

# **SUMMARY OF REPORTABLE RESULTS FROM THE DOUBLE BLIND, PLACEBO CONTROLLED CROSSOVER CLINICAL STUDY**

**IN ONLY 60 DAYS OF USE, MaxGXL® USERS;**

- Experienced an average increase in intracellular glutathione levels of 292%. *Glutathione is the body's most powerful antioxidant and normally decreases by 10% to 12% per decade in healthy adults, and more in adults who are ill.*
- Experienced an average INCREASE in their body's DHEA of 46% and IGF-1 of 40.8%. *DHEA and IGF-1 are markers related to levels of human growth hormone, which is the indicator of true biological age. They decrease with age.*
- Experienced a 37% Decrease in TNF. *Tumor Necrosis Factor alpha is one of the three most significant markers of cellular inflammation.*

# **PATENTED ORAL GLUTATHIONE ENHANCEMENT IMPROVES INFLAMMATION AND AGE RELATED HORMONAL VALUES IN NORMAL AGING POPULATION**

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that constitute the subject of this presentation*

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# GLUTATHIONE BACKGROUND

One of only four endogenous antioxidants:

- Glutathione\*
- Superoxide Dismutase
- Catalase
- Coenzyme Q10

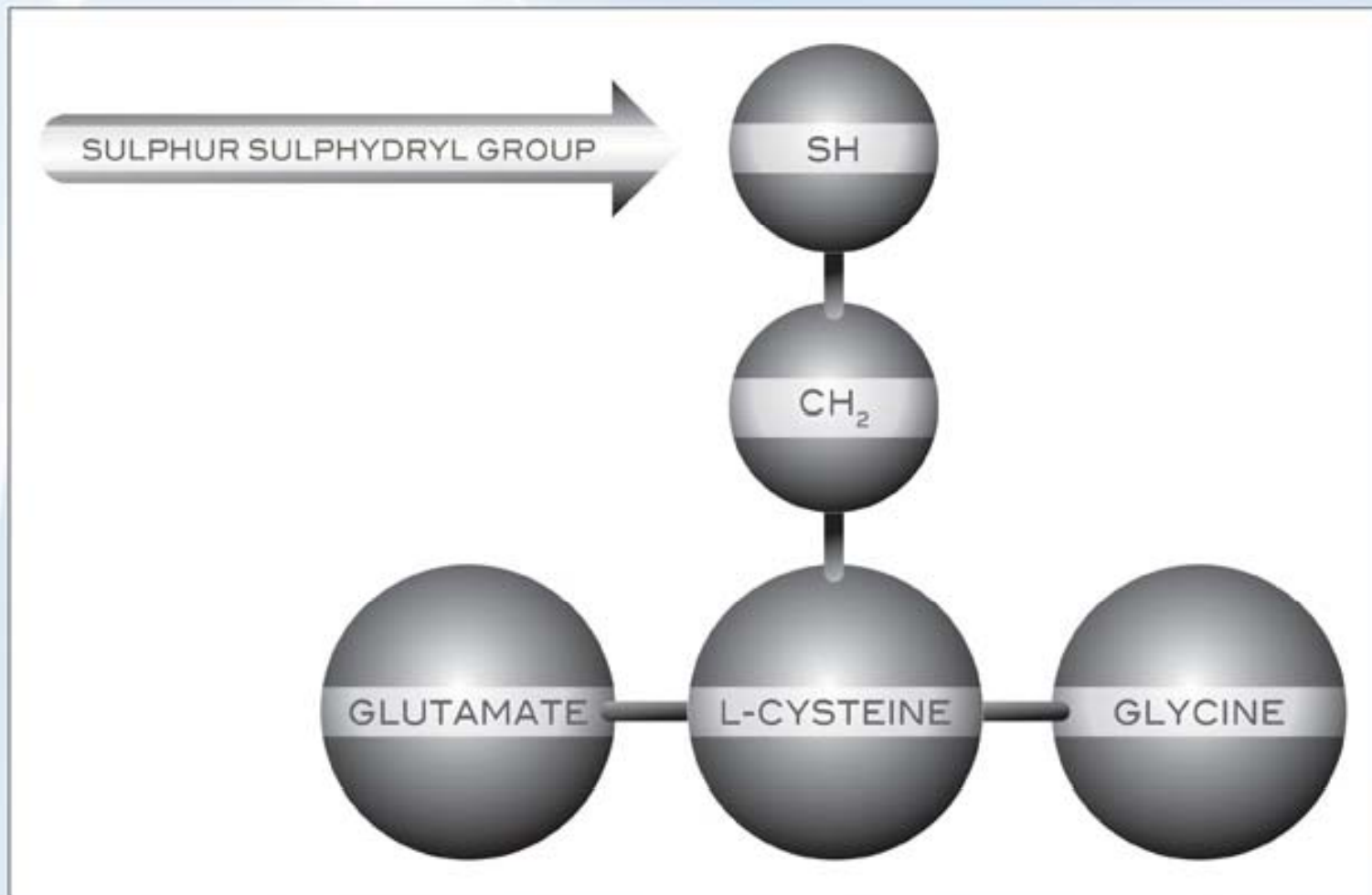
*\*Most Concentrated Intracellular Antioxidant*



