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THE BETTER HEALTH NEWS

LINK BETWEEN KNEE INJURIES AND MENSTRUAL CYCLE

SPORTS

According to researchers, in female athletes, knee injuries are more likely to occur when estrogen levels are highest. A research project conducted in 1997 by the University of Michigan and the Cincinnati Sports Medicine Clinic studied 40 female athletes with acute anterior cruciate ligament injury (a ligament that supports the knee—these are serious injuries that often require surgery).

Injuries to the anterior curciate ligament (also called the ACL) are becoming increasingly common in women. The researchers found that ACL injuries were more common during the ovulatory phase of the menstrual cycle—this is when the estrogen levels are at their highest. This occurs around the middle of the cycle (between days 10 and 14). The scientists think that estrogen and relaxin may possibly have a pronounced effect on the mechanics of connective tissue like ligaments and tendons, and on neuro-muscular systems in women.

The study also found that just under two-thirds of the ACL injuries in the women studied occurred during a game. Almost two-thirds of the injuries happened during the first half-hour of play. The injuries did not seem to be influenced by the type of shoes that were worn.

It is possible that women have more knee injuries because of their body mechanics. For example, wider hips place greater pressure on the inside of the knee and less leg-muscle strength and endurance. Some believe that women's knees are more susceptible to knee injury because female athletes, in general, rely excessively on their quadricep muscles and too little on their hamstrings. These mechanical considerations do not explain the possible connection between knee injuries and hormone levels.

D-RIBOSE FOR CELLULAR ENERGY

D-ribose is a naturally occurring five-carbon sugar found in all living cells. Though not an essential nutrient since it can be made in the body from other substances such as glucose, D-ribose, however, is very essential for life. Some of the most important biological molecules contain D-ribose, including ATP (adenosine triphosphate), all the nucleotides and nucleotide coenzymes and all forms of RNA (ribonucleic acid). D-ribose in RNA and D-deoxyribose in DNA may be considered genetic sugars. Since D-ribose is ubiquitous in living matter, it is ingested in our diets. Supplementally, it enhances energy significantly when additional support is needed.

Supplemental D-ribose may have metabolic cardioprotective activity. In supraphysiological amounts, D-ribose may serve as a precursor to 5-Phosphoribosyl 1-pyrophosphate (PRPP), which allows for synthesis of purine nucleotides and ATP, the energy molecule produced in the mitochondria, as well as L-histidine and pyrimidine nucleotides. Scientists have found that oral or intravenous ribose can rapidly restore ribose levels in nerves and muscles and dramatically improve recovery of failing ATP levels as during and following acute or chronic hypoxia or ischemia. Research has shown that taking D-ribose has a positive effect on ATP production in all muscle fiber types, especially the heart. D-ribose supplementation increases the de novo production of ATP through oxidative phosphorylation by 340 to 430 percent. It activates material salvaging, causing nucleotides to be revitalized into the manufacture of ATP by over 700 percent. The heart being very dependent on ATP, especially when ATP levels are low, is double pressed to pump harder to get more oxygen to the cells for increased ATP synthesis. D-Ribose obviously helps save the situation by providing the material for the manufacturing of ATP, as well as for quickly needed genetic nucleotide components generally.

Research Summaries: In a study of 20 men (aged 45 to 69 years) with documented severe coronary artery disease and a history of angina induced by normal daily activities, 60 grams of ribose (in four doses of 15 grams each) were tested against placebo. Treated subjects exhibited improvement as measured both electrocardiographically and time to onset of moderate angina during exercise testing. There was no significant electrocardiograph improvement in the placebo group, and there was no significant difference between the groups in time to onset of moderate angina. However, the authors concluded: "In patients with CAD, administration of ribose by mouth for three days improved the heart's tolerance to ischemia. The presumed effects on cardiac energy metabolism offer new possibilities for adjunctive medical treatment of myocardial ischemia." Besides improving diastolic function parameters following ischemia,

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D-ribose demonstrates a benefit in ventilatory efficiency, one of the most powerful predictors of survival in congestive heart failure patients. This is more than likely also due to increased efficiency in the same blood volume.

