

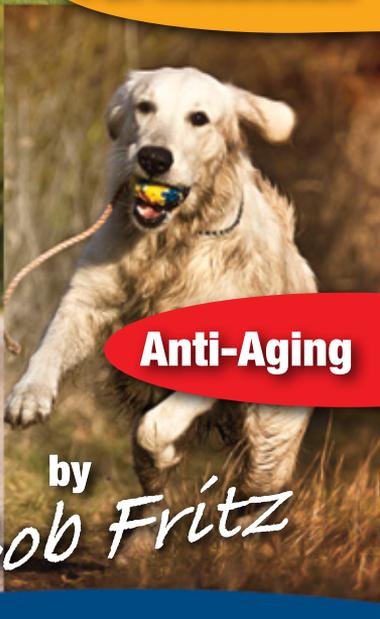
# **Muscle** is a Dog's *Best Friend*™

Lean Muscle

Performance

Fat Reduction

Joint Health



Anti-Aging

by  
*Bob Fritz*



**Book Series**

**It's not just for K9 Athletes!**

All Dogs Need to **MAXIMIZE**  
Their Muscle for **Total Health!**

# *Muscle* is a Dog's *Best Friend*™

## *Introduction*

***Call me the Nutrition Guy.*** No matter how much you think you know about sports nutrition, I know more. I was at ground zero with aminos, BCAAs, creatine, Muscle Milk®, Cytomax®. I was there at the start of almost every major advance in the history in sports nutrition.

For humans and dogs.

Sports nutrition for humans and dogs is my world. Has been for 35 years. I own it. And I'm going to take you there.

When you walk into a store, you are confronted by dozens of competing products. All promising miraculous results. Transformation. All claiming to be exactly what you need. While emptying your pocketbook. And maybe made in a dirty barn.

I am here to separate fact from fiction. To show you what's real and what's snake oil.

To tell you what works. Why it works. When it works. And how to use it.

Of course, just reading a book won't make your dog stronger or leaner. So I'm going to keep this short and sweet.

Then you can help your dog live stronger, for longer.

*Bob Fritz*

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Information in this book is provided for informational purposes and is not meant to substitute for the advice provided by your own animal health professional. This data is not intended to diagnose, treat, cure or prevent any disease.

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## **Healthy Muscle In Dogs**

Healthy muscle is the key to a long life in dogs and humans. If you are lucky enough to reach 80, you will have lost 50% of your lean muscle mass. This loss (called sarcopenia) often begins at just 25 years old. Yes, 25.

Adults with muscle loss are easily identified. Among other factors, they are stooped and get cold easily. Muscle produces heat, and muscle loss results in less body heat produced. Muscle loss reduces virtually every aspect of physical performance and is accompanied by amplified inflammation.

Dogs lose muscle too, which affects their health, energy level, and life span. The “seven-to-one” rule provides a rough estimate when your dog will start losing muscle. Expressing dog age with this method depends on the breed. For example, an 8 year old Yorkie is about 48 years old in human years; but an eight-year-old Great Dane is near end of days. Large breeds are the human equivalent of 30 and losing muscle when they’re only slightly over three years old. That’s when they start losing muscle mass, which impairs their health, and eventually their lifespan.



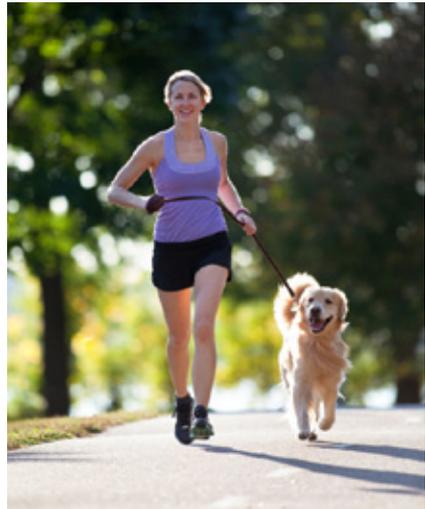
**One of the best ways to keep your dog fit and lengthen life is through canine bodybuilding.**

One of the best ways to keep your dog fit and lengthen life is through canine bodybuilding. No, your dog doesn’t have to do squats and curls. He can maintain healthy muscle by using the nutritional techniques of modern human bodybuilders. And, even modest exercise helps preserve muscle mass as dogs age. Nutrition and exercise together is a proven muscle protector combo.

