CLAIMS

1. A method of isolating tumour-derived extracellular vesicles from a sample, the method comprising:

contacting a sample comprising tumour-derived extracellular vesicles with a binding molecule that binds to N-glycolylneuraminic acid (Neu5Gc) under conditions that enable binding of the binding molecule to the tumour-derived extracellular vesicles in the sample; and

isolating the binding molecule from the sample.

2. A binding molecule that binds to N-glycolylneuraminic acid (Neu5Gc) when used for capturing and/or detecting tumour-derived extracellular vesicles in a sample.

3. A method of isolating tumour-derived extracellular vesicles from a sample, the method comprising:

contacting the sample with a layered, multipolymeric molecular net which comprises multiple layers of at least one binding molecule that binds Neu5Gc under conditions that enable binding of the binding molecule to tumour-derived extracellular vesicles in the sample; and

isolating the layered, multipolymeric molecular net from the sample.

4. A method of detecting tumour-derived extracellular vesicles comprising:

contacting a sample comprising extracellular vesicles with a binding molecule that binds to N-glycolylneuraminic acid (Neu5Gc), in which the sample is obtained from a subject; and,

detecting binding of the Neu5Gc binding molecule to extracellular vesicles in the sample, in which binding of the Neu5Gc binding molecule to extracellular vesicles indicates the presence of tumour-derived extracellular vesicles in the sample.

5. A composition comprising extracellular vesicles enriched for extracellular vesicles expressing N-glycolylneuraminic acid (Neu5Gc), in which the extracellular vesicles are tumour-derived extracellular vesicles isolated by a method according to Claim 1 or 3.

6. A population of extracellular vesicles enriched for extracellular vesicles expressing Neu5Gc, in which the extracellular vesicles are tumour-derived extracellular vesicles.

7. A composition according to Claim 5 or population according to Claim 6, in which at least 20%, at least 30%, at least 40%, at least 50%, at least 60% or at least 70% of the extracellular vesicles in the composition or the population express N-glycolylneuraminic acid (Neu5Gc).

8. A method according to any of Claims 1 or 3 or 4, in which:

(i) the sample is obtained from a subject suspected of having cancer or a subject that has cancer;

(ii) the sample is selected from a group consisting of blood, plasma, serum, urine, saliva, faeces, tears, brocho-alveolar lavage fluid (BALF), cerebrospinal fluid (CSF) and seminal fluid; and/or

(iii) the sample is a purified or partially purified population of extracellular vesicles.

9. A method according to Claim 8, in which the purified or partially purified population of extracellular vesicles express one or more protein(s) selected from a group consisting of CD63, b2microglobulin, CD11, CD81, CD13, EGFR.

10. A method according to any of Claims 1, 3, 4, 8 or 9, in which the sample is substantially free of cells.

11. A method according to any of Claims 1, 3 or 4, in which the sample is the supernatant of a tumour cell culture.

12. A method according to any of Claims 1, 3, 4 or 8 to 11, in which the binding molecule is an isolated protein comprising an amino acid sequence as set forth in SEQ ID NO: 2 or SEQ ID NO: 4 or fragment or variant of SEQ ID NO: 2 or SEQ ID NO: 4 which comprises a modification to at least one of the amino acid sequences in SEQ ID NO: 2 or SEQ ID NO: 4 and, in which the fragment or variant thereof is capable of binding α2-3-linked N-glycolylneuraminic acid and α2-6-linked N-glycolylneuraminic acid.

13. A method according to Claim 12, in which the modification comprises a non-conservative substitution or deletion of at least one of the underlined residues of TTSTE from SEQ ID NO: 1.

14. A method according to any of Claims 1, 3, 4 or 8 to 13, in which the binding molecule comprises:

(i) a single chain Fv fragment (scFv);

(ii) a dimeric scFv (di-scFv); or

(iii) a diabody;

(iv) a triabody;

(v) a tetrabody;

(vi) a nanobody

(vii) a Fab;

(viii) a $F(ab')_2$;

(ix) a Fv;

(x) an aptamer;

(xi) one of (i) to (ix) linked to a constant region of an antibody, Fc or a heavy chain constant domain (C_H) 2 and/or C_H3;

(xii) one of (i) to (ix) linked to albumin or a functional fragment or variants thereof or a protein that binds to albumin; or

(xiii) an antibody.

15. A method according to Claim 14, in which the binding molecule is an antibody.

16. A method according to any of Claims 1, 3, 4 or 8 to 15, in which the method further comprises dissociating bound tumour-derived extracellular vesicles from the binding molecule and collecting the dissociated tumour-derived extracellular vesicles, optionally in which the method further comprises analysing the tumour-derived extracellular vesicles.

17. A method according to Claim 8, in which the cancer is selected from a group consisting of breast cancer, melanoma, malignant epithelial tumour, oesophageal carcinoma, gastric cancer, colorectal cancer, epidermoid carcinoma of rectum, pancreatic cancer, hepatocellular carcinoma, lymph node metastases, kidney cancer, urinary bladder cancer, ovarian cancer, uterine cancer, testicular cancer, prostate cancer, neuroblastoma, non-small cell lung cancer, lymphoma, neuroectodermal tumour (astrocytoma and glioblastoma), nephroblastoma (Wilms tumours), sarcoma, Ewing sarcomas and thyroid carcinoma.

18. A method according to any of Claims 1, 3, 4 or 8 to 17 or a binding molecule according to Claim 2 or a composition according to Claim 7 or a population according to Claim 6 or 7, in which the extracellular vesicles are selected from a group consisting of small extracellular vesicles, exosomes, exomeres and microvesicles, optionally in which the extracellular vesicles are CD63+ exosomes.

19. A method of detecting cancer comprising:

contacting a sample comprising extracellular vesicles with a binding molecule that binds to N-glycolylneuraminic acid (Neu5Gc), in which the sample is obtained from a subject; and,

detecting binding of the Neu5Gc binding molecule to extracellular vesicles in the sample, in which binding of the Neu5Gc binding molecule to extracellular vesicles indicates the presence of tumour-derived extracellular vesicles in the sample, thereby detecting cancer.

20. A method according to Claim 19, in which the binding molecule comprises an amino acid sequence as set forth in SEQ ID NO: 2 or SEQ ID NO: 4.