

NEWS

The University of Texas Health Science Center at Dallas
5323 Harry Hines Boulevard Dallas, Texas 75235 (214)688-3404

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Contact: Ann Williams

Office: 688-3404

Home: 375-6043

*****Alcohol causes phosphorus deficiency in muscle.

DALLAS -- Phosphorus deficiency may be the cause of muscle injury in alcoholics. Studies done by Dr. James Knochel show that excessive alcohol consumption causes a phosphorus deficiency in dogs and the dogs show the same kind of muscle cell damage seen in human alcoholics.

Knochel, vice chairman of Internal Medicine at The University of Texas Health Science Center at Dallas and chief of the Medical Service at Veterans Administration Medical Center, says the blood phosphorus level stays normal but the muscle phosphorus decreases by one-third.

The dogs fed a "super-nutritious" diet with extra phosphorus and alcohol (the equivalent of a quart of Scotch a day) get the same kind of muscle damage as human alcoholics and as dogs fed a phosphorus-deficient diet. "The muscle leaks phosphorus in the presence of alcohol, and there's nothing you can do about it," says Knochel.

It's estimated that there are 30 million alcoholics in the United States. Five to 10 million require hospitalization due to accidents and disease each year. "This study might imply that every alcoholic has muscle cell injury, which may be the most common and important side effect of alcoholism," says Knochel.

"There's no evidence that social drinking will cause a phosphorus deficiency. It took a long time -- two months -- for the dogs to develop this, drinking the equivalent of a quart of whisky a day."

The research animals, which were monitored continuously during the study, maintained a normal amount of phosphorus in the blood, evidently because the muscle cells gave up phosphorus. "The muscle seems to be a reservoir for phosphorus," says Knochel. "It will give up its phosphorus for the vital organs -- the heart, brain and liver. The heart and brain phosphorus remain perfectly normal in animals deficient in phosphorus."

Why does alcohol cause a phosphorus deficiency? "My hunch is that alcohol interferes with the sodium transport into the cell, which interferes with the phosphate concentration inside the cell," says the researcher.

In previous studies, he has shown that hospitalized alcoholics are usually admitted with normal blood phosphorus levels. Within a few days of withdrawal from alcohol the blood level becomes abnormally low as the phosphorus is shifted into cells. The low blood level at this point may be the factor that precipitates muscle cell injury.

In addition to muscle injury, phosphorus deficiency also causes abnormalities in the blood cells, interfering with the body's ability to fight infection and with the blood's ability to oxygenate the tissues. The deficiency causes abnormalities of the central nervous system and can also affect the heart.

Symptoms of phosphorus deficiency include weakness, bone and muscle pain and tingling sensations. Eventually the deficiency will apparently affect every cell. Phosphorus is needed for maintaining the cell membrane, for activating enzymes, for maintaining the proper

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acid-base balance and to build ATP, the source of all energy for cell function. "Without phosphorus a cell can't feed itself," says Knochel. "It can't metabolize protein, fat or carbohydrates. Phosphorus deficiency can impair every biological process."

Other researchers involved in the study are Dr. Jon Blachley and Dr. John B. Johnson.

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