## ***Not Just for Bodybuilders***

Until recently, the average person viewed bodybuilders as overgrown freaks who used whacky supplements to make their muscles even bigger. Supplements such as protein powder, creatine monohydrate, and amino acids were considered little more than performance-enhancing drugs. Building muscle through weight training took a back door to developing cardiovascular capacity through aerobics.

The Baby Boom generation changed that. Boomers began losing muscle mass as they aged, a condition called sarcopenia, which led to muscle and joint pain, decreased mobility, and poor metabolic health. Now, even ordinary people take supplements such as whey protein, amino acids such as leucine and citrulline, and creatine monohydrate.



**Even ordinary people take supplements such as whey protein, and amino acids.**

It's not unusual to see soccer moms downing a protein shake or a stockbroker taking amino acids or creatine to build and tone muscles. Muscle is the largest tissue in the body, accounting for about 40 percent of body mass. Losing muscle with age leads to disease and early death. Nutritional techniques can maintain muscle mass in your dog, too.

## ***Nutritional Bodybuilding for Dogs***

Much of today's sports nutrition traces back to dog studies. For example, in 1923, Benedict and Osterberg, in a study on dogs, showed that creatine supplementation increased whole body protein synthesis. Their studies showed that creatine increased muscle mass and improved muscle performance. Their work on dogs preceded the popular study by Greenhaff on humans in 1994, which led to the popularity of creatine monohydrate among human athletes.



D.B. Dill from the Harvard fatigue laboratory did much of the early work on sports drinks using dogs. Dill's work showed the importance of hydration for health, performance, and the prevention of heat stroke and heat exhaustion. His early work included the effects of nutrients in fluid replacement beverages on performance and well being.

We've gone through a sea of change in America regarding protein intake and muscle. Formerly the exclusive domain of athletes, protein supplements have trickled down to working people trying to take the edge off their hunger during the day. Protein has evolved from a questionable supplement for overgrown bodybuilders to lunchbox food for seniors.

## *Muscle is a Dog's Best Friend*

As noted earlier, loss of muscle tissue is called sarcopenia. Some giant breeds of dogs are seniors at age two and up, and start to lose muscle tissue. A basic problem is that their anabolic signaling chemistry is muted. Signaling is especially important in large breeds. Their body does not respond to dietary protein as it did when they were young.

Fortunately, signaling chemicals such as the amino acid leucine are easily consumed in the diet. Here's what the latest science says about growing bigger, stronger, healthier dogs. Think of it as a megaphone signaler.

Scientists have finally uncovered the secrets of muscle growth. Even 10 years ago the chemical processes governing hypertrophy and breakdown in muscle were mysteries. That's changed. New techniques using radioactive tracers, CT scans, and MRI showed scientists the precise ways in which the cells make new muscle proteins. Our new understanding helps take away the guesswork about animal nutrition. Pet owners who know this information have healthier, happier dogs.



**New understanding helps take away the guesswork about animal nutrition.**

Sports nutrition research first took off in the 1960s and 70s. Predictably, most researchers focused on carbohydrates. Protein and amino acids were put on the back burner. We learned a lot about metabolism and the heart, lungs, and blood vessels but not much about muscles and the best ways to make them bigger and preserve their mass. Fortunately, our knowledge of muscle protein synthesis has grown in leaps and bounds in the past 10 years, which will help improve canine nutrition.

## **Muscle Growth Basics**

Muscle protein synthesis is the same in dogs and humans. Proteins give muscles bulk and make them contract. The nucleus is the control center for protein production in muscle cells. Muscle cells contain many nuclei, which makes it easy for them to make new protein. The nucleus contains DNA, which serves as the blueprints for making new proteins. The DNA does not cause protein synthesis directly. Rather, information about protein structure stored in the DNA is passed on to messenger RNA (mRNA) in a process called transcription.

Proteins are made from amino acids on cell structures called ribosomes. After DNA provides the blueprint for



**Muscle protein synthesis is the same in dogs and humans.**

making protein, mRNA leaves the nucleus and moves into the interior of the cell where it binds with the ribosomes. The ribosomes read the information from mRNA and then combine amino acids to form new proteins in a process called translation. Transfer RNA (tRNA) lines up specific amino acids for protein synthesis.

When muscle fibers expand in size and get stronger (hypertrophy) the muscle cells create satellite cells— muscle cells consisting of just a nucleus. Muscle growth factors can cause the satellite cells to combine with muscle cells that were stressed or damaged during training and assist in cell repair and adaptation. Satellite cell formation is extremely important because it maintains a balance between the number of cell nuclei and cell mass.