# GLUTATHIONE BACKGROUND

IMPORTANCE I

SCHEMATIC DEPICTION OF GSH



# GLUTATHIONE BACKGROUND

## IMPORTANCE II

GSH, alone in the antioxidant world, regenerates (recycles) directly and indirectly a variety of other antioxidants including vitamin C, alpha lipoic acid and vitamin E.

More than six (6) percent of the total energy (ATP) production of the whole body may be used to synthesize and regulate intracellular glutathione levels.

GSH is the only non-enzyme antioxidant that does not itself become a free radical after it has quenched a free radical. In fact, oxidized glutathione (GSSG) induces delta-wave sleep.

# GLUTATHIONE BACKGROUND

## IMPORTANCE III

GSH not only functions as a multifunctional antioxidant itself but as an essential component of antioxidant enzymes including glutathione peroxidases and genetically determined family of glutathione transferases.

Major chelator of heavy metals (50% as effective as free radical chelator) in removing mercury.

Detoxifies organic pollutants via Phase II Hepatic Detoxification.



# GLUTATHIONE BACKGROUND

## IMPORTANCE IV

GSH levels decrease with age (1% per year).

Age matched normals reveal those with any defined disease have decreased GSH compared to “well” subjects.

GSH is major protector of Mitochondrial DNA (MtDNA). Compared to 5 year olds, only 5% of MtDNA is normal in 90 year olds.

Maintenance of normal MtDNA directly correlates with maximum life span

Centenarians demonstrate GSH levels similar to 30-50 year old well normals.

Caloric restriction (animals) increases GSH and SIRT1.

# GLUTATHIONE BACKGROUND

## MOA OF MtDNA PROTECTION

Food (Krebs cycle, PPP) + O<sub>2</sub> → mitochondrial activity → ATP production



Free radical production (intense)



SOD → Superoxide Free Radicals



Hydroxyl & Peroxide Free Radicals



GSH Neutralizer Hydroxyl  
GSHPx Neutralizer Peroxide



MtDNA protection



# GLUTATHIONE BACKGROUND

CAUSES OF GLUTATHIONE DEPLETION



# GLUTATHIONE

## COMPONENT/PRECURSORS

### AMINO ACID    PHYSIOLOGIC USES

#### Glutamine

- *Conditionally essential (must be ingested) in illness or injury*
- *GSH production*
- *GI health; Strengthens GI barrier to entry of abnormal substances*
- *Promotes intestinal cell production*
- *Accelerated wound healing*
- *Major role in protein synthesis*
- *A substrate (necessary building block) for DNA synthesis*
- *Aids in Immune function*
- *Alternate source of fuel for brain cells*

