OPEN ACCESS Freely available online

Journal of Osteoporosis and Physical Activity

Commentary

Risk Factors and Treatment of Osteoporosis

Vanessa Thompson*

Department of Orthopaedic Surgery and Sports Medicine, University of Kentucky, Lexington, United States

DESCRIPTION

Osteoporosis is caused by an imbalance between the resorption and growth of bone tissue. Two cell types are involved in the phenomenon's induction: osteoblasts, which have anabolic properties, and osteoclasts, which catabolize osseous tissue. An increase in the inflammatory activity of many cell types, including macrophages, lymphocytes, fibroblasts, osteoblasts, and osteoclasts (through autocrine and paracrine mechanisms), results in excessive activation of the osteoclastic cell line. Inflammatory cytokines, along with anti-inflammatory cytokines, growth factors, and other chemicals, constitute a complex network of cell humoral association known as the "cytokine network," which is responsible for the passage of inflammatory information from one cell to another. Numerous inflammatory cytokines, such as IL-1 (interleukin 1 beta), TNF (tumour necrosis factor), IL-6 (interleukin 6), IL-12 (interleukin 12), and IL-17 (interleukin 17), have been shown to catabolize Bone Mineral Density (BMD), which is relevant to the pathogenesis of osteoporosis. Research into the causes and ideal treatment of this disease appears to be an important and challenging task due to an increasing number of osteoporotic patients (longer lifespan, rapidly deteriorating environmental conditions, and medication) and numerous health complications, such as osteoporotic fractures.

Recent research has shown that the chemokine CX3CL1, also known as fractalkine, has a role in the pathophysiology of osteoporosis. The cytokine group includes chemokines. They are low molecular weight proteins that help control how leukocytes and other cells migrate, which affects the inflammatory process. CX3CL1 and CX3CR1 (CX3C chemokine receptor 1) have special qualities among the more than 50 chemokines that have been characterized. CX3CL1 is the only chemokine with a unique molecular structure in addition to its chemotactic action, and it may serve as an adhesion molecule that makes it simpler for immune system cells to pass through the vascular endothelium and reach the site of inflammation. Osteoporosis is a disease of civilization that still presents a challenge to modern medicine, both in terms of preventive and therapeutic. It is directly linked to a decrease in the quality of life and a number of BMD-related problems, such as fractures and an accelerated progression of osteoarthritis. Numerous articular diseases, including rheumatoid arthritis and hemophilic arthropathy, also cause osteoporotic lesions. It has extremely serious side effects, such as patient restriction or total immobilization, cardiovascular, infectious, or thrombotic problems.

The presumed causes of osteoporosis (endocrine disorders, neoplastic diseases, excessive alcohol intake, smoking, and malnutrition) are well recognized, however, studies attempting to determine its genesis based on the immune system are very uncommon. It is difficult to say whether immunological systems have a main or secondary role in the development of osteoporotic lesions. However, osteoporosis certainly results in increased expression of signalling axes linked to inflammatory factors, such as the CX3CL1/CX3CR1 axis. The current study provides compelling evidence that this axis plays a substantial role in the events leading to BMD reduction. When CX3CR1 binds to mCX3CL1, it plays a key role in osteoclast maturation (the development of multinucleated forms) and binds osteoclasts to the surface of bone tissue, where they can express their catabolic activity. The function of sCX3CL1 is to attract other immune system cells to the osseous tissue as well as osteoclast precursors. These immune system cells then accumulate and become activated on the bony surface (through CX3CR1), causing the release of other inflammatory cytokines like TNF-, IL-1, and IL-6. Through binding osteoblasts, the CX3CL1/CX3CR1 axis also has a significant impact on the maturation of osteoclast precursors. Overexpressing this axis may attract large numbers of osteoblasts bound to the bone surface to osteoclastogenesis, which changes the metabolism of osseous tissue from anabolism to catabolism. Therefore, it seems that the CX3CL1/CX3CR1 axis plays an important role in the initiation and progression of osteoporotic. It would be very beneficial to examine CX3CR1 condensation on cells that naturally surround the osseous tissue, such as fibroblasts or vascular endothelium, in addition to osteoclast precursors and osteoblasts. This activity may cause inflammation to shift from the circulatory system (systemic) to the bone tissue (local). The network of blood vessels that supply the bone also contributes significantly to osteoporosis. Understanding of the role of the CX3CL1/CX3CR1 axis, which not only activates osteoclastogenesis but also affects local perfusion and bone nourishment, may be

Correspondence to: Vanessa Thompson, Department of Orthopaedic Surgery and Sports Medicine, University of Kentucky, Lexington, United States, E-mail: vanessa.thompson@yale.edu

Received: 01-Aug-2022, Manuscript No. JOPA-22-19139; **Editor assigned:** 05-Aug-2022, PreQC No. JOPA-22-19139 (PQ); **Reviewed:** 19-Aug-2022, QC No. JOPA-22-19139; **Revised:** 26-Aug-2022, Manuscript No. JOPA-22-19139 (R); **Published:** 06-Sep-2022, DOI: 10.35841/2329-9509.22.10.322

Citation: Thompson V (2022) Risk Factors and Treatment of Osteoporosis. J Osteopor Phys Act. 10: 322.

increased by observing the correlation between the concentration of VEGF and other growth factors in the vascular endothelium and CX3CL1 concentrations in blood serum and DXA results.

Since osteoporosis is a multifactorial disease, cautious optimism is advised in relation to the crucial part the CX3CL1/CX3CR1 axis plays in the pathophysiology of this condition. It is not anticipated that the potential for treatment based on particular antibodies will be the only therapeutic approach. Although one of many potential causes of osteoporosis, primary or secondary overexpression of the CX3CL1/CX3CR1 axis appears to be particularly important in the context of immunity-related causes. As one of the most promising targets in osteoporosis therapy, it, therefore, seems acceptable to continue research that would accurately identify its role in the metabolism of bone tissue.