## *Muscle is a Dog's Best Friend*

Muscle cells go into overdrive to make new proteins following meals high in proteins and amino acids. Measurable changes in muscle size take weeks. Why does it take so long? Muscle size reflects the balance between making new protein and breaking down old protein. Muscle breakdown accelerates with age— often exceeding the rate of protein synthesis. Catabolic (breakdown) hormones, such as corticosteroids, and anti-growth factors, such as myostatin, speed the rate of muscle breakdown. The nutritional goal for dogs is to maximize the rate of muscle protein synthesis and slow the rate of muscle loss that occurs with age.



**Muscle breakdown accelerates with age — often exceeding the rate of protein synthesis.**

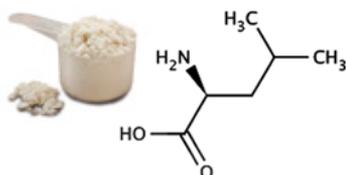
## **Nutrition and Healthy Muscle Tissue in Dogs**

Muscle is the largest protein-based tissue in the body. Muscle proteins are made constantly and then broken down into amino acids. Amino acids are the building blocks of proteins. Muscle destruction appears very wasteful, but it serves as tissue quality control, which eliminates damaged proteins and allows the muscles to work at peak levels. Also, the amino acids released during protein breakdown are used for fuel and help maintain blood sugar.

Optimal amino acid transport requires an adequate concentration of amino acids in the blood and muscles. Usually, this is not a problem because most dogs take in enough protein in their diets to supply the muscles with plenty of amino acids. However, as dogs age they become less sensitive to amino acid intake. In effect, the aging body does not hear the signal.



**Leucine**  
Triggers  
muscle growth



### **Leucine**

The amino acid leucine is an important nutrient that promotes protein synthesis in your dog's muscles. Leucine activates the mTOR pathway, which triggers muscle growth, and serves as a building block for muscle protein synthesis. Leucine supplements increases muscle weight and improve blood sugar regulation. Whey protein is high in leucine, but several recent studies found that combining whey and

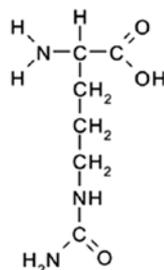
## Muscle is a Dog's Best Friend

leucine supplements works better than consuming either supplement by itself. Increasing leucine intake in aging dogs promotes muscle protein synthesis and prevents atrophy.



### Citrulline

Influences  
blood  
flow



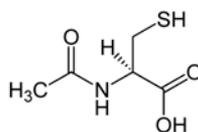
## Citrulline

This is an important amino acid involved in the formation of urea. It is an effective component in canine food supplements because it participates in key amino acid reactions and influences blood flow by increasing nitric oxide levels. Nitric oxide is an important chemical secreted by the endothelium— the inner lining of the blood vessels.



### NAC

Rids the body  
of toxic chemicals



## NAC (N-Acetyl-Cysteine or acetylcysteine)

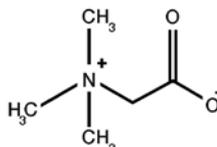
NAC is a natural amino acid by-product found naturally in foods that fight free radicals, and improves metabolic health. For humans, physicians often use it to break up mucus accumulation in the lungs in conditions such as emphysema, pneumonia, bronchitis, and tuberculosis. NAC works together with glutathione to help rid the body of toxic chemicals.

## Muscle is a Dog's Best Friend



### TMG

Increase muscle mass,  
maintains liver, heart,  
and kidney health



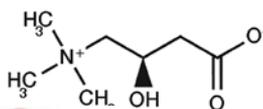
### TMG (trimethylglycine or betaine)

This is an amino acid compound found in wheat, spinach, shellfish, and sugar beets. It is an important regulator of body water and is useful in reducing levels of an inflammatory chemical called homocysteine. Ranchers use TMG to increase muscle mass in domestic animals. It assists glutathione with detoxification reactions in the liver and is useful for preventing depression. It is an important canine nutrient that is rapidly absorbed and utilized as an osmolyte (fluid regulator) and participates in amino acid reactions that help maintain liver, heart, and kidney health.



