[0014] **US 2005059113** relates to antibodies and antigen-binding portions thereof that specifically bind to aCSF-1. The invention also relates to human anti-CSF-1 antibodies and antigen-binding portions thereof. This application invention also provides gene therapy methods using nucleic acid molecules encoding the heavy and/or light immunoglobulin molecules that comprise the human anti-CSF-1 antibodies.

[0015] **Roussel and Sherr, 1989**, PNAS, 86, 7924-7927 and **Ashmun et al., 1989**, Blood, 73, 827-837 are disclosing monoclonal antibodies to the human CSF-1 receptor (e.g. 12-3A3 and 2-4A5) which specifically block CSF-1 binding to the human receptor, thereby inhibiting ligand-dependent growth. The recognized epitope has been localized between positions amino acids 349-512.

[0016] **WO2009/026303** provides antigen binding proteins that are able to compete with CSF-1 and therefore prevent CSF-1 from binding to its receptor, and in certain embodiments inhibit binding between IL-34 and CSF-1R. Moreover the experimental section of WO2009/026303 indicates that the antibodies developed by the Inventors are binding epitopes that are mainly located at the N-terminus between amino acids 20 to 223 of SEQ ID NO 29 (corresponding to Ig-like loop 1 and Ig-like loop 2 in WO2009/026303) of CSF-1R and require the presence of both the Ig-like loop 1 and Ig-like loop 2 regions.

Summary

[0016a] In one aspect, there is provided an isolated, recombinant or purified antibody that specifically binds to CSF-1R, characterized in that said antibody comprises:

(i) (a) first variable region consisting in SEQ ID NO:42, and (b) a second variable region consisting in SEQ ID NO:44; or

(ii) (a) first variable region consisting in SEQ ID NO:43, and (b) a second variable region consisting in SEQ ID NO:45; or

(iii) (a) first variable region consisting in SEQ ID NO:42, and (b) a second variable region consisting in SEQ ID NO:46.

[0016b] In another aspect, there is provided a nucleic acid sequence encoding an antibody as defined above.

[0016c] In yet another aspect, there is provided a vector containing the nucleic acid sequence as defined above.

[0016d] In yet another aspect, there is provided a cell comprising the nucleic acid sequence as defined above.

[0016e] In yet another aspect, there is provided a process for producing an antibody as defined above comprising culturing a cell as defined above under conditions permitting expression of the antibody and purifying the antibody from the cell or medium surrounding the cell.

[0016f] In yet another aspect, there is provided a pharmaceutical composition comprising the antibody as defined above, the nucleic acid sequence as defined above or the vector as defined above and a pharmaceutically acceptable carrier.

[0016g] In yet another aspect, there is provided the antibody as defined above, the nucleic acid sequence as defined above, the vector as defined above or the pharmaceutical composition as defined above for use as a medicament.

[0016h] In yet another aspect, there is provided the antibody as defined above, the nucleic acid as defined above, the vector as defined above or the pharmaceutical composition as defined above for use in the treatment of a disease selected from the group consisting in cancer, a disease associated to an increased osteoclast activity, inflammatory disease and rheumatoid arthritis.

Detailed Description~~Disclosure of Invention~~

[0017] The present invention relates to an antibody that specifically binds to the CSF-1R, and more specifically to human CSF-1R.

[0018] As used throughout the entire application, the terms "a" and "an" are used in the sense that they mean "at least one", "at least a first", "one or more" or "a plurality" of the referenced components or steps, unless the context clearly dictates otherwise. For example, the term "a cell" includes a plurality of cells, including mixtures thereof.

[0019] The term "and/or" wherever used herein includes the meaning of "and", "or" and "all or any other combination of the elements connected by said term".

[0020] The term "about" or "approximately" as used herein means within 20%, preferably within 10%, and more preferably within 5% of a given value or range.