

EP 1 777 523 discloses methods for determining the outcome of a cancer in a patient, which are based on the quantification of one or several biological markers that are indicative of the presence of, or alternatively the level of, the adaptive immune response of said patient against said cancer.

5 After extensive researches, for patients without distant metastasis (Stage IV), the inventors have found :

1. That a patient with low expression levels for the genes of the immune adaptive response and high expression levels for the genes representative of the immunosuppressive response not only will have a bad prognosis (e.g. a short disease-free survival time) but also
10 will not significantly improve his survival in case of treatment.

2. that a patient with high expression levels for the genes of the immune adaptive response and low expression levels for the genes representative of the immunosuppressive response will not only have a good prognosis (e.g. a long disease-free survival time) but also will not significantly improve his survival in case of treatment.

15 3. that a patient with high expression levels for the genes of the immune adaptive response and high expression levels for the genes representative of the immunosuppressive response will show an intermediate prognosis, but an antitumoral treatment will a significant impact on his survival (e.g from an intermediate prognosis to a good prognosis).
The two first groups of patients are to be considered as "bad responders" (i.e. the treatment
20 will have a limited (or moderate) impact on their survival), whereas the third group of patients is to be considered as "good responders".

SUMMARY OF THE INVENTION:

25 A subject of the present ~~invention~~ disclosure is therefore a method and kits for screening patients with a cancer, particularly for determining whether a patient with a cancer would benefit of an antitumoral treatment.

In a first aspect, there is provided a method for screening patients with a cancer comprising: i) determining in a tumor sample obtained from a patient an expression level $ELA_1 - ELA_n$ of one or several genes $GA_1 - GA_n$ representative of human adaptive immune response and an expression level $ELI_1 - ELI_n$ of one or several genes $GI_1 - GI_n$ representative of human immunosuppressive response, ii) comparing the expression levels $ELA_1 - ELA_n$ and $ELI_1 - ELI_n$ determined at step i) with predetermined reference values $ELRA_1 - ELRA_n$ and $ELRI_1 - ELRI_n$ selected such as said predetermined reference values separate a panel of patients with a cancer into two groupings according to the expression level of said genes and

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to survival of patients according to Kaplan Meier curves analyses and associated logrank p values; iii) concluding whether the patient has a good (level higher than the predetermined reference value) or a bad (level lower than the predetermined reference value) adaptive immune response and a good or a bad immunosuppressive response.

Another aspect relates to a kit comprising nucleic acids which may be used as primers or probes for implementing the step of determination of an expression level $ELA_1 - ELA_n$ of one or several genes $GA_1 - GA_n$ representative of human adaptive immune response and the expression level $ELI_1 - ELI_n$ of one or several genes $GI_1 - GI_n$ representative of human immunosuppressive response of the method disclosed herein.

A further aspect relates to a chemo therapeutic agent, an immunotherapeutic agent or a radiotherapeutic agent for use in the treatment of a cancer patient who is considered as responder to antitumoral treatment according to the method disclosed herein.

Yet another aspect relates to a method of selecting a patient for the treatment of cancer comprising the steps consisting of:

- screening a patient with a cancer according to a method disclosed herein,
- concluding that the patient is a good responder for each of human adaptive immune response and human immunosuppressive response,
- selecting the patient for an appropriate anti cancer treatment.

DETAILED DESCRIPTION OF THE INVENTION:

The present invention relates to a method for screening patients with a cancer comprising

genes $GA_1 - GA_n$ representative of human adaptive immune response and the expression level $ELI_1 - ELI_n$ of one or several genes $GI_1 - GI_n$ representative of human immunosuppressive response of the method, of one of claims 1-11.

5 13. A kit according to claim 12, wherein the nucleic acids are selected from nucleic acids specific of the genes of one of claims 8, 9 and 10.

14. A chemo therapeutic agent, an immunotherapeutic agent or a radiotherapeutic agent for use in the treatment of a cancer patient who is considered as responder to antitumoral
10 treatment according to the method of one of claims 3 and 8 to 11.

15. A method of selecting a patient for the treatment of cancer comprising the steps consisting in
- screening a patient with a cancer according to a method of one of claims 1 to 10,
15 - concluding that the patient is a good responder for each of human adaptive immune response and human immunosuppressive response,
- ~~providing~~ selecting the patient ~~with~~ for an appropriate anti cancer treatment.