### Carnitine

Influences lifespan



### Carnitine

It is a chemical compound formed from the amino acids lysine and methionine. It is critical for transporting fatty acids from the cell interior into the mitochondria. Carnitine helps break down long-chain fatty acids and promotes oxygen consumption. The mitochondria are the powerhouses of the cells that provide your dog's energy needs, exercise capacity, and greatly influence lifespan. Carnitine is a promising

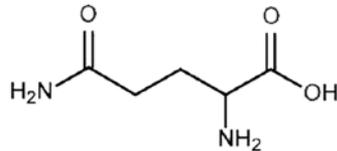
## *Muscle is a Dog's Best Friend*

supplement because it might boost cell energy levels and increase the size and number of mitochondria.



### **Glutamine**

Promotes healing and recovery



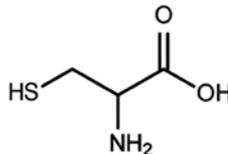
## **Glutamine**

It is an amino acid that plays an important role in the function of your dog's immune system. It is the most abundant amino acid in the body but can be depleted during trauma or illness. Glutamine is a non-essential amino acid important in protein and DNA synthesis, preservation of the immune system, acid-based balance, and fuel for the central nervous system. Glutamine promotes wound healing and speeds recovery from serious illnesses, injury, and trauma. In humans, several studies found a relationship between depressed immune function and low levels of glutamine.



### **L-Taurine**

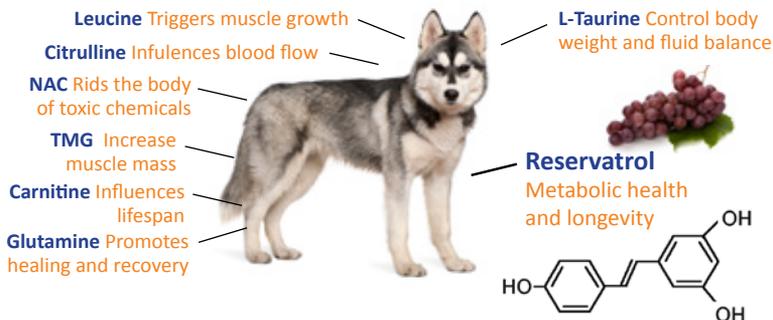
Control body weight and fluid balance



## **L-Taurine**

It is produced during the metabolism of the amino acid cysteine. It crosses the blood-brain barrier and is involved in a variety of brain functions. It is also involved in the control of body weight and helps regulate fluid balance. It may also be useful in regulating liver metabolism.

## Muscle is a Dog's Best Friend



## Resveratrol

Red wine and grape seeds contain a powerful chemical called resveratrol that prevents cell damage, increases HDL (good cholesterol), and prevents blood clot formation and chronic inflammation. Studies on mice and rats found that resveratrol increased lifespan, prevented cancer and cardiovascular disease, and improved blood sugar regulation. Resveratrol has powerful effects on metabolism that could protect dogs from premature aging. Your dog's metabolic health, longevity, and physical performance depend on using energy efficiently and minimizing DNA and cell damage from environmental stressors.



High quality dog nutritional products should promote growth, supply antioxidants to prevent cell damage, and prevent inflammation. Harnessing metabolism is the key to improving your dog's metabolism, increasing longevity, preventing obesity, and blocking inflammation.

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Muscle is a Dog's Best Friend

# GO DOG™

A true sports drink for dogs! Energy, hydration, and oxygen boosting, so you can beat the heat this summer and save your dog's life!

## FOR

**For Active Dogs**

## HOW TO

Pour into standard water bottle almost filled with clean water. Shake and feed to dog before, during, and after exercise.

## SIZES

Available in 1.25 lb. size

## INGREDIENTS

GoDog Performance Factors™ Glucose polymers (long chain complex carbohydrates), Resistant starch, Medium-chain triglycerides, Protein-free tallow, Potassium L-lactate, Sodium L-lactate, O2Boost™ (L-Citrulline, L-Citrulline Malate, D-Ribose, Potassium ascorbate), Magnesium orotate, GoDog Recovery Factors™ Cooked chicken, L-Glutamine, L-Leucine, L-Valine, L-Isoleucine, L-Taurine, L-Carnosine, ALA (alpha lipoic acid), L-Alanine, L-Glycine, Phosphatidylserine, GoDog Hydration Factors™ USP Glycerol, Sodium citrate, Potassium citrate, Potassium succinate, GoDog Antioxidant Factors™ Vitamin E (alpha-tocopherol), Calcium ascorbate (non-acidic source of vitamin C), GoDog Joint Factors™ TMG (trimethylglycine), Chondroitin sulfate, MSM (S-Adenosyl Methionine), Sodium hyaluronate (glucuronic acid N-acetyl glucosamine), Choline bitartrate, Calcium Lactate, Pyridoxine HCL, Inositol, Dicalcium phosphate, Zinc L-Aspartate, Folic acid, Manganese L-Aspartate, Thiamin monohydrate, Cyanocobalamin (B12), PABA.