# GLUTATHIONE

## COMPONENT/PRECURSORS (CONTINUED)

### AMINO ACID    PHYSIOLOGIC USES

- |                      |   |
|----------------------|---|
| <b>Glutamic Acid</b> | <ul style="list-style-type: none"><li>• <i>Form of glutamine used in GSH Synthesis</i></li><li>• <i>Complexed to nitrogen waste products for safe elimination (UREA)</i></li><li>• <i>Excitatory neurotransmitter (NMDA)</i></li><li>• <i>Precursor to inhibitory neurotransmitter (GABA)</i></li></ul>           |
| <b>Cysteine</b>      | <ul style="list-style-type: none"><li>• <i>Antioxidant by itself</i></li><li>• <i>Can become oxidant in states of inflammation (homocysteine)</i></li><li>• <i>GSH production</i></li><li>• <i>Binds to heavy metals</i></li><li>• <i>Involved in apoptosis (programmed cell death or cell suicide)</i></li></ul> |
| <b>Glycine</b>       | <ul style="list-style-type: none"><li>• <i>Inhibitory neurotransmitter in the brain</i></li><li>• <i>Major component of collagen (35%)</i></li><li>• <i>Component of blood (hemoglobin) and muscle (myoglobin) proteins</i></li></ul>   |



# DIETARY SOURCES OF GLUTATHIONE AND GSH PRECURSORS

## AMINO ACID    DIETARY SOURCE

- |             |   |
|-------------|---|
| Glutathione | <ul style="list-style-type: none"><li>• <u>Animal sources</u>: red meat (fresh), fish, poultry</li><li>• <u>Vegetable sources</u>: fresh and frozen fruits, blackberries, strawberries, blueberries, leafy green vegetables (raw or steamed), particularly asparagus, avocados and nuts (walnuts)</li></ul> |
| Glutamine   | <ul style="list-style-type: none"><li>• <u>Animal sources</u>: meat, fish, poultry, milk, eggs, yogurt, whey protein and cottage cheese</li><li>• <u>Vegetable sources</u>: beans, spinach, parsley, cabbage</li></ul>  |
| Cysteine    | <ul style="list-style-type: none"><li>• <u>Animal sources</u>: eggs, milk, whey protein, yogurt, cottage and ricotta cheese, pork, sausages, poultry and lunch meats</li><li>• <u>Vegetable sources</u>: red peppers, garlic, onions, leeks, broccoli, brussels sprouts, granola and wheat germ</li></ul>   |
| Glycine     | <ul style="list-style-type: none"><li>• <u>Animal sources</u>: meat, poultry, fish, milk, eggs, yogurt, whey protein, ricotta and cottage cheeses</li><li>• <u>Vegetable sources</u>: leafy green vegetables, legumes</li></ul>   |

# GLUTATHIONE BACKGROUND

GSH PROMOTING DRUGS, SUPPLEMENTS AND CO FACTORS

## DRUGS

Glutathione

N Acetyl Cysteine

### Drug Candidates

OTC

OTZ

Procysteine

GSH monoesters

GSH Diesters

## SUPPLEMENTS

Glutamine

N Acetyl Cysteine

SAM-e

Melatonin

Alpha Lipoic Acid

Silymarin

Cordyceps

Quercetin

Whey Protein (bioactive)

Transdermal Glutathione

Oral Glutathione

## CO FACTORS

Selenium

Vitamin B1

Vitamin B2

Vitamin B3

Vitamin B5

Vitamin B6

Vitamin B12

Folic Acid

Vitamin E

Vitamin D3

Beta Carotene (Vitamin A)

