CLAIMS

1. Use of an inhibitory agent for the manufacture of a medicament for the treatment of cancer, wherein the cancer is characterized by presenting a concentration of LIF which is at least 5% greater than that occurring in a control sample, and wherein said inhibitory agent is an anti-LIF antibody and/or a siRNA against LIF.

2. The use according to claim 1, wherein said inhibitory agent is an anti-LIF antibody.

3. The use according to claim 1 or claim 2, wherein said cancer is selected from breast, heart, lung, small intestine, colon, spleen, bladder, head, neck, ovarian, brain, pancreatic, skin, bone, bone marrow, blood, thymus, uterine, testicular and liver tumors.

4. An *in vitro* method for selecting patients suffering from cancer to be treated with an inhibitory agent of LIF comprising:

a) quantifying the expression level of LIF in said patient, and

b) comparing said expression level with a control level, wherein if the expression level of LIF in said patient is greater than the control level, then said patient is selected to receive treatment with an inhibitory agent of LIF.

5. An *in vitro* method for the prognosis of life expectancy of subjects suffering from cancer, comprising quantification of the expression level of the gene encoding LIF or of the protein encoded by said gene in a biological sample from said subject, wherein an increase of the expression of the gene encoding LIF or of the protein encoded by said gene, with respect to the expression of the gene encoding LIF or of the protein encoded by said gene in a control sample, is indicative of a reduced life expectancy.

6. An *in vitro* method for the diagnosis of glioma in a subject, which comprises quantifying the expression level of the gene encoding LIF or of the protein encoded by said gene in a biological sample from said subject, wherein an increase of the expression of the gene encoding LIF or of the protein encoded by said gene, with respect to the expression of the gene encoding LIF or of the protein encoded by said gene in a control sample, is indicative of glioma.

7. The method according to any one of claims 4 to 6, wherein the quantification of the expression level of the gene encoding LIF comprises the quantification of the messenger RNA (mRNA) of said gene, a fragment of said mRNA, complementary DNA (eDNA) of said gene, a fragment of said eDNA, or mixtures thereof.

8. The method according to claim 7, wherein the quantification of the expression level of the gene encoding LIF is performed by means of a quantitative polymerase chain reaction (PCR).

9. The method according to any one of claims 4 to 6, wherein the quantification of the level of protein is performed by means of Western blot, immunohistochemistry, ELISA or by means of the determination of the activity of said protein.

10. An *in vitro* method for the identification of compounds capable of blocking/inhibiting the cell proliferation of tumor cells induced by LIF, comprising the steps of:

(i) contacting a cell expressing the receptor for LIF with LIF and a candidate compound, and

(ii) identifying compounds blocking the cell proliferation of said cell,

wherein the cell expressing the receptor for LIF is an ovarian cancer cell, a colon cancer cell, a lung cancer cell or a glioma cell.

11. The method according to claim 10, wherein the glioma cell is a glioma initiating cell (GIC).

12. Use of a kit comprising reagents for the quantification of the expression level of the gene encoding LIF or of the protein encoded by said gene for the diagnosis of cancer in a subject or for determining the predisposition of a subject to suffer from said cancer, or for determining the stage or severity of said cancer in a subject, or for monitoring the effect of the therapy administered to a subject with said cancer, wherein if the reagents detect an increase in the expression of said gene or said protein with respect to a control sample, then said subject can suffer from cancer, or present a greater predisposition to suffer from said cancer, or present a greater severity of said cancer, or the administered therapy is not being effective.

13. The use according to any one of claims 1 to 3 or the method according to claim 4, wherein said agent acts through the inhibition of the self-regeneration of tumour stem cells.

14. The method according to claim 4 or claim 13, wherein the inhibitory agent is selected from the group consisting of siRNAs, antisense oligonucleotides, specific ribozymes, antibodies, polypeptides and inhibitors of cytokine receptor binding.

15. The method according to claim 14, wherein the antibodies are inhibitory antibodies specific to LIF or antibodies blocking the LIF receptors.

16. The use according to any one of claims 1 to 3, the method according to any one of claims 4 to 6 or 13 to 15, or the kit according to claim 12, wherein said cancer is caused by a high activity of the JAK-STAT signaling pathway.

17. The use according to any one of claims 1 to 3, 13 or 16, or the method according to any one of claims 4 to 7 or 13 to 15, wherein said cancer is one of the following: glioma, pre-B cell acute lymphoblastic leukemia, acute myeloid leukemia, colorectal carcinoma, bladder cancer, breast ductal cancer or breast carcinoma.

18. The use or the method according to claim 17, wherein said glioma is grade IV glioma.