CLAIMS

1. An RNA aptamer which binds specifically to EpCAM, in which the aptamer is not DT3 having the sequence GCGACUGGUUACCCGGUCG (SEQ ID NO: 1) and in which the aptamer is capable of binding specifically to cancer stem cells expressing $EpCAM^{high}/CD44^{high}/CD24^{high}$.

2. An aptamer according to Claim 1, in which the aptamer has a dissociation constant for EpCAM of about 90 nM or less.

3. An RNA aptamer comprising the sequence ACGUAUCCCUUUUCGCGUA (SEQ ID NO: 2) or comprising one or more substitutions within the sequence of SEQ ID NO: 2, in which the aptamer binds specifically to EpCAM.

4. An aptamer according to Claim 1, 2 or 3, in which the aptamer comprises at least one substitution within the stem region of the aptamer, in which the stem region is that of the predicted two dimensional structure of the aptamer.

5. An aptamer according to any preceding claim, in which the sequence length is between 19 and 100 bases.

6. An aptamer according to any preceding claim, which consists of the sequence of SEQ ID NO: 2.

7. An aptamer according to any preceding claim, comprising one or more modifications that increase aptamer stability.

8. An aptamer according to Claim 7, in which the pyrimidine bases are 2'-fluoro (2'F) modified.

9. An aptamer according to any preceding claim, in which the aptamer specifically binds to $EpCAM^{+}$ cell(s).

10. An aptamer according to Claim 9, in which the $EpCAM^{+}$ cell(s) are cancer stem cell(s).

11. An aptamer according to Claim 9 or 10, in which the cell is *in vivo* or *in vitro*.

12. An aptamer according to Claim 9 or 10, in which the cell is present in a biological sample obtained from a subject.

13. An aptamer according to any of Claims 9 to 11, in which the cell is a breast cancer stem cell, a prostate cancer stem cell, a pancreatic cancer stem cell, a colon cancer stem cell, a liver cancer stem cell, a lung cancer stem cell, an ovarian cancer stem cell or a head and neck cancer stem cell.

14. A diagnostic agent comprising an aptamer according to any preceding claim coupled to a detectable label.

15. A diagnostic agent according to Claim 14, in which the detectable label is selected from an enzyme, prosthetic group, fluorescent material, luminescent material, bioluminescent material, electron dense label, labels for MRI and radioactive material and combinations of these.

16. A aptamer according to any of Claims 1 to 13, or a diagnostic agent according to Claim 14 or 15 for use in histological examination of biological samples.

17. An anticancer agent comprising an aptamer according to any of Claims 1 to 13 coupled to a moiety.

18. An anticancer agent according to Claim 16, in which the moiety is selected from toxins, radionuclides and chemotherapeutic agents and combinations thereof.

19. An anticancer agent according to Claim 18, in which the moiety is doxorubicin.

20. An anticancer agent according to any of Claims 17 to 19 further comprising PEG.

21. A method for isolating, purifying or enriching a EpCAM expressing cell(s) and/or cancer stem cell(s) from a biological sample obtained from a subject, the method comprising contacting the cell with an RNA aptamer according to any of Claims 1 to 13 or a diagnostic agent according to Claim 14 or 15.

22. A method for identifying a EpCAM expressing cell(s) and/or cancer stem cell(s) in a subject or in a biological sample obtained from a subject having, or suspected of having cancer, the method comprising contacting the cell with an isolated RNA aptamer according to any of Claims 1 to 13 or a diagnostic agent according to Claim 14 or 15.

23. A method according to Claim 20 or 21, in which the subject is one which has a cancer selected from breast cancer, prostate cancer, pancreatic cancer, colon cancer, liver cancer,

lung cancer, ovarian cancer, head and neck cancer, melanoma or any other cancer in which $EpCAM^+$ cells are present.

24. An aptamer according to any of Claims 1 to 13, or an anticancer agent according to any of Claims 17 to 20 in the manufacture of a medicament for use in medicine.

25. Use of an aptamer according to any of Claims 1 to 13, or an anticancer agent according to any of Claims 17 to 20 in the manufacture of a medicament for treating or preventing cancer in a subject.

26. A delivery agent comprising an RNA aptamer comprising the sequence ACGUAUCCCUUUUCGCGUA (SEQ ID NO: 2) coupled to an siRNA or ribozyme.

27. A delivery agent according to Claim 26 comprising the sequence ACGUAUCCCUUUUCGCGUAAAAUGUAGAGAUGCGGUGGUCCUU (SEQ ID NO: 3).

28. A composition comprising a therapeutically effective amount of an aptamer according to any of Claims 1 to 13, an anticancer agent according to any of Claims 17 to 20 or a delivery agent according to Claim 26 or 27, together with a pharmaceutically acceptable carrier and/or excipient.

