

Methods of Using Bone Morphogenic Proteins as Biomarkers for Determining Cartilage Degeneration and Aging

This invention contemplates methods for determining cartilage degeneration or regeneration in articular joints in a patient by measuring levels of osteogenic protein-1 (OP-1) and/or mRNA in synovial fluid or joint tissue. In particular, the invention is based on the discovery that OP-1 is a biomarker associated with age-related tissue changes found in cartilage and could be also associated with inflammation in autoimmune diseases. In addition, the difference in OP-1 protein or OP-1 mRNA levels in the sample and the predominated OP-1 protein or OP-1 mRNA standard may be indicative of the presence or absence of an inflammatory disease. The methods according to the invention are useful for detecting, diagnosing, predicting, determining a predisposition for, or monitoring joint tissue degeneration and/or regeneration in patient including inflammatory joint disease, degenerative or age-related disorders.

BACKGROUND

A number of factors can cause and contribute to cartilage degeneration in mammals, including trauma, age, genetic predisposition, inflammatory disease, etc. While the underlying causes of articular cartilage degeneration seen with age or due to inflammatory disease have not been identified, there is increasing evidence that growth factors and cytokines play a critical mediatory role. For example, the bone morphogenetic proteins (BMPs), which belong to a TGF- β superfamily of growth factors are important regulators of matrix production that can also inhibit certain degradative processes. Osteogenic protein 1 (OP-1) is the seventh member of the BMP family (BMP-7) and the endogenous expression of OP-1 by articular chondrocytes indicates that articular cartilage has the potential to repair and might suggest the unique role of this BMP in tissue protection and regeneration.

AREAS OF APPLICATION

The invention relates generally to uses of OP-1 and other bone morphogenetic proteins as biomarkers of tissue integrity or deterioration, and more particularly to methods for diagnosing and/or monitoring cartilage degeneration associated with age or inflammatory processes.

ADVANTAGES

The unique property of the invention relates generally to methods for determining tissue integrity using bone morphogenetic proteins such as OP-1 as biomarker. Specifically, the invention relates to methods for determining the condition of the cartilage (e.g. degeneration, deterioration or regeneration) in patient by measuring the level of OP-1 and/or OP-1 mRNA in patient tissue sample. In particular, the invention is based on the discovery that OP-1 is a biomarker for age-related, degenerative as well as inflammation associated and autoimmune tissue changes such as cartilage degradation. The invention offers easy detection of OP-1 protein by enzyme-linked immunosorbent assay (ELISA) and OP-1 mRNA is preferably measured using a reverse transcription polymerase chain reaction (RT-PCR).

PATENT

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