



GROWING INTEREST IN DMG

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You may have first heard about DMG as "Vitamin B15." The Russians called it pangamic acid, which is really a chemical known as the ester of dimethylglycine. It was reported as a "superdrug" when used by the Russian track and field athletes in international competition a decade ago. Actually, DMG is N, N-dimethylglycine, a normal intermediate in choline metabolism, and a rather controversial substance.

An article in *The Physician and Sportsmedicine*¹ described how the first test of DMG came about in athletics. Dr. Thomas V. Pipes was quoted as saying, "I heard a colleague tell a meeting of national track coaches that B15 had no effect, and they snickered at him." Pipes, of the Institute of Human Fitness in Escondido, California, became one of the first to study the effects of DMG on athletic performance. His first test was a one-week double-blind comparison of 5 mg daily DMG with placebo in 12 male college track athletes. His subjects were run to exhaustion on a treadmill both before and after the test week; each athlete trained normally during the test week.

Pipes really didn't expect any effects from DMG, and so he just tossed the data to one side as it came in because he was doing some other writing at the time. But, eventually, he was astonished to find the results showed a 27.5 percent increase in VO₂ max and a 23.6 percent increase in time to exhaustion for the DMG group.

Another exciting effect of DMG on the animal system is an enhancement of immune mechanisms. One paper,² in particular, reported a four-fold increase in antibody response to pneumococcal vaccine in humans receiving DMG orally as compared to controls. The first study of this characteristic in horses was recently published.³ It seeks to show whether the substance enhances the immune system as reported in the many references cited in that paper. Admittedly limited in numbers and scope, the study showed no apparent increase in immune response from DMG. Because of the strong positive research in humans,² further study is needed to prove what really happens in horses.

According to information from Dr. Roger Kendall, Ph.D., a DMG researcher, there are at least 3 areas of current study of DMG immune enhancement. Cellular-mediated and humoral immunity increases have been shown in rabbits on DMG. Also, DMG stimulation of interferon has been shown in rabbits. Research is in progress to study DMG N-killer cell potentiation. These studies are all being done at Clemson University.

An early study in horses⁴ with a DMG supplement, called Spur-15 (no longer available), showed that DMG is responsible for a lower blood lactic acid level following training. The Standardbreds in this study were found to be more aggressive, to have better appetites and attitudes and to recover faster from racing and training than the control group studied. Biochemically, DMG is involved in 3 basic reactions in which it acts as a one-carbon donor. DMG makes it easier for the body to produce phosphocreatine in muscles and the brain, explaining the reduction of lactic acid after exercise. This is a small energy storage reaction, but extremely flexible and available.

It should be pointed out that the benefits, or lack thereof, of DMG are yet to be clearly shown. A product with the possible potential of DMG needs thorough conclusive testing. The preliminary tests have a lot of people excited.

Biochemically, DMG functions in the body as an indirect methyl donor, serves as a source of 2-carbon species, and serves as a mineral transporter-chelating agent. The nutritional and physiological properties of DMG come from it being an ergogenic (tending to increase work output) substance, an anti-stress nutrient, a cell antioxidant, and an immune response potentiator.

Dr. Jerzy W. Meduski, of the Nutritional Research Laboratory, at the University of Southern California's School of Medicine in Los Angeles, has said that experimental data in both medicine and comparative nutritional sciences led many years ago to introduction of the concept of food factors called today biologically active non-fuel nutrients. Originally, nutritional sciences distinguished only one group of these compounds: so called essential nutrients. In this group we have vitamins, essential amino acids, essential fatty acids, and essential trace elements. The concept of "essentiality" developed around the old concept of health as absence of disease.

The vitamins are "essential", according to Meduski, because their absence in the diet causes the appearance of pathological symptoms and their administration removes these symptoms. But, Meduski explains that with the introduction by the World Health Organization of a new, positive concept of health: as "the complete physical, mental and social well-being of an individual and not merely the absence of disease" the physicians began to look beyond the disappearance of pathological symptoms, farther than the limited field of essential nutrients. Such considerations and the accumulation of laboratory data in experimental medicine and in nutritional sciences led to the introduction of a second group of biologically active non-fuel nutrients—metabolic enhancers. The absence of these substances in the diet does not produce deficiency symptoms, but when present in a diet, they improve the performance of the animal.

While the FDA will not allow the merchant of DMG to advertise clinical applications for DMG, there are some effects that have been suggested by research, some of which continue to be studied. There may be some benefits in cardiovascular dysfunction, blood-sugar metabolism, and immune dysfunction. Some of these benefits, while traditionally described as "clinical," can be traced to DMG's property of metabolic enhancement. In an editorial in the February (1987) issue of *Let's Live*, Dr. Richard A Passwater wrote, "DMG has long been used by athletes to improve overall performance and endurance, to enhance oxygen utilization, and to improve recovery after strenuous exercise. Nutritionally oriented physicians have been using DMG to deal with fatigue, to enhance blood sugar metabolism, to improve liver function, and to strengthen the cardiovascular system."

Meduski claims that DMG is perfectly safe when used as a dietary supplement in conventional amounts. In the horse, this translates to about 1.6 mg/kg of body weight. The average 1200 pound horse would require 750 mg per day. This is only about one-seventh of a teaspoonful, an amount easily lost or mis-measured, therefore, an inert carrier is added to the commercial product, *Vetri-Cine*, to make the daily dose equivalent to 10.5 grams. This can be dispensed with a 37 cc serving cup, which comes with the product. Most horsemen double or triple the dose a few days before a race or other heavy activity, without seeing any side effects.

The U.S. producer of DMG is Food Science Laboratories, headed by Dom Orlandi. He says, "The FDA is confusing me with my father, Guido Orlandi, the chairman of the Laetrile Company." Possibly for this reason the FDA is acting quite arbitrary and has classified DMG as a food additive without safety studies.

"We've never said that DMG is a vitamin or a drug," Dom Orlandi is quoted as saying. He is satisfied to call it a "non-fuel nutrient," which is supposed to be out of FDA's jurisdiction. Neither Orlandi nor his Food Science Laboratory will make claims for DMG. That can be left up to the scientists. But Orlandi wants to get into court against the FDA to make them prove their claims.

Meanwhile Food Science Laboratories continues to sell DMG to the Pittsburgh Steelers, the New York Yankees, the Dallas Cowboys, and a whole lot of race horse owners.

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References:

1. Barnes, Lan. B15: the politics of ergogenicity. *The Phys. and Sportsmed.* 7(11), 17-18, 1987.
2. Beech, Jill, et al. The effect of DMG on antibody response to influenza vaccination in horses. *JEVS* 7(2), 62,65, 1987.
3. Graber CD, et al. Immunomodulating properties of DMG in humans. *J Infect Dis* 143:101-105, 1981.
4. Levine SB, et al. Effect of a nutritional Supplement containing N,N-dimethylglycine on the racing standardbred. *Eq Prac* 4(3), 1982.

