

### Transcript Details

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## GlyNAC and Healthy Aging: A Review of New Clinical Data

### Announcer:

Welcome to ReachMD. This medical industry feature, titled "GlyNAC and Healthy Aging: A Review of New Clinical Data," is sponsored by Nestlé Health Science. This program is intended for physicians. Now, here's your host, Dr. Rajagopal Sekhar.

### Dr. Sekhar:

Hello. My name is Dr. Rajagopal Sekhar. I am here to discuss a recently published, randomized clinical trial on the role of GlyNAC supplementation in supporting healthy aging.

First, let me provide some background information. The 60+ age group is the fastest growing demographic, and is predicted to represent about a third of the world's population in about 20 years. And so, over the past two decades, my lab has been investigating why declines occur with normal aging, in an attempt to find solutions. Because mitochondria provide energy, and mitochondrial health declines with aging, we believed that improving mitochondrial function was important to promote health in aging.

Glutathione is the most abundant intracellular antioxidant that cells produce to protect themselves from damage caused by oxidative stress. However, glutathione levels decline with aging. Could these declining levels contribute to declining mitochondrial health?

To answer this question, we took a look at how we can improve glutathione levels. We discovered that the decline in glutathione levels in aging occurred due to reduced synthesis caused by decreased availability of amino acid precursors, glycine and cysteine. We also found that supplementing a combination of glycine and N-acetyl cysteine, or GlyNAC for short, improved both glutathione synthesis and intracellular glutathione levels.

And so, we received funding to conduct an investigator-initiated, randomized, double blind, placebo-controlled trial from the National Institutes of Health, and the results of this study were recently published in the Journal of Gerontology in January 2023. This trial primarily evaluated the impact of GlyNAC supplementation in older adults on glutathione synthesis and concentrations, oxidative stress and mitochondrial function. It also evaluated physical function, metabolic health and several key hallmarks of aging.

The trial compared 12 healthy young adults, around 26 years of age, to 24 healthy older adults, around 71 years of age. The young adults were studied before and two weeks after receiving GlyNAC daily. The older adults received either GlyNAC or an isonitrogenous placebo for 16 weeks, and were studied before supplementation, two weeks after supplementation, and 16 weeks after supplementation. The doses of glycine and NAC in the trial were 100 milligrams per kilogram per day of each, and were guided by prior studies on the daily need for glycine and cysteine in older people.

The randomized clinical trial found that older adults were making lower amounts of intracellular glutathione than young adults, and this was contributing to intracellular decline in glutathione levels. Supplementing GlyNAC for 16 weeks improved intracellular glutathione synthesis and concentrations, to levels comparable to young adults.

Before supplementation, the markers of oxidative stress were about five times higher in older adults. GlyNAC supplementation rapidly lowered oxidative stress, as early as two weeks, and improved it further after 16 weeks, to reach levels comparable to young adults. Older adults also had evidence of mitochondrial decline, with mitochondrial dysfunction affecting fuel oxidation and markers of mitochondrial biogenesis, function and mitophagy. GlyNAC supplementation in older adults for 16 weeks significantly improved these defects and reversed mitochondrial dysfunction.

In addition to mitochondrial dysfunction, GlyNAC supplementation in older adults also improved multiple additional aging hallmarks

affecting nutrient sensing, altered intercellular communications, genomic damage, stem cell fatigue, and cellular senescence. GlyNAC supplementation for 16 weeks lowered markers of inflammation by 40-78%, lowered endothelial dysfunction by 44-57%, and lowered insulin resistance by 64%. GlyNAC supplementation also significantly decreased waist circumference and systolic blood pressure, and improved physical function measured as gait speed, upper and lower extremity muscle strength, and exercise capacity.

Overall, this randomized clinical trial found GlyNAC to be a novel, safe and effective oral supplement that can promote healthy aging by improving multiple age-associated declines in glutathione, oxidative stress, muscle strength, mitochondrial function and other aging hallmarks, and multiple additional metabolic outcomes. These findings support the need for additional research to further understand the benefits of supplementing GlyNAC to support healthy aging and health span. Thank you.

**Announcer:**

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