

Serum level of 25-Hydroxycholecalciferol in patients with Primary Osteoarthritis and Correlation with Disease Severity

Thesis

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List of Abbreviations

Abbreviations	Meaning
1,25(OH)₂D₃	1-alpha, 25-dihydroxycholecalciferol
25(OH)D₃	25-Hydroxycholecalciferol
CYP27B1	25-hydroxycholecalciferol 1-alpha-hydroxylase
CYP24A1	25-hydroxycholecalciferol-24-hydroxylase
CYP27A1	25-hydroxycholecalciferol-25-hydroxylase
ADAMTS	A Disintegrin And Metalloprotease with Thrombospondin motifs
Abs.	Absent
ALK1	Activin-Like Kinase 1
AGEs	Advanced Glycation End
ACR	American College of Rheumatology
ACL	Anterior Cruciate Ligament
BMI	Body Mass Index
BMD	Bone Mineral Density
BMPs	Bone Morphogenetic Proteins
CGRP	Calcitonin Gene-Related Peptide
Ca	Calcium
CACP	Camptodactyly-Arthropathy-Coxa vara-Pericarditis
CV	Cardiovascular
COMP	Cartilage Oligomeric Matrix Protein
CNS	Central Nervous System
COL	Collagen
CBC	Complete blood counts
COX	Cyclooxygenases
DC	Dendritic cells

DMOAD	Disease-modifying OA drug
DEXA	Dual Energy X-ray Absorptiometry
ESR	Erythrocyte Sedimentation Rate
ECM	Extracellular matrix
FGF23	Fibroblast Growth Factor 23
GI	Gastrointestinal
HNF4α	Hepatic Nuclear Factor 4 alpha
HS	Highly significant
HA	Hyaluronic Acid
IGFs	Insulin-like Growth Factors
IFN-γ	Interferon-gamma
IL-1R	Interleukin-1 Receptor
IL-1Ra	Interleukin-1 Receptor antagonist
IL-1 α and β	Interleukin-1 alpha and beta
IU	International Unit
K-L	Kellgren-Lawrence Grading System
kDa	kilo Daltons
LIF	Leukemic inhibitory factor
LIF-R	Leukemic inhibitory factor receptor
MRI	Magnetic Resonance Imaging
MHC	Major <i>Histocompatibility Complex</i>
MMP	Matrix Metalloproteinase
MSC	Mesenchymal Stem Cell
MSM	Methylsulfonylmethane
mcg (μg)	Micrograms
μmol/L	Micromoles/Litre
mg/mL	Milligram/millilitre
ng/ml	Nanograms/millilitre
nmol/L	Nanomoles/Litre

NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases
NO	Nitric Oxide
NOS	NO synthases
NS	Non-significant
NSAIDs	Nonsteroidal Anti-inflammatory Drugs
N	Number
OA	Osteoarthritis
OATS	Osteoarticular Transplant Surgery
PTH	Parathyroid hormone
PPAR γ and α	Peroxisome Proliferator-Activated Receptor Gamma and Alpha
PXR	Pregnane X receptor
Pres	Present
PGES	Prostaglandin E synthase
PGE-2	Prostaglandin E-2
PKC	Protein kinase C
PGs	Proteoglycans
ROA	Radiographic Osteoarthritis
RXR	Retinoic X receptor
RA	Rheumatoid Arthritis
SAMe	S-adenosylmethionine
S (Sig.)	Significant
SHP	Small Heterodimer Partner
SD	Standard Deviation
STZ	Superficial Tangential zone
TMB	Tetramethylbenzidine
TIMP	Tissue Inhibitor of Metalloproteinases
TGF-β	Transforming Growth Factor- β
TNF-α	Tumor Necrotic Factor alpha

TNFsR	Tumor Necrotic Factor soluble receptor
TACE	Tumor Necrotic Factor- α Convertase Enzyme
TNF-R	Tumor Necrotic Factor- α Receptor
UVB	Ultraviolet-B
VEGF	Vascular Endothelial Growth Factor
VLDL	Very-low-density lipoprotein
VAS	Visual analogue scale
VDBP	Vitamin D Binding Protein
VDR	vitamin D receptor
VDRE	Vitamin D Response Element
WOMAC	Western Ontario and McMaster Universities Osteoarthritis Index
WHO	World Health Organization

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Introduction

Osteoarthritis (OA) is a chronic degenerative disorder characterized by cartilage loss, its prevalence is high, and it is a major cause of disability. The cause of OA is unknown; however, current evidence indicates that it is multifactor. Major risk factors for OA are age, female sex, obesity, geographic factors, occupational knee-bending, physical labour, genetic factors, race, and joint trauma; it causes joint pain, stiffness, and limitation of joint function. Knee involvement is the commonest presentation of this disease all over the world (*Das and Farooqi, 2008*).

OA is a disorder of the whole synovial joint organ. There is growing evidence of the importance of bone turnover in OA and human studies have demonstrated that the subchondral bone is metabolically active in OA (*Hunter et al., 2003*). Diagnosis is usually done by X-rays, which include loss of cartilage, subchondral sclerosis, subchondral cysts, narrowing of the joint space, and bone spur formation (osteophytes) from increased bone turnover (*Altman, et al., 1990*).

Vitamin D is a fat-soluble vitamin that is essential for maintaining normal calcium metabolism. Vitamin D₃ (cholecalciferol) can be synthesized by humans in the skin upon exposure to ultraviolet-B (UVB) radiation from sunlight, or it can be obtained from the diet (*National Institutes of Health,*