.

Glutathione and artherosclerosis: In one study, ten patients with artherosclerosis were administered