Breaking News! Breaking News!

X-FACTOR™

FINALLY - The Discovery of the Anabolic Secret of Red Meat!

Jupiter, FL, March 19, 2003 -- Molecular Nutrition has unlocked the anabolic secret of red meat with its revolutionary new supplement, X-Factor™! Bodybuilders have known for ages that red meat is an aggressive muscle and strength builder, offering benefits far beyond its protein content alone. Anyone will tell you that if you want to pack on serious mass, you need red meat - lots of it! X-Factor™ is here to take the anabolic power of red meat to the next level, supplying high levels of what, according to its inventor William Llewellyn, is red meat's most precious nutrient for muscle growth: arachidonic acid. Arachidonic acid is actually the chemical messenger first released by your muscles during intense weight training, controlling the core physiological response to exercise and regulating the intensity of all growth signals to follow. By allowing a much greater retention of arachidonic acid in skeletal muscle tissue than diet alone would provide, X-Factor™ is the only supplement in history to support the very "core" of muscle growth. Amplify the protein synthesizing intensity of each workout far beyond what you were achieving before!

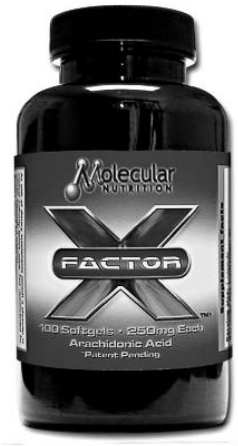
What is Arachidonic Acid?

Arachidonic acid is an essential fatty acid, which is consumed in small amounts in our regular diets. It is found mainly in the fatty parts of meats and fish (largely in red meat), so vegetarians usually have lower levels of arachidonic acid in the body than those with omnivorous diets. The intake even in meat-eaters is still small, owing to how little is actually found here. For example, the visible fat area on beef only contains anywhere from 20 to 180 milligrams of arachidonic acid per 100 grams (nearly a quarter pound) of fat! In the lean portion of meat the arachidonic acid content is lower. Since this particular fatty acid is so scarce, the average western diet provides only about 230 milligrams of this important nutrient to each of us per day. And being that arachidonic acid is found in lower concentrations in lean meats, bodybuilders who adhere to strict low-fat diets could potentially be ingesting even less. Given how important this nutrient is to our bodies, we may all want to start paying very close attention to its intake. As we find, it may be a great benefit to us all to have a little more of it.

Arachidonic acid is considered an "essential" fatty acid because it is an absolute requirement for the proper functioning of the human body. In this case it is vital to the operation of the prostaglandin system. More specifically, it is the base material used by the body to synthesize a key series of hormones referred to collectively as dienolic prostaglandins (the major prostaglandins in mammals). This includes the prostaglandins PGE2 and PGF2a, which are the primary focus of our investigation. The ability of the body to output normal levels of these prostaglandins is therefore directly dependent of the availability of this fatty acid. This is of crucial importance to the athlete, because among several other important physiological roles, prostaglandins are integral to protein turnover and muscle accumulation. They operate right at the very core of muscle growth, and are responsible for regulating the direct local (muscular) response to physical exercise.

Prostaglandins and Anabolism

Prostaglandins begin to exert their strong effects on muscle growth immediately following physical exertion. More specifically, it is the stretch stimulus provided by eccentric muscle contraction that first triggers the local synthesis of these hormones. They in turn play a pivotal role in what will be going on in your muscles during the days of recovery that will follow. A study published in the American Journal of Physiology in 1990 perhaps looks most closely at the relationship between prostaglandins, protein turnover and the growth response to physical exercise . In this investigation, skeletal muscle cell preparations were incubated under stretch stimulus to replicate the stimulation of exercise, and protein turnover was measured by quantifying the incorporation of the labeled amino



acid phenylalanine into muscle tissue. During the first 5 hours of stimulation, PGE2 and PGF2a prostaglandin levels increased 101% and 41% respectively (PGE2 is tied to the initial damage response to exercise). PGF2a remained elevated for 48 hours, and correlated with a 52-98% long-term increase in protein synthesis. Additionally, several

other studies point to PGF2a, specifically, as being the prostaglandin most closely tied to increases in skeletal muscle protein synthesis .

