

Claims

1. A method for diagnosing Non-Small Cell Lung Cancer from a sample comprising serum and/or plasma extracted from a subject, comprising the steps of:
 - 5 (i) testing the sample for the presence of biomarkers specific for Non-Small Cell Lung Cancer;
 - (ii) determining whether the subject has Non-Small Cell Lung Cancer based on the detection of said biomarkers;characterised in that the biomarkers are autoantibodies to antigens comprising
10 XAGE1D, LRRFIP2 and GAGE2C.
2. The method according to claim 1 wherein the antigens further comprise one or more of DDX53, DDX43, GAGE1, MAGEA10, ZNRD1, MAP2K5, MAGEA4, STAT1, CT47A1, IGF2BP3, CTAG2, RAD23B, FADD, PTPN20A, TPM1, CTAG1A.
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3. The method according to claim 1 or 2 wherein the antigens are biotinylated proteins.
4. The method according to claim 3 wherein each biotinylated protein is formed from
20 a Biotin Carboxyl Carrier Protein folding marker which is fused in-frame with a protein.
5. The method according to claim 3 or 4 wherein the biotinylated proteins are bound to a streptavidin-coated substrate.

6. The method according to claim 5 wherein the substrate comprises a hydrogel-forming polymer base layer.
- 5 7. The method according to any preceding claim wherein the antigens are exposed to a sample extracted from a person, such that autoantibody biomarkers from the sample may bind to the antigens.
8. The method according to claim 7 wherein the antigens are subsequently exposed to
10 a fluorescently-tagged secondary antibody to allow the amount of any autoantibodies from the sample bound to the antigens to be determined.
9. The method according to claim 8 wherein the presence of non-small cell lung cancer corresponds to the relative or absolute amount of autoantibodies from the
15 sample specifically binding to the antigens.
10. The method according to any preceding claim wherein the steps are performed *in vitro*.
- 20 11. The method according to any preceding claim wherein the method comprises detecting upregulation/downregulation of one or more of said biomarkers.
12. A method for manufacturing a kit for diagnosing Non-Small Cell Lung Cancer from a sample extracted from a subject, comprising the steps of:

for each antigen in a panel, cloning a biotin carboxyl carrier protein folding marker in-frame with a gene encoding the antigen and expressing the resulting biotinylated antigen;

binding the biotinylated proteins to addressable locations on one or more streptavidin-coated substrates, thereby forming an antigen array ;

such that the amount of autoantibodies from the sample binding to the antigens on the panel can be determined by exposing the substrate to the sample and measuring the response;

characterised in that the antigens comprise XAGE1D, LRRFIP2 and GAGE2C.

13. The method according to claim 12 wherein the antigens further comprise one or more of DDX53, DDX43, GAGE1, MAGEA10, ZNRD1, MAP2K5, MAGEA4, STAT1, CT47A1, IGF2BP3, CTAG2, RAD23B, FADD, PTPN20A, TPM1, CTAG1A.

14. A composition comprising a panel of antigens for detecting non-small cell lung cancer, characterised in that the antigens comprise XAGE1D, LRRFIP2 and GAGE2C.

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15. A composition according to claim 14 wherein the antigens further comprise one or more of DDX53, DDX43, GAGE1, MAGEA10, ZNRD1, MAP2K5, MAGEA4, STAT1, CT47A1, IGF2BP3, CTAG2, RAD23B, FADD, PTPN20A, TPM1, CTAG1A.

16. A composition according to claim 14 or 15 wherein the antigens are biotinylated proteins.
- 5 17. A composition according to any of claims 14-16 wherein the amount of one or more exosomal autoantibody biomarkers binding *in vitro* to the antigens in a sample from a patient can be measured to determine the presence of non-small cell lung cancer.
18. A composition comprising a panel of exosomal autoantibody biomarkers for
10 detecting non-small cell lung cancer:
 wherein the levels of exosomal autoantibody biomarkers are measured in a sample from a NSCLC patient;
 characterised in that the exosomal autoantibody biomarkers are selected from autoantibodies specific for at least X Antigen Family Member 1D (XAGE1D), LRR
15 Binding FLII Interacting Protein 2 (LRRFIP2) and G Antigen 2C (GAGE2C).