29. An aptamer according to any of Claims 1 to 13, or a diagnostic agent according to any of Claims 17 to 20 for use in molecular imaging of tumors.

CLAIMS

1. An RNA aptamer comprising the sequence 5'-ACGUAUCCCUUUUCGCGUA-3' (SEQ ID NO: 2) or comprising one or more substitutions within the sequence of SEQ ID NO: 2, in which the aptamer binds specifically to EpCAM and in which the aptamer is not DT3 having the sequence GCGACUGGUUACCCGGUCG (SEQ ID NO: 1).

2. An aptamer according to Claim 1, in which the aptamer has a dissociation constant for EpCAM of 90 nM or less.

3. An aptamer according to Claim 1 or 2, in which the aptamer comprises at least one substitution within the stem region of the aptamer, in which the stem region is that of the predicted two dimensional structure of the aptamer.

4. An aptamer according to Claim 1, 2 or 3, in which the sequence length is between 19 and 100 bases.

5. An aptamer according to any preceding claim, which consists of the sequence of SEQ ID NO: 2.

6. An aptamer according to any preceding claim, comprising one or more modifications that increase aptamer stability.

7. An aptamer according to Claim 6, in which the pyrimidine bases of the aptamer are 2'-fluoro (2'F) modified.

8. An aptamer according to any preceding claim, in which the aptamer specifically binds to $EpCAM^+$ cell(s).

9. An aptamer according to Claim 8, in which the $EpCAM^+$ cell(s) are cancer stem cell(s).

10. An aptamer according to Claim 8 or 9, in which the cell is *in vivo* or *in vitro*.

11. An aptamer according to Claim 8 or 9, in which the cell is present in a biological sample obtained from a subject.

12. An aptamer according to any of Claims 8 to 11, in which the cell is a breast cancer stem cell, a prostate cancer stem cell, a pancreatic cancer stem cell, a colon cancer stem cell, a liver

cancer stem cell, a lung cancer stem cell, an ovarian cancer stem cell or a head and neck cancer stem cell.

13. A diagnostic agent comprising an RNA aptamer according to any preceding claim coupled to a detectable label.

14. A diagnostic agent according to Claim 13, in which the detectable label is selected from an enzyme, prosthetic group, fluorescent material, luminescent material, bioluminescent material, electron dense label, labels for MRI and radioactive material and combinations of these.

15. An aptamer according to any of Claims 1 to 12, or a diagnostic agent according to Claim 13 or 14 for use in histological examination of biological samples.

16. An anticancer agent comprising an RNA aptamer according to any of Claims 1 to 12 coupled to a moiety.

17. An anticancer agent according to Claim 16, in which the moiety is selected from toxins, radionuclides and chemotherapeutic agents and combinations thereof.

18. An anticancer agent according to Claim 16 or 17, in which the moiety is doxorubicin.

19. An anticancer agent according to any of Claims 16 to 18 further comprising PEG.

20. A method for isolating, purifying or enriching a EpCAM expressing cell(s) and/or cancer stem cell(s) from a biological sample obtained from a subject, the method comprising contacting the cell with an RNA aptamer according to any of Claims 1 to 12 or a diagnostic agent according to Claim 13 or 14.

21. A method for identifying a EpCAM expressing cell(s) and/or cancer stem cell(s) in a biological sample obtained from a subject having, or suspected of having cancer, the method comprising contacting the cell with an isolated RNA aptamer according to any of Claims 1 to 12 or a diagnostic agent according to Claim 13 or 14.

22. A method according to Claim 20 or 21, in which the subject is one which has a cancer selected from breast cancer, prostate cancer, pancreatic cancer, colon cancer, liver cancer, lung cancer, ovarian cancer, head and neck cancer, melanoma or any other cancer in which $EpCAM^+$ cells are present.

23. Use of an RNA aptamer according to any of Claims 1 to 12, or an anticancer agent according to any of Claims 16 to 19 in the manufacture of a medicament for treating or preventing cancer in a subject.

24. A delivery agent comprising an RNA aptamer comprising the sequence ACGUAUCCCUUUUCGCGUA (SEQ ID NO: 2) coupled to an siRNA or ribozyme.

25. A delivery agent according to Claim 24 comprising the sequence ACGUAUCCCUUUUCGCGUAAAAUGUAGAGAUGCGGUGGUCCUU (SEQ ID NO: 3).

26. A composition comprising a therapeutically effective amount of an RNA aptamer according to any of Claims 1 to 12, an anticancer agent according to any of Claims 16 to 19 or a delivery agent according to Claim 24 or 25, together with a pharmaceutically acceptable carrier and/or excipient.

27. An RNA aptamer according to any of Claims 1 to 12, or a diagnostic agent according to Claim 13 or 14 for use in molecular imaging of tumors.