Studies with drugs that inhibit the conversion of arachidonic acid to prostaglandins perhaps give us an even better way of seeing just how important these hormones are to muscle growth. In March 2002 just such a study was published. It involved a group of 24 recreationally active young male subjects, who were given maximum OTC doses of ibuprofen (1,200mg/day) or acetaminophen (4,000mg/day) and subjected to resistance training. These two popular over-the-counter pain relief medications are known to work by inhibiting the enzymes responsible for prostaglandin synthesis. Amino acid turnover was measured for 24 hours following the bout of exercise, which allowed the investigators to determine what effect, if any, these drugs would have on protein breakdown and synthesis. It turned out that both ibuprofen and acetaminophen effectively blunted the normal post-exercise rise in protein synthesis, which was increased 76% above baseline in the group taking only the placebo. A follow up investigation using the same conditions and subjects demonstrated that both drugs blocked the normal post-exercise rise in PGF2a, specifically. Together these studies show us how strongly prostaglandins actually support the basic process of muscle growth. Without them there is no growth; it is as simple as that.

Release During Exercise

The role arachidonic acid plays in muscle growth must be looked at as much more than just that of a precursor to prostaglandins. Skeletal muscle tissue has no capacity to actually store prostaglandins, so the only local source for PGF2a is the arachidonic acid that is retained in the outer phospholipid layer of each cell. Even more importantly, it is the stretching of muscle fibers during intense physical exercise that causes arachidonic acid to be released and metabolized to active prostaglandins. Arachiconic acid release is therefore the very first trigger in a long cascade that controls the rebuilding and strengthening of muscle tissue after exercise. A study conducted at the Rowett Research Institute in the U.K. illustrates this relationship. Here, researchers used similar muscle incubation and stretching techniques to the 1990 American Journal of Physiology study to demonstrate that it is arachidonic acid release, not stored prostaglandins, that serves as the core stimulus for protein synthesis. Their work was summarized by the participants well when they noted, "…the link between mechanical activity and protein synthesis… is most simply explained by the assumption that free arachidonic acid is released by stretching, is retained intracellularly and continues to be metabolized to the prostaglandins." Two additional studies by Palmer and colleagues at the Rowett Institute support the same conclusion.

Exercise and AA Concentrations

To make things a little more difficult for athletes, both animal and human studies show that exercise lowers the content of arachidonic acid in skeletal muscle tissue. One such investigation divided human subjects into exercise and sedentary (inactive) groups, giving both the same standardized diet with an equivalent makeup of fatty acids and arachidonic acid (total food intake varied slightly between groups). The sedentary group noticed about a 5% increase in arachidonic acid concentrations during the course of the study, while the exercise group exhibited a moderate 7-8% depletion of this fatty acid. This was in spite of the fact that the exercise group actually consumed 13% more food on average compared with the sedentary group, which would account for a slightly greater total intake of fatty acids. Since dienolic prostaglandin synthesis is inextricably tied to the amount of available arachidonic acid, lower levels can only result in less arachidonic acid being release with the stretching of eccentric exercise, as well as less muscle-building PGF2a being synthesized to increase muscle protein synthesis.

AA Loading

In June of 2001, a paper was published in the journal "Lipids" that reviewed many of the medical studies over the past few decades concerning the sources of arachidonic acid in the body. Among other things, this paper discussed several studies that looked at the effect of short-term diets very rich in arachidonic acid. In going over both animal and human data, the authors consistently noted strong increases in the arachidonic acid content of various body tissues with supplementation of higher levels than the normal diet would provide. One such concerned a series of studies actually, where human subjects ingested 1.7grams per day of arachidonic acid for 50 days. This extensive investigation reported that arachidonic acid at this level in the diet nearly doubled the arachidonic acid content of plasma phospholipid, and also significantly increased the content of this fatty acid in platelet, red blood cell, and tissue lipids.

