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Researchers pinpoint osteoporosis genes

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A team of international researchers has identified 20 genes associated with osteoporosis and bone weakness, including 13 genes never previously associated with the disease. Osteoporosis is a highly heritable trait, but this marks the largest international effort to conclusively identify genes linked to the often-devastating bone disorder.

The study's co-first author is Dr. J. Brent Richards of the Lady Davis Institute for Medical Research at the Jewish General Hospital in Montreal, who collaborated with more than 30 co-authors worldwide. Their results were published recently in the journal *Nature Genetics*. The researchers reviewed data collected from nearly 20,000 individuals in five recent international genetic studies.

Osteoporosis reduces bone mineral density (BMD) and disrupts the microarchitecture of bone tissue, making bones more fragile and subject to fracture. The disease affects an estimated two million Canadians and 75 million people in the USA, Europe and Japan.

"Osteoporosis hip fractures alone cost $2.4 billion dollars per year in Canada in direct care," said Dr. Richards, a genetics researcher at the Lady Davis Institute and an assistant professor at McGill University's Faculty of Medicine. "Hip fractures are a common and costly condition which has a 50 percent mortality rate at two years, worse than some cancers."

Though it occurs in people of all ethnic groups, the lion's share of the osteoporosis burden falls on post-menopausal women of European and

Asian descent. According to the International Osteoporosis Foundation (IOF), one in three women over the age of 50 will experience osteoporotic fractures, as will one in five men. By 2050 the worldwide incidence of hip fracture is projected to increase by 310 percent in men and 240 percent in women.

"We were able to look across the whole human genome to try to identify which genes - of all the genes that we inherit - that seem to be responsible for osteoporosis," Dr. Richards explained. "Not only did we find 13 entirely new genes, we also demonstrated that some of these genes were related not just to bone density, but also to fracture risk itself."

Richards is optimistic that these results will bring practical benefits to patients.

"In order to better treat any condition, we need to know what causes it," he said. "We knew that one of the strongest factors in osteoporosis was genetic, but we didn't have a clear picture what those genetic factors were. This study affords us the opportunity to study the genetic mechanisms which control bone strength, and to intervene to prevent peoples' bones from getting weak. Also, if we are able to uncover more genes which influence bone strength, then we may be able to identify whole populations that require early preventive treatment."

Provided by Jewish General Hospital