

Claims

- [Claim 1] A modified macrophage, comprising
a macrophage phenotype, characterized by CD14⁺CD206⁺; and
type II collagen.
- [Claim 2] The modified macrophage of claim 1, wherein the type II collagen is
expressed within the modified macrophage.
- [Claim 3] The modified macrophage of claim 1, wherein the type II collagen is
expressed on the surface of the modified macrophage.
- [Claim 4] A modified monocyte, comprising
a monocyte phenotype, characterized by CD14⁺; and
type II collagen.
- [Claim 5] The modified monocyte of claim 4, wherein the type II collagen is
expressed within the modified monocyte.
- [Claim 6] A pharmaceutical composition, comprising
(a) the modified macrophage of claim 1 or the modified monocyte of
claim 4; and
(b) a pharmaceutically acceptable carrier or excipient.
- [Claim 7] The pharmaceutical composition of claim 6, comprising about 0.01% to
99.9% of the modified macrophage or the modified monocyte.
- [Claim 8] A method of treating a musculoskeletal disease, comprising admin-
istering an effective amount of the modified macrophage of claim 1 or
the modified monocyte of claim 4 to a subject in need thereof to treat
the musculoskeletal disease.
- [Claim 9] The method of claim 8, wherein the musculoskeletal disease is arthritis.
- [Claim 10] The method of claim 9, wherein the arthritis is osteoarthritis, au-
toimmune arthritis or traumatic arthritis.
- [Claim 11] The method of claim 8, wherein the musculoskeletal disease is de-
generative disc disease or intervertebral disc degeneration.
- [Claim 12] The method of claim 11, wherein the disc is selected from the group
consisting of the cartilage tissue portion of articulate cartilage, the
cartilage tissue portion of a meniscus and the cartilage tissue portion of
an intervertebral disc.
- [Claim 13] The method of claim 8, wherein the musculoskeletal disease is
tendinitis.
- [Claim 14] The method of claim 8, wherein the modified monocyte or the modified
macrophage is administered by intra-articular injection.
- [Claim 15] The method of claim 8, further comprising administering to the subject

- an agent selected from hyaluronic acid or a derivative or salt thereof, growth factor, chondrogenic agent, vitamin D3 (cholecalciferol), collagen hydrolyzate, rusulatide acetate, avocado soy unsaponifiables (ASU), a steroid and a non-steroidal anti-inflammatory agent (NSAID).
- [Claim 16] A method for inducing cartilage formation in a body site of a subject, comprising the step of administering the modified macrophage of claim 1 or the modified monocyte of claim 4 to the body site of the subject in need thereof.
- [Claim 17] An in vitro method of inducing differentiation of monocytes into the modified macrophages of claim 1, comprising contacting peripheral blood mononuclear cells with an effective amount of a composition comprising
- (a) a cell culture medium; and
 - (b) a polarization mixture comprises at least one of the following: IL-4, GM-CSF, G-CSF, or M-CSF.
- [Claim 18] The method of claim 17, wherein the cell culture medium is RPMI-1640 or Iscove's modified Dulbecco's Medium (IMDM).
- [Claim 19] The method of claim 17, wherein the contact time of the modified macrophage with the composition for about 2 hours to about 7 days.
- [Claim 20] The method of claim 17, where in the polarization mixture is IL-4 and M-CSF.
- [Claim 21] The method of claim 17, wherein the polarization mixture is substantially free of IL-10, IL-13 or TGF- β .