Another investigation specifically looked at what effect high tissue concentrations of arachidonic acid would have on the prostaglandin system. Investigators loaded high levels of arachidonic acid in the body by requiring subjects to consume 6 grams daily for 2-3 weeks in the form of its ethyl ester. Researchers noted a significant retention of arachidonic acid in the lipids of all tissues measured. In addition, there was a significant increase in the output of prostaglandin metabolites during the course of the study (they looked at E series prostaglandin metabolites specifically). In 3 of the 4 subject s studied, the increase in prostaglandin output was a remarkable 47%, indicating a dramatic rise in the synthesis rate of these hormones. The authors concluded that supplementing precursor fatty acids in high levels augments the biosynthesis and function of

prostaglandins. The arachidonic acid intake studies help us establish not only that we can use X-FACTOR™ to supplement normal dietary levels of this nutrient, but also that that it can be used to enhance our level of stored arachidonic acid in muscle tissue above normal and heighten the sensitivity of the prostaglandin system to exercise.

Supplement Safety

For those concerned that there might be immediate cardiovascular health concerns with taking a "red meat" nutrient like arachidonic acid, we should refer to a study conducted back in 1997 that looked very closely at the effect of high doses on blood lipoprotein and lipid values known to be risk factors for cardiovascular disease. This investigation, again, involved consuming 1.7grams per day, and ran for a period of 50 days. Noting that subjects were consuming this fatty acid in levels eightfold of the average western diet, researchers reported no adverse effects on plasma cholesterol or triglyceride concentrations at all. Both good (HDL) and bad (LDL) cholesterol seemed unaffected during the course of the study. Thus, we can conclude that while feeding increased amounts of arachidonic acid will increase its content in tissue phospholipids, and by extension the responsiveness of the prostaglandin system dependent on this fatty acid, it does not appear that doing so involves any increased cardiovascular health risks (provided you are healthy to begin with). This product, however, is not recommended if you have diabetes, asthma, high blood pressure, high cholesterol, arthritis, heart disease, are pregnant, or are suffering from any inflammatory diseases. Consult with your physician before use if you are taking any medications, or suffer any health conditions where red meat consumption is restricted.

What the Research Tells Us

The above studies on prostaglandins and arachidonic acid have been taken from several different areas of medical research, and tie-in together to reveal the role this nutrient will play as a muscle-building supplement. They show not unfulfilled promises and the typical "yet another worthless supplement" scenario, but a scientifically well-supported new method for increasing muscle growth. To summarize what we have learned in their review, we can highlight several very important key points. 1) Prostaglandins are the very core stimulators of protein synthesis following exercise. 2) The synthesis of prostaglandins is dependent on levels of available arachidonic acid. 3) The body stores arachidonic acid in muscle tissue, not active prostaglandins. 4) Arachidonic acid is released from the outer phospholipid layer of muscle cells during the stretching caused by exercise. Once freed, it is rapidly converted to active prostaglandins. 5) Exercise lowers the levels of arachidonic acid in muscle tissue. 6) Consuming higher than normal levels of arachidonic acid will result in the greater retention of this fatty acid in body tissues, which should markedly enhance the output of anabolic prostaglandins in response to physical exercise.