## FEATURES

- Increases outdoor safety & fun
- Helps build stamina
- Aids O2 transport
- "Baits" water to motivate dogs to drink more and rehydrate
- Helps reduce muscle soreness
- Enhances mental focus



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Muscle is a Dog's Best Friend

# PEAK MUSCLE™

World's first K9 Gainer Supplement

## FOR

**For Big Dogs**

## HOW TO

Mix in to any food, wet or dry. Begin with 1/2 scoop, building up to full amount per dog's weight over two week period. Daily amount can be divided among feedings.

## SIZES

Available in 1 lb. and 4 lbs.

## INGREDIENTS

Rice bran, Chicken fat, Maltodextrin, Creatine, Whole Egg, Cooked chicken, Total Milk Protein, TMG, L-Citrulline, Sodium chloride, Vitamin E Supplement, Ferrous Sulfate, Ascorbic Acid (Source of Vitamin C), Vitamin A Palmitate, Zinc Sulfate, Niacin Supplement, Biotin, Vitamin D3 Supplement, Vitamin B12 Supplement, Riboflavin, Pantothenic Acid, Rosemary, Citric Acid, Brewer's Yeast Powder, Pyridoxine Hydrochloride, Thiamine Monohydrate, Manganese Sulfate, Potassium Iodide, Copper Carbonate, Folic Acid, and Cobalt Carbonate, L-Leucine, Fenugreek seeds.



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## FEATURES

- Egg, chicken, and milk proteins
- Leucine and creatine
- Rich in gamma oryzanol
- Built in multivitamin
- Developed by experts



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# HEALTHY GAINER™

**Natural appetite and weight gainer. Ideal for traveling and show dogs. Contains high density, low-residue calories, perfect for dogs attempting to add solid weight.**

## FOR

**For Finicky Eaters  
& Underweight Dogs**

## HOW TO

Just mix in with your dog's regular food, wet or dry. Begin with ½ scoop. Build up to full amount over two weeks. Daily amount can be divided among feedings. Amount fed can be tailored to individual dog's needs. See label for detailed directions based on dog's size.

## SIZES

Available in 1 lb. and 4 lbs.

## INGREDIENTS

Cooked chicken, Chicken fat, Maltodextrin, Molasses solids, Silica (flowing agent), Oat Fiber, Creatine monohydrate\*, L-Arginine, Taurine, Sodium chloride, Amylase, Protease, Protease II, Protease III, Peptizyme SP, Lipase, Cellulase, Lactase, Maltase, Invertase, Papain, Bromelain, Potassium chloride, Calcium citrate, Magnesium oxide, Potassium iodide, Choline bitartrate, Vitamin E (alpha-tocopherol), Pyridoxine HCL, Inositol, Di-calcium phosphate, Copper gluconate, Zinc oxide, Folic acid, Thiamin monohydrate, Calcium lactate, Sodium selenite, Wild blueberry extract, Raspberry, Raspberry seed extract, Cranberry, Prune, Cherry, Wild bilberry extract, Cobalamin (B12).



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## FEATURES

- Concentrated calorie source
- Promotes healthy appetite
- Aids normal digestion
- Natural antioxidants
- Digestive enzymes, amino acids, probiotics & more



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Muscle is a Dog's Best Friend

# SHOWSTOPPER™

Coat and skin optimizer. Helps turn average coats from good to great, and gives competition dogs that added advantage.

## FOR

**For Show Dogs  
and Special Pets**

## HOW TO

Just mix in with your dog's regular food, wet or dry. Begin with ½ scoop. Build up to full amount over two weeks. Daily amount can be divided among feedings. Amount fed can be tailored to individual dog's needs. See label for detailed directions based on dog's size.

