Glutathione: The Antiviral You Need Now

Endogenous Deficiency of Glutathione as the Most Likely Cause of Serious Manifestations and Death in COVID-19 Patients

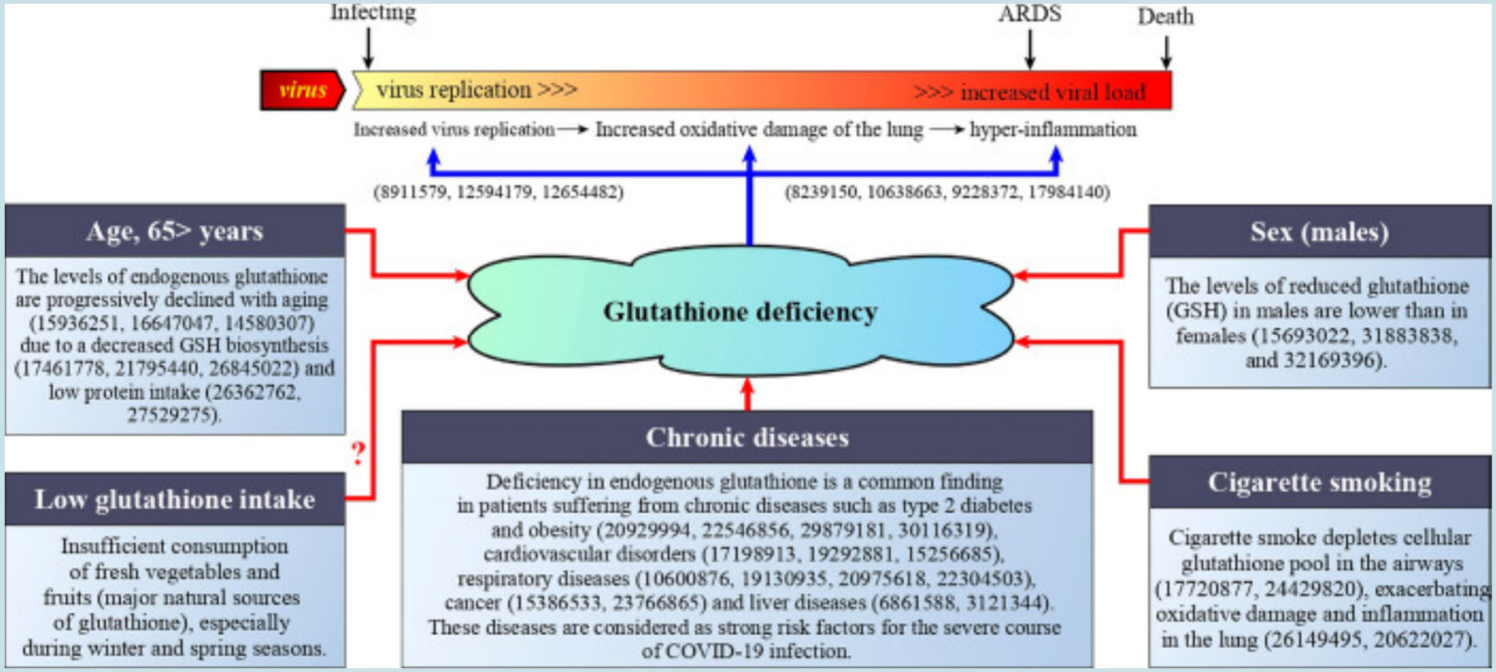
Benefits of Optimized Glutathione

Glutathione Fact Sheet on CoVid-19:

- The hypothesis that glutathione deficiency is the most plausible explanation for serious manifestation and death in COVID-19 patients was proposed on the basis of an exhaustive literature analysis and observations. The hypothesis unravels the mysteries on the risk factors determining serious manifestations of COVID-19 infection and the high risk of death and opens real opportunities for effective treatment and prevention of the disease.[1]

- Higher rates of serious illness and death from coronavirus SARS-CoV-2 (COVID-19) infection among older people and those who have comorbidities suggest that age and disease-related biological processes make such individuals more sensitive to environmental stress factors including infectious agents like coronavirus SARS-CoV-2.[2]

- Glutathione deficiency is an acquired condition attributable to decreased biosynthesis and/or increased depletion of the endogenous GSH pool influenced by risk factors such as aging, male sex, comorbidity, and smoking alone or in combinations. Glutathione deficiency in COVID-19 patients with serious illness may also be a result of decreased consumption of fresh vegetables and fruits (especially during winter and spring seasons), which contributes to over 50% of dietary glutathione intake.[3]



Factors responsible for endogenous glutathione deficiency and the mechanisms through which this deficiency may contribute to COVID-19 pathogenesis and outcomes. The bottom of the figure shows that the risk factors for severe COVID-19 infection are associated with decrease/depletion of intracellular glutathione. The top of the figure shows the potential mechanisms through which glutathione deficiency could influence clinical manifestations and outcomes in COVID-19 disease. The numbers in brackets indicate PubMed references (PMID) [4]