# PATENTED GLUTATHIONE

## SUPPLEMENT STUDY

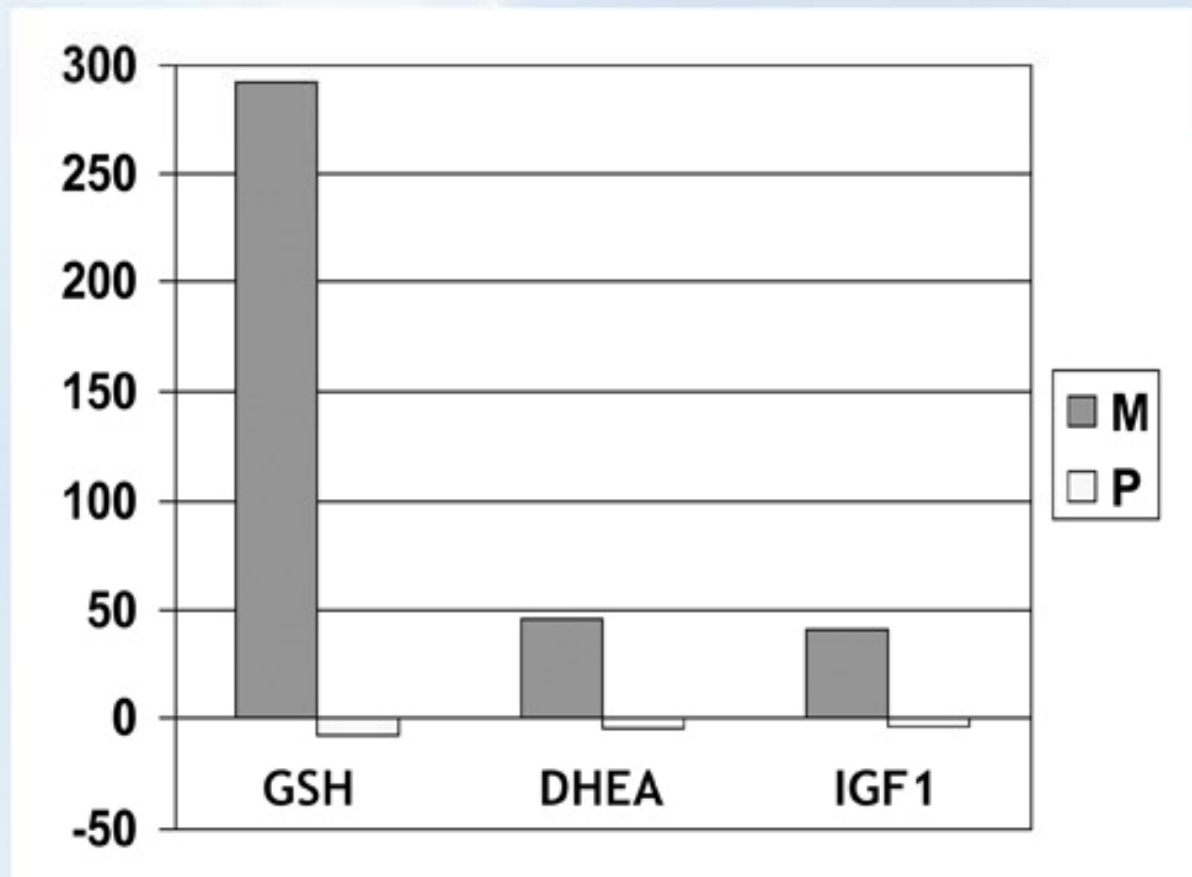
### Normals

#### Study Schematic

- Placebo-controlled, double-blind, crossover design
- 2 months on each arm
- 2 week washout between crossover
- Lab evaluation, screening, baseline, monthly and post crossover
- SF 32 QOL survey on same schedule as lab evaluation



# CHANGES IN GLUTATHIONE & AGE-RELATED HORMONES WITH A PATENTED GLUTATHIONE SUPPLEMENT



# CHANGES IN MARKERS OF INFLAMMATION WITH A PATENTED GLUTATHIONE SUPPLEMENT

<b>TNF alpha*</b>	<b>11/6 Elevated</b>
• GSH Supplement	-37.7 ± -5.4%
• Placebo	+2.6% ± 1.3%

*\* TNF alpha assay sensitive to 6ngs/ml.  
Changes may be greater than depicted*

# **IMPROVEMENT IN QOL (SF32) WITH A PATENTED GLUTATHIONE SUPPLEMENT**

- Improved Energy
- Increase in Quality of Sleep
- Improved Mood
- Improved Mental Focus
- Decreased Aches & Pains



# SUMMARY

- Patented GSH supplement significantly raises lymphocyte GSH levels
- Increasing lymphocyte glutathione\* significantly improves age related hormones and markers of cellular inflammation in a normal aging population

*\* Proprietary testing modality*