MedicalXpress

New research holds promise for development of new osteoporosis drug

October 4 2010

Researchers at the Hebrew University of Jerusalem have discovered a group of substances in the body that play a key role in controlling bone density, and on this basis they have begun development of a drug for prevention and treatment of osteoporosis and other bone disorders.

The findings of the Hebrew University researchers have just been published in the American journal *PNAS* (Proceedings of the National Academy of Sciences).

The research group working on the project is headed by Prof. Itai Bab of the Bone Laboratory and Prof. Raphael Mechoulam of the Institute of Drug Research at the Hebrew University, and includes post-doctoral fellow Reem Smoum and doctoral students Gary Millman, Orr Ofek, Alon Bajayo, Joseph Tam, Vardit Kram and associates from the United States.

Osteoporosis is the most widespread degenerative disease in the Western world and is expressed in the loss of bone mass and the weakening of bone structure, contributing to frequent bone fractures, disability and even death. The loss of bone mass in osteoporosis is caused by internal destruction of the bone tissue. With age, the quantity of bone tissue that is lost is greater than that which is created, which leads to the decrease in bone density.

In their current research, the researchers found that the bone cells produce a series of substances composed of fatty acids and amino acids

called "acyl amides." They then analyzed their precise chemical composition, created synthetic versions of them, and examined their effect on bone cell cultures.

In experiments on mice, they discovered that one of the compounds in the group of synthetic materials, oleoyl serine, increased bone density in both healthy and osteoporotic mice. They also found that the osteoporotic mice were actually missing the oleoyl serine in their bones. These findings, say the researchers, can serve as the basis for new drugs that can both prevent bone loss and boost bone formation and in this way reverse loss of bone tissue in osteoporosis patients.

Development of such a drug has begun in the laboratories of Prof. Mechoulam and Prof. Bab. Yissum, the technology transfer company of the Hebrew University, has submitted a patent application based on their work and is seeking a commercial partner for further development.

Prof. Mechoulam expressed confidence that their work showing bone mass accumulation would lead soon to the development of an effective osteoporosis drug. Drugs in use until now have worked to prevent further bone loss or to encourage bone formation, but none of them are able to accomplish both functions together as this new formula can do, said Prof. Bab.

The researchers noted that research in this field until now has been based primarily on proteins and genetics. Now, the Hebrew University researchers say, they have opened a new approach, called "skeletal lipidomics" based on the examination of substances in the skeleton containing fatty acids and amino acids. This has great significance in understanding the regulation of metabolism in bone and in other body tissues, they say.

Provided by Hebrew University of Jerusalem