Glutathione Fact Sheet on CoVid-19:

- Age is a well-recognized risk factor for severe illness, complications, and death from COVID-19 infection. Interestingly, animal and human studies indicate that the levels of endogenous glutathione progressively decline with aging, thereby making cells in the elderly more susceptible to oxidative damage caused by different environmental factors compared to younger individuals. [5]

- Comorbidity is considered one of the major risk factors responsible for poor prognosis in COVID-19 patients. Interestingly, the deficiency in endogenous glutathione is common in individuals with chronic diseases as well as in individuals with a worsening prognosis of COVID-19. This means that decreased levels of glutathione occurring in COVID-19 patients with chronic diseases could be a triggering factor that shifts redox homeostasis toward oxidative stress, thereby exacerbating lung inflammation and leading to acute respiratory distress syndrome (ARDS), multi-organ failure, and death. [6]

- Sex-related COVID-19 mortality is one of the common epidemiologic findings around the globe suggesting susceptibility to severe illness. It has been observed that men are significantly more likely to suffer severe effects of COVID-19 infection and experience a higher mortality rate that women.9 In addition, men have lower plasma levels of reduced glutathione (GSH) than women, making men more susceptible to oxidative stress and inflammation. [7]

- Smoking of anything and inhaled pollution is also considered a risk factor for severe complications and death from COVID-19.10 Cigarette smoke is known to deplete the cellular glutathione pool in the airways, exacerbating oxidative damage and inflammation in the lung, which is likely the reason why smokers with COVID-19 more likely require intensive medical interventions. [8]

Glutathione Fact Sheet on Co-Vid-19 and Viruses:

- Glutathione (GSH) is a peptide (smaller versions of proteins). These are found in plants and animal tissue, but we often don't get enough of them because they are easily destroyed by cooking. Additionally, glutathione is used rapidly by exposure to toxins, infections, and some pharmaceuticals, leaving us depleted when we need it the most. Supplementation is essential during these critical times of depletion. [9]

- Glutathione "is essential for the viability and function of virtually all cells" (PMID: 9050888). Glutathione reduces viral replication. (PMID: 32123833). [10]

- Glutathione is the most abundant antioxidant that plays a crucial role in antioxidant defense against oxidative damage of cells and is also involved in the regulation of various metabolic pathways essential for whole body homeostasis.7 The maintenance of the highest concentrations of reduced glutathione (GSH) in most cell types highlights its vital and multifunctional roles in the control of various biological processes such as detoxification of foreign and endogenous compounds, protein folding, regeneration of vitamins C and E, maintenance of mitochondrial function, antiviral defense, regulation of cellular proliferation, apoptosis, and immune response. [11]

Glutathione Fact Sheet on Chronic Diseases:

- Mounting evidence supports the concept that oxidative stress and associated inflammation resulting from decreased antioxidant defense contribute to the pathogenesis of various chronic diseases,4 including diabetes and cardiovascular and respiratory diseases, known to increase the risk of severe illness and death in COVID-19 patients.5 It is also known that virus-induced modulation of the host antioxidant response represents a crucial determinant for the progression of several viral diseases.6 In this regard, the antioxidant defense system protecting against oxidative stress is of great interest in the context of understanding the mechanisms underlying nonspecific sensitivity or resistance to infectious agents. [12]

- Studies showing that exogenously added oxidative stress induce inflammatory cytokines, while addition of antioxidants, including the main thiol antioxidant, glutathione (GSH), inhibits it. [13]

- This study supports the view that endogenous GSH plays a pivotal role for the establishment of the innate immune responses to viruses, possibly acting as a signaling molecule for the immune system to optimally deploy. [14]

- Small pattern of genes mapping to innate immunity and antiviral activity required GSH (glutathione) for their induction. [15]

- The finding that several genes that are important for the antiviral response, require glutathione for optimal induction adds knowledge to previous findings, indicating that GSH can inhibit viral infection. [16]

Glutathione Fact Sheet on Immunity:

- There is a large body of evidence showing the importance of Glutathione in immunity, including antiviral immunity, but so far this was ascribed to its action as ROS scavenger to inhibit oxidative stress. The present study indicates that Glutathione has other important signaling roles independently of protection from oxidative stress. [17]

- The “oxidative stress,” and consequent Glutathione depletion, caused by a virus as a direct consequence of its replication cycle and implicated in the cause of the disease, could be a way by which the virus attempts to diminish the antiviral response by impairing GSH Glutathione-dependent antiviral pathways. [18]

- PMID: 8540746: Evidence for antiviral activity of glutathione: in vitro inhibition of herpes simplex virus type 1 replication. [19]

- PMID: 9050888 Glutathione deficiency is associated with impaired survival in HIV disease. [20]

- One macrophage group, mapping to innate immunity and antiviral required Glutathione for optimal induction. Consequently, Glutathione depletion prevented the activation of antiviral response and its inhibition of influenza virus infection. [21]