In other studies, patients treated with D-ribose showed significant, positive improvement in ventilatory efficiency as well as oxygen uptake efficiency, and stroke volume, the amount of blood the heart pumps with each beat. In patients undergoing "off" pump coronary artery revascularization, those treated with D-ribose demonstrated a 49% greater increase in cardiac indices compared with the control group. One case reported a patient with adenylosuccinate deficiency whose neurological symptoms (behavior and seizure frequency) improved with supplemental D-ribose. There are no known contraindications for its use.

CO Q_{10} AND SPORTS PERFORMANCE

Coenzyme Q_{10} is also known as ubiquinone. The letter Q refers to quinone, which is a chemical group derived from aromatic rings. The number 10 refers to the 10 isoprene (CH2=C(CH3) CH=CH2) units attached to the molecule. CoQ_{10} is found in all human cells. It is found primarily in the mitochondria and is vital for the production of energy in the cell. CoQ_{10} is found in high levels in cells that require a lot of energy, like the cells of the heart, liver and kidney. CoQ_{10} is oil-soluble and also acts as an antioxidant.

Since it is so important for cellular energy, CoQ_{10} turns out to be a great supplement for sports performance. A study appearing in the *British Journal of Nutrition* (2008, 100: 903-9097) looked at CoQ_{10} supplementation and muscle damage after intense exercise. This was a double-blind, placebo controlled study. Athletes were given either 300 mg of CoQ_{10} or a placebo for 20 days. During the course of the study they exercised intensely for $5^{1/2}$ hours each day for six days Blood tests to indicate the level of muscle damage were taken (myoglobin, and creatine kinase). The muscle-damage indicators increased in both groups, but were significantly lower in the group receiving the supplement.

Another double-blind, placebo-controlled study, appearing in the *Journal of the International Society of Sports Nutrition* (2008; 5(1): 8) looked at CoQ_{10} supplementation along with athletic performance. The participants of the study were 22 trained athletes and 19 untrained subjects. An hour before a series of exercise tests they were randomly given either a placebo or 200 mg of Coenzyme Q_{10}. Blood samples and muscle biopsies were taken before and after exercise. The subjects were then given either a placebo or 100 mg of Coenzyme Q_{10} twice each day for a period of two weeks. At the end of the period they performed the same exercises and were tested in the same way. A trend for increased time to exhaustion was observed following 2 weeks of CoQ_{10} supplementation.

Just play. Have fun. Enjoy the game.

Michael Jordan

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EXERCISE PAIN

There is some evidence that taking enzymes can reduce pain and inflammation, and improve healing. Usually enzymes are taken to aid digestion. When they are taken on an empty stomach, they act to clean up the debris left over from the chemical warfare of inflammation. One study in the *Journal of Strength and Conditioning Research* (2007 Aug;21(3):661-7) showed that taking enzymes reduced loss of strength due to muscle damage following exercise. Another study in *Clinical Experimental Rheumatology* (Jan-Feb;24(1):25-30) compared enzyme supplementation to NSAID use in patients with osteoarthritis of the hip. The double-blind, placebo controlled study lasted six weeks and involved 90 subjects and found that enzyme to be comparable to the drug in relieving pain, joint stiffness and improving function.

Antioxidants in cherry juice also can mitigate pain from exercise. According to research submitted to the 2009 annual meeting of the American College of Sports Medicine (abstracts 851 and 852), consuming tart cherry juice can reduce pain from exercise. Healthy runners between the ages of 18 and 50 were randomly selected to receive either tart cherry juice or a placebo to drink one week before the race. The group who drank the cherry juice reported less pain. Another study had 14 women with fibromyalgia drink either tart cherry juice or a placebo for 10 days to determine its effect on muscle pain and strength after exercise. Once again, the group receiving the cherry juice had less pain and more strength.

It makes sense, according to an article appearing in the *Journal of Natural Products* (1999;62(2):294-296), substances in tart cherries, called anthocyanins and cyanidin are both antioxidant and anti-inflammatory. Another article in the *Clinical Journal of Pain* (January/February 2004;20(1):19-26) mentions that substances in tart cherry juice are anti-inflammatory.