

JW CreaGene Corp.

Technology Overview

1. Background of Technology

1) Rheumatoid Arthritis therapy CreaVax-RA

Rheumatoid arthritis (RA) is an abnormal immune response and one of the autoimmune disease in which the thin synovial tissue surrounding joints are filled with leukocytes to cause continuous inflammation. Secreted cytokines or other elements cause an abnormal increase in FLSs (fibroblast-like synoviocytes) to create a hyper layer of synovial cells, known as pannus. This is a systemic disease which infiltrates surrounding cartilage and bones to cause cartilage/bone damage. While the initial pathological diagnosis is focused on joints, it is a serious disease which spreads over the entire body with time.

Non-steroidal anti-inflammatory drugs (NSAIDS) and Disease modifying anti-rheumatic drugs (DMARDS) are widely used to treat Rheumatoid arthritis. Yet such forms of treatment cannot prevent or delay the progression of the disease and work only to relieve arthritic pain and edema. As a result, it is a priority to develop a new form of treatment which can overcome the limitations of current Rheumatoid arthritis treatments.

JW CreaGene is actively conducting research and development for permanent forms of treatment using dendritic cells in patients suffering from Rheumatoid arthritis by customizing to its autoimmune disease characteristics.

Patients enrollment for Ph I clinical trial of rheumatoid arthritis therapy 'CreaVax-RA' is completed at the second quarter of 2012.

2. Description on Technology Applied

1) Rheumatoid Arthritis therapy using dendritic cells (CreaVax-RA)

(A) Types of Dendritic cell

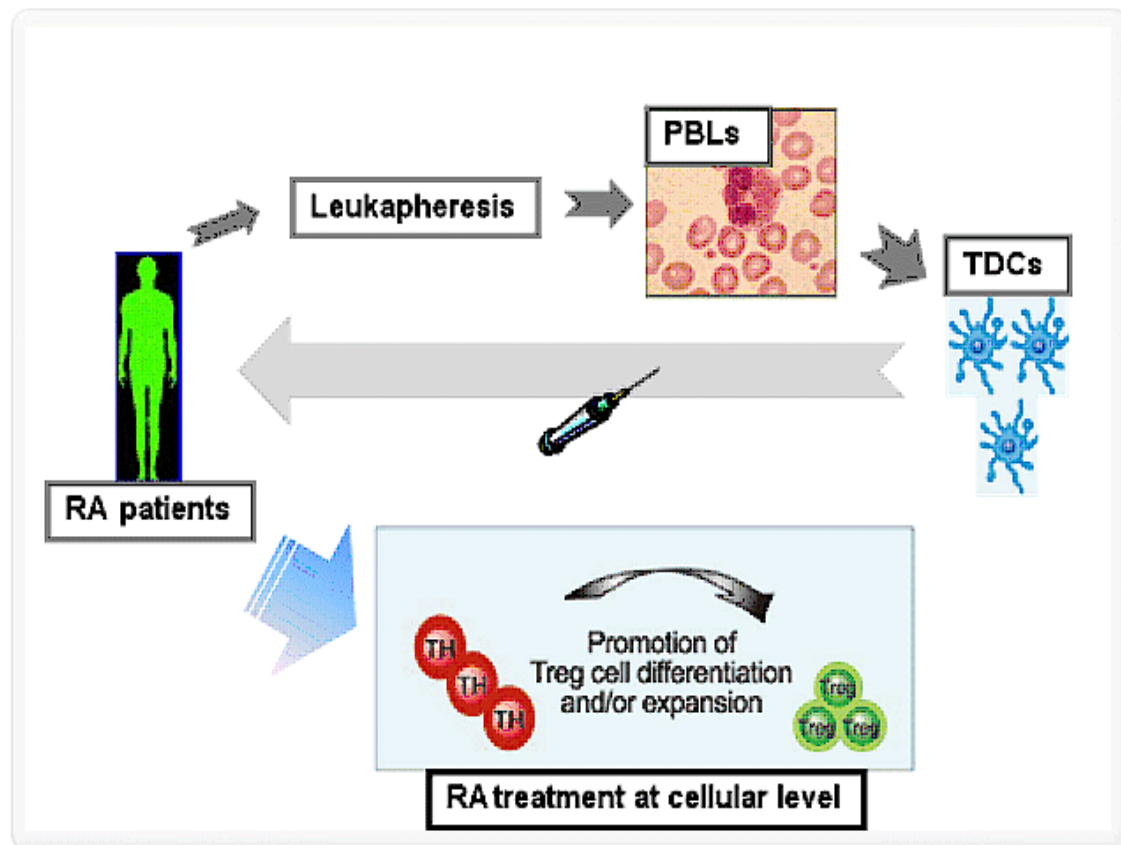
Dendritic cells can be classified into mature DC and immature DC according to levels of differentiation. Mature DC induces immune responses and is used to treat tumors, whereas immature DC is known to control immune tolerance and immune regulation. In addition, semi-mature DC exposed to arthritis antigens for short periods of time is known to have the feature of antigen specific immune suppression rather than immune activities as they show lower manifestation levels of co-stimulatory molecules.

(B) Treatment of Rheumatoid arthritis through use of immune tolerant dendritic cells

JW CreaGene has used mature DC to develop cancer treatments while semi-mature DC is used to treat autoimmune diseases, such as rheumatoid arthritis. In addition, MSCs (mesenchymal stem cells), which induce strong immune suppression, can be used together with dendritic cells to induce more effective immune tolerance.

JW CreaGene has technologies for the production of immune treatments which utilize dendritic cells from bone marrow as well as related pre-clinical and clinical experience and technologies. Based on such foundation, the company has been developing a type of Rheumatoid arthritis therapy which utilizes immature or semi-mature dendritic cells. In addition, the powerful immune suppressive effects of immature dendritic cells are expected to be utilized not only within autoimmune diseases, but also for organ transplants.

[Figure, Diagram of treatment process using immuno-modulating dendritic cells]



3. Differential Point, Superiority or Characteristics of Technology Applied

Rheumatoid arthritis therapy utilizing dendritic cells treat rheumatoid arthritis through antigen specific immune suppression without affecting normal cells. Rheumatoid arthritis therapy utilizing dendritic cells have no toxicity or side effects. More than just reducing arthritic pain and edema, the therapy is a fundamental treatment for rheumatoid through the immune suppression effects of dendritic cells.

Specific Patent

No.	Name of Patent	Application No.	Date of application /approval	Country	Status (Applied /approval)	Cost for patent (thousand, KRW)
1	Novel use of MLN51 gene and protein	2006-0041646	appl:06.05.09 appr:08.04.08	Korea	approval	1,460
		PCT/KR2007/002259	appl:07.05.08	PCT	applied	4,735
		12/299,919	appl:08.11.07	USA	applied	1,697
2	Pharmaceutical compositions for treating rheumatoid arthritis comprising semi-mature dendritic cell	10-2007-0039629	appl:07.04.24 appr:09.03.02	Korea	approval	1,551
		PCT/KR2008/001397	appl:08.03.12	PCT	applied	4,343

※ Please provide accurate information for Application No and Date of application/approval. It will be used for patent search.

※ In case of Cost for patent, please consider administrative cost for patent application only.

※ In case of PCT or overseas patent (application) except domestic patent, Please attach a certificate of application/approval (or patent abstract) as a separate file.