

DOGS: THE ULTIMATE ATHLETES

Well-conditioned dogs capture our attention with their intensity and the ease with which they perform their sport. As they run alongside their owners training for marathons or compete in the final round of an agility championship, our canine partners amaze us with their athleticism.

Contributing to their intensity, canine athletes have a higher VO₂ max – the rate of maximum oxygen use -- than average family dogs. Dogs also have a higher VO₂ max than humans. Consider this: Even average family dogs that are largely couch potatoes and sleep most of the day have more endurance than the most fit and conditioned human athlete, when comparing the VO₂ max.

This means dogs efficiently consume more oxygen when exercising at maximum capacity, giving them increased aerobic energy and endurance. Endurance for dogs is based on how well their body can use fat as energy, thus not primarily relying on and/or depleting the limited sugar energy stored in muscles and liver as glycogen. Fat oxidation provides most of the dog's energy at low rates

of energy expenditure. In contrast with humans, energy is more preferentially generated from glucose from glycogen stores. More specifically, for dogs, the amount of energy from fat oxidation at rest and during exercise is twice that in less aerobic species such as goats^{2,3}. In humans, carbohydrate oxidation supports the intermediate speed of marathon runners until all glycogen stores have been depleted, whereupon fat oxidation becomes the only source available for energy⁴. Depletion of glycogen stores in people results in an inability to accelerate. The consequence is stamina for humans is limited by the amount of glycogen in muscle, whereas in dogs, activation of fat metabolism and conversion of amino acids into glucose becomes initiated soon after exercise, thus contributing to an overall increased aerobic capacity and endurance.

Faster-paced running and sprinting deplete these sugar stores faster and result in a sensation of fatigue and lactic acid buildup. Fat burning for endurance is preferred during prolonged exercise because of the limited amount of stored glycogen in muscle, the equivalent amount of fat in muscle provides dogs 50 times more energy stores. Burning fat for energy requires more oxygen, which is why aerobic metabolism is linked to endurance.

A successful training strategy is to train the muscles to be better at burning fat and save the limited stores of carbohydrates for intense exercise when they are essential for performance. Increased fat metabolism and higher oxygen capacity help to increase metabolic capacity and generate energy.



A dog's diet is the foundation that supports performance. High carbohydrate diets increase stamina in human athletes by increasing muscle glycogen⁴, but high carbohydrate diets have the reverse effect in dogs, as stamina is reduced⁵ and VO₂ max becomes lower^{6,7}.

Therefore, a dog's diet should not only be complete and balanced, but for a more optimized performance, it should contain a highly digestible source of fat and protein to "metabolically condition" its muscles and metabolism for exercise, as well as provide energy that is readily available for hard work.

Purina Pro Plan realizes the importance of providing canine athletes with proper nutrition to provide a more optimized energy balance. This is why the Purina Pro Plan Sport dog food formulas contain high levels of fat, not carbohydrates, to provide energy. A diet high in fat and protein will increase an active dog's metabolism and endurance.



FACTOID

Canine athletes and hardworking dogs should be fed a high-fat, high-protein performance formula year-round to help maximize training and conditioning.

Did you know that a dog food high in fat and protein can help boost a dog's metabolism and endurance?

It is not recommended to feed canine athletes and hardworking dogs before exercise. In most cases, a dog should be fed 30 to 60 minutes after exercise or a minimum of 10 to 12 hours before exercise. Ideally, a dog should be fed the night before exercise the next morning, as complete digestion takes 20 to 24 hours.

To learn more about dogs as athletes, you may read the article cited above as well as this research abstract.

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