References

Reduced arachidonate in serum phospholipids and cholesterol esters associated with vegetarian diets in humans. Phinney et al. AM. J. Clin. Nutr. 51:385-92

Contribution of meat fat to dietary arachidonic acid. Li, Ng, Mann, Sinclair. Lipids 1998 33(4):437-40

A human dietary arachidonic acid supplementation study conducted in a metabolic research unit: rationale and design. Lipids 32:415-20

Goodman & Gilman's The Phamacological Basis of Therpeutics. Ninth Edition. Joel G. Hardman, Alfred Goodman Gilman, Lee E. Limbird. ©1996 The McGraw-Hill Companies

Stretch-induced prostaglandins and protein turnover in cultured skeletal muscle. Vandenburgh et al. Am J Physiol 1990 v.259 pg.C232-40

Arachidonic acid, Prostaglandin E2 and F2a Influence Rates of Protein Synthesis in Skeletal and Cardiac Muscle. Rodemann, Goldberg. J. Biol. Chem. 257(4) 1632-8 1982

The possible involvement of prostaglandin F2 alpha in the stimulation of muscle protein synthesis by insulin. Biochem Biophys Res Commun. 1983 Nov 15;116(3):1084-90.

The influence of changes in tension on protein synthesis and prostaglandin release in isolated rabbit muscles. Palmer RM, Reeds PJ Biochem J 1983 Sep 15;214(3):1011-4

Arachidonic acid, Prostaglandin E2 and F2a Influence Rates of Protein Synthesis in Skeletal and Cardiac Muscle. Rodemann, Goldberg. J. Biol. Chem. 257(4) 1632-8 1982

Effect of ibuprofen and acetaminophen on postexercise muscle protein synthesis. Trappe, White et al. Am J Physiol Endocrinol Metab. 2002 Mar;282(3):E551-6.

Mechanism of acetaminophen inhibition of cyclooxygenase isoforms. Ouellet M, Percival MD. Arch Biochem Biophys 2001 Mar 15;387(2):273-80

Inhibition of cyclooxygenase-1 and -2 by R(-)- and S(+)-ibuprofen. Boneberg EM, Zou MH, Ullrich V. J Clin Pharmacol 1996 Dec;36(12 Suppl):16S-19S

Skeletal muscle PGF(2)(alpha) and PGE(2) in response to eccentric resistance exercise: influence of ibuprofen acetaminophen. Trappe, White et al. J Clin Endocrinol Metab. 2001 Oct;86(10):5067-70.

Protein synthesis in isolated forelimb muscles. The possible role of metabolites of arachidonic acid in the response to intermittent stretching. Smith, Palmer et al. Biochem J. 1983 214,153-61

The influence of changes in tension on protein synthesis and prostaglandin release in isolated rabbit muscles. Palemr, Reeds et al. Biochem J. 1983 214,1011-14

Protein synthesis and degradation in isolated muscle. Effect of n3 and n6 fatty acids. Palmer, Wahle. Biochem J. 1987 242, 615-18

Regular exercise modulates muscle membrane phospholipid profile in rats. Helge et al. J. Nutr. 1999 129:1636-42

Exercise training reduces skeletal muscle membrane arachidonate in obese (fa/fa) Zucker rat. Ayre et al. J. Appl. Physiol. 1998 85(5):1898-1902

Effects of physical exercise on phospholipid fatty acid composition in skeletal muscle. Andersson et al. Am. J. Physiol. 274 (Endocrinol. Metab. 37):E432-38 1998

Sources of eicosanoid precursor fatty acid pools in tissues. Zhou, Nilsson. L. Lipid Res. 2001. 42:1521-42

A human dietary arachidonic acid supplementation study conducted in a metabolic research unit: rationale and design. Lipids 32:415-20

Effects of dietary arachidonic acid on human immune response. Nelson et al. Lipids 32:449-56

Effects of dietary arachidonic acid on metabolism of deuterated linoleic acid by adult male subjects. Nelson et al. Lipids 33:471-80

Influence of dietary arachidonic acid on metabolism in-vivo of 8cis,11cis,14-eicosatrienoic acid in humans. Nelson et al. Lipids 32:441-48

Increased arachidonate in lipids after administration to man: Effects on prostaglandin biosynthesis. Seyberth et al. Clin. Pharm Ther. 1975 18(5) 521-9

The effect of dietary arachidonic acid on plasma lipoprotein distributions, apoproteins, blood lipid levels, and tissue fatty acid composition in humans. Nelson, Schmidt et al. Lipids 32:427-33 1997