Glutathione Fact Sheet on Vitamin D:

- Several studies reported that glutathione levels positively correlate with active vitamin D. [22]

- A recent experimental study16 showed that Glutathione deficiency and the associated increased oxidative stress epigenetically alters vitamin D regulatory genes and, as a result, the suppressed gene expression decreases Vitamin D biosynthesis, ultimately leading to a secondary deficiency of Vitamin D. [23]

- This study provides important information that Glutathione is essential for the control of endogenous vitamin D biosynthesis and demonstrates potential benefits of Glutathione treatment in reducing the deficiency of vitamin D. Taken together, these findings suggest that glutathione deficiency rather than vitamin D deficiency is a primary cause underlying biochemical abnormalities, including the decreased biosynthesis of vitamin D, and is responsible for serious manifestations and death in COVID-19 patients. [24]

- The depletion of Glutathione levels characterizes viral infections and associated-disease progression. Many studies correlated the Glutathione level with immune response and suggest adding the glutathione replenishment to highly active antiviral treatment. [25]

Glutathione Fact Sheet on Respiratory Disease/Flu:

- Emory investigators first exposed human respiratory tract cells in culture with the influenza virus. Some of the cells were treated with glutathione. The investigators found that the human respiratory cells treated with glutathione antioxidants were completely protected against infection by the influenza virus. [26]

- Emory scientists reported that glutathione, a naturally occurring antioxidant compound, could help prevent infection by the influenza virus if administered directly (via a lozenge or spray, to the tissues lining the mouth and upper airway. [27]

- The flu virus is normally released from infected cells as an inactive particle. To infect another cell, it must be activated by having one of its proteins split into two pieces by a protease enzyme. Proteases, along with proteins that normally inhibit their activation, are present in the fluid that lines the epithelial cells in the mouth, upper airways and intestine. Scientists have found through studies in mice that viral infections result in oxidative responses that inactivate natural protease inhibitors, thus enhancing viral activation. [28]

Glutathione Fact Sheet on Respiratory Disease/Flu:
Dean Jones, Professor of Biochemistry at the Emory School of Medicine

- "It appears that by going directly to the site of infection, we can block the influenza infection in the upper airway," Jones said. "We believe that if we put the glutathione in a lozenge, we could directly expose the virus-susceptible tissues to glutathione over a relatively long period of time. This could be very helpful, for example, if you were sitting next to someone with the flu on an airplane. You could effectively block the infection for a period of several hours." [29]

- "Glutathione allowed the epithelia to provide the first line of defense," says Jones. "It changed the character of those cells, blocking activation of virus particles and stopping a conversion of the cells to an active form." [30]

- Similarly, a 1999 clinical study in France revealed that selenium dietary supplementation to elderly subjects not only corrected nutritional deficiencies, but also, fewer patients developed respiratory infections. Optimized Glutathione contain Selenium as well. [31]

Why Optimized Glutathione...

Available as a chewable/suckable lozenge, this patented product interferes with the penetration of the viral and influenza virus into the mucosal cells, providing a shielding adjunct in the prevention of viral and influenza infection, and helping ameliorate the symptoms and duration of illness. [33]

Working topically, the glutathione-based composition prevents the virus from penetrating mucosal cells and thereby keeps the virus from multiplying as virus usually does in living cells. Absorbed systemically through the buccal mucosa cells, the synergistic antioxidant composition boosts the body's immunologic defenses to viral infections. [34]

Why Optimized Glutathione in Lozenge Form…

Glutathione is one of the five network antioxidants and has been recognized as a master antioxidant. [38]

- Substances that are absorbed through the buccal route go directly into the systemic circulation, effectively bypassing the gastrointestinal tract. It eliminates the disadvantages imposed by oral intake, such as the decreased ability of GSH to pass through the gastrointestinal tract as an intake molecule. [35]

- In order to maximize absorption of the glutathione molecule, the buccal mucosa may be a useful route of administration. Substances that are absorbed through the buccal route go directly into the systemic circulation. [36]

- A novel preparation of glutathione, with absorption using the oral mucosal route, has thus been formulated to facilitate optimum absorption into the bloodstream without the side effects of IV administration. [37]

- The product investigated in this study is a lozenge containing a proprietary mixture of reduced L-glutathione, selenium, vitamin C, vitamin D3, vitamin E, and grape seed extract. [39]

- Biochemist Dean Jones tracked oxidation levels, finding that they are higher in the morning, placing people in a vulnerable state in which their bodies are less able to guard against infection. If you are able to pop something in your mouth at vulnerable times of oxidation, you may be able to use your first line of defense to fight off infection. [40]

- "The supplement can mitigate the risk, which is manifest in times and places where infection occurs—when people are tired and stressed, when they are using public transportation, or even when they are sitting in the sun at a baseball game," according to Jones. [41]

For more information and to order, please visit our website – www.juliathuntermd.com

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