## SIZES

Available in 1 lb. 4 lbs.  
7 lbs. 15 lbs. and 30 lbs. sizes

## INGREDIENTS

Chicken fat, Stabilized rice bran, Chicken, Silica dioxide, Creatine monohydrate, Canola oil, Safflower oil, Extra virgin olive oil, Evening primrose oil, FOS (fructo-oligosaccharides), Red cabbage, Sprouted broccoli, Citrus bioflavonoids, L-Glutamine, L-Arginine, L-Taurine, Freeze dried blueberry powder, Lactobacillus acidophilus casei/latis, Potassium chloride, Magnesium oxide, Sodium Chloride, Plant-derived DHA, Potassium iodide, Choline bitartrate, Vitamin E (alpha-tocopherol), Pyridoxine HCL, Lycopene, Beta Carotene, Inositol, Di-calcium phosphate, Copper gluconate, Zinc oxide, Folic acid, Thiamine monohydrate, Calcium lactate, PABA, Hyaluronic acid, Sodium selenite, Cobalamin.



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## FEATURES

- Rich in omega fatty acids
- Promotes glossy, shiny coat
- Supports healthy skin
- Antioxidant support
- With olive oil, probiotics & more



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Muscle is a Dog's Best Friend

# SUPER FUEL™

Body Builder & Performance Booster

## FOR

**For Working Dogs**

## HOW TO

**With Meals** Feed recommended dosage at meal mixed with dog food. Either pour and mix dry, or add 1-2 cups of water to make a delicious, awesomely powerful SuperFuel meal and/or...

**After Workouts** Feed K9 SuperFuel within a half-hour after exercise to support recovery. Mix 1-2 scoops in 1-2 cups water.

## SIZES

Available in 1 lb., 4 lbs. 8 lbs. 15 lbs.  
and 30 lbs. sizes

## INGREDIENTS

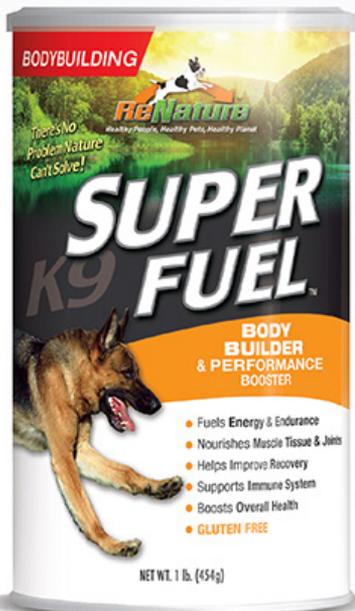
Cooked Chicken, Chicken Fat, Stabilized Rice Bran, Total Milk Protein, Colostrum, Canola Oil, Extra Virgin Olive Oil, MCTs (Medium Chain Triglycerides), Glucose Polymers, L-Leucine, L-Valine, Resistant Starch, L-Arginine, L-Taurine, Phosphatidyl-serine, Citrus Bioflavonoids, Beta-Carotene, Lycopene, Creatine Monohydrate, ALA (Alpha Lipic Acid), L-Glycerol, L-Sodium Citrate, L-Alanine, MSM (Methyl-Sulfonyl-Methane), Chondroitin Sulfate, Acetyl-Cysteine, Sodium Hyaluronate, Cruciferous Vegetable Mix Powder, Freeze Dried Blueberry Powder, Whole Leaf Barley Grass Extract, Green Tea Extract, Cranberry Fruit Powder, Streptococcus Faecium, Lactobacillus Acidophilus Casei, Lactobacillus Acidophilus Latis, Saccharomyces Cerevisiae, Lipase, Amylolytic, Beta-glucanase, Hemicellulase, Protease, Potassium Chloride, Potassium Iodide, Choline Bitartrate, Vitamin E, Pyridoxine HCL, Inositol, Di-Calcium Phosphate, Copper Gluconate, Zinc Oxide, Folic Acid, Thiamin Monohydrate, Sodium.



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## FEATURES

- Feeds muscle tissue
- Fuels energy & endurance
- Nourishes joints
- Improves recovery
- Supports immune system
- Boosts overall health



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Muscle is a Dog's Best Friend

# HARD DOG™

Lean Muscle Supplement

## FOR

**For Hardcore Dogs**

## HOW TO

Mix with dry, wet or raw food. Add enough water to make thick "soup." Give 1 scoop per 25 lbs. of body weight. Double serving size in times of intense training or stress.

## SIZES

Available in 1 lb. and 4 lbs.

## INGREDIENTS

Cooked chicken, Cooked pork, Total milk protein, Egg Whites, Whey hydrolysates, Egg white hydrolysates, Creatine monohydrate, L-Leucine, Lutein, Coconut oil.



an *Animal Naturals* brand

## FEATURES

- 100% American proteins to help maintain lean muscle
- Zero sugar or lactose
- No added carbs
- Low residue, easy to digest



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