OPEN ACCESS Freely available online

Journal of Osteoporosis and Physical Activity

Short Communication

The Link between the Variation in Bone Mineral Density and Types of Bone Diseases

Aaron Deng*

Department of Rheumatology, McMaster University, Hamilton, Canada

DESCRIPTION

Strong bones are necessary for our health. A Bone Mineral Density (BMD) check is the best way to measure bone health. It compares bone density, or mass, with a healthy person. Low bone mass that's not low enough to be osteoporosis is usually known as osteopenia. Causes of low bone mass embrace case history, not developing good bone mass once you are young, and some conditions or medicines. Not everybody who has low bone mass gets osteoporosis, however, they're at higher risk for obtaining it. Bone fracture, chiefly caused by the decrease in bone strength related to bone loss, has contributed to a rise in disability, morbidity, death, and health expenses. As per a recent estimation, 200 in every 1000 individuals would suffer a bone fracture throughout their whole lifespan, which imposes a burden on public health services worldwide. It's been reported that a variety of risk factors, like HIV infection, obesity, fibrous abnormality of bone, age, and gender, besides genetic factors, have played crucial roles in the pathological process of bone fractures [1,2]. In general, osteoporosis, characterized by progressive degeneration of bone tissues and a low bone mineral density, is widely accepted as a secret general skeletal disease, without being detected by a majority of its infected persons.

Previous research has showed that osteoporosis would increase bone fragility and is prone to fracture; meantime, it's been demonstrated to have an effect on over 75 million people. As a complex disease, the etiology of osteoporosis is difficult, mainly attributed to interactions between family genetic history and environmental risk factors [3]. Multiple environmental factors, as well as physical activity, diet, age, smoking, and malabsorption, have had large effects on the development of osteoporosis. Recently, several studies have stressed exploring the relationships of clinical biomarkers with bone fracture and osteoporosis, and Lipoprotein Receptor-Related Protein 5 (*LRP5*), whose mutations would reduce bone mineral density, is believed to be corrected with the susceptibleness to osteoporosis.

LRP5 is a member of the low-density lipoprotein receptor family, maybe a single-pass plasma membrane protein secreted in several tissues and cells, like breast tissues, bone tissues, epithelium cells, and stem cells. Human *LRP5* is found on chromosome 11q13.4 and consists of 22 introns and 23 exons. It's been revealed that *LRP5* has an effect on the Wnt signal pathway, which is closely associated with the regulation of osteoblasts' growth and differentiation by controlling bone density as well as bone metabolism. Additionally, *LRP5* plays a crucial role in blood lipid metabolism and glucose, leading to the prevention of decreased bone formation; so *LRP5* is important for bone development and health. However, recent research has shown that loss-of-function mutations of the *LRP5* gene contribute to the reduction of Bone Mineral Density (BMD), indicating a dominant-negative result on bone mass, which might result in varied bone diseases [4]. Some common polymorphisms of the *LRP5* gene are detected in correlation with bone phenotypes, as well as fracture risk and BMD.

The polymorphism rs3736228, located in exon 18, would limit the expression of Tph1 in the duodenum enterochromaffin cells, which adjusts bone formation, and BMD, and at last results in osteoporosis or bone fracture. Therefore, it is often speculated that SNP rs3736228 C>T of the LRP5 might be considered a helpful genetic biomarker for the prediction of osteoporosis and bone fracture. The main findings of the analysis indicated that *LRP5* rs3736228 C>T polymorphism may be connected with the pathological process of bone fracture and osteoporosis, demonstrating that this polymorphism is also involved in the development of bone fracture and osteoporosis, which is manifested by reduced bone strength and hyperbolic susceptibleness to fracture [5]. A crucial member of the Low-Density Lipoprotein (LDL) receptor family, *LRP5* might bind and internalize ligands within the process of receptor-mediated endocytosis and additionally play an important role in skeletal homeostasis. It's been demonstrated that the Wnt signal pathway has a very important role in the formation of bone and also the pathological process of osteoporosis, in which *LRP5* signaling is important for morphology, developmental processes, and bone health. Actually, *LRP5* genetic polymorphisms may cause loss of function of *LRP5*, decrease the signaling activity of the canonical Wnt signaling pathway, and result in reduced bone formation, thereby conducing to the development of bone fracture and osteoporosis.

Correspondence to: Aaron Deng, Department of Rheumatology, McMaster University, Hamilton, Canada, E-mail: arondeng38@mcmaster.ca

Received: 03-May-2022, Manuscript No. JOPA-22-17790; **Editor assigned:** 06-May-2022, PreQC No. JOPA-22-17790 (PQ); **Reviewed:** 20-May-2022, QC No. JOPA-22-17790; **Revised:** 27-May-2022, Manuscript No. JOPA-22-17790 (R); **Published:** 06-Jun-2022, DOI: 10.35841/2329-9509.22.10.305.

Citation: Deng A (2022) The Link between the Variation in Bone Mineral Density and Types of Bone Diseases. J Osteopor Phys Act. 10: 305.

Copyright: © 2022 Deng A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

REFERENCES

1. Wang XF, Seeman E. Epidemiology and structural basis of racial differences in fragility fractures in Chinese and Caucasians. Osteoporos Int. 2012;23(2):411-422.
2. Banu J. Causes, consequences, and treatment of osteoporosis in men. Drug Des Devel Ther. 2013;7:849-860.
3. Ofotokun I, Weitzmann MN. HIV-1 infection and antiretroviral therapies: risk factors for osteoporosis and bone fracture. Curr Opin Endocrinol Diabetes Obes. 2010;17(6):523-529.
4. Kim JE, Hsieh MH, Soni BK, Zayzafoon M, Allison DB. Childhood obesity as a risk factor for bone fracture: a mechanistic study. Obesity. 2013;21(7):1459-1466.
5. Lewiecki EM., Bilezikian JP, Bonewald L, Compston JE, Heaney RP, Kiel DP, et al. Osteoporosis update: proceedings of the 2013 santa fe bone symposium. J Clin Densitom. 2014;17(3):330-343.