[0030] Figures 5a and 5b show an example of a mitochondrial DNA region before and after splicing of genes.

[0031] Figures 6a to 6g illustrate the results for transcripts 2, 3, 8, 9, 10, 11 and 12 of the invention in the identification of colorectal cancer tumours.

[0032] Figures 7a to 7d illustrate the results for transcripts 6, 8, 10 and 20 of the invention in the identification of lung cancer tumours.

[0033] Figures 8a to 8g illustrate the results for transcripts 6, 10, 11, 14, 15, 16 and 20 of the invention in the identification of melanomas.

[0034] Figures 9a to 9h illustrate the results for transcripts 1, 2, 3, 6, 11, 12, 15 and 20 of the invention in the identification of ovarian cancer.

[0035] Figures 10 to 18 illustrate the results for transcripts 2, 3, 4, 11, 12, 13, 15, 16 and 20 of the invention in the identification of testicular cancer.

[0036] Figure 19 illustrates the SDS PAGE gel of cytosolic and mitochondrial fractions of RWPE1 and WPE1-NA22 celll lines conducted during the fusion protein discovery phase.

[0037] Figure 20a illustrates the identified protein of fusion transcript P0026 based on the peptides ILYMTDEVNDPSLTIK and STPYECGFDPMSP.

[0038] Figure 20b illustrates the wild-type CO2 protein identified in mitochondrial NA22 cell line gel slice 5 of Figure 19 after searching the Human (SwissProt) database.

[0039] Figure 21a illustrates the identified protein of fusion transcript P0062 based on the peptides KGPNVVGPYGLLQPFADAMK, YDQLMHLLWK and LITTQQWLIK.

[0040] Figure 21b illustrates the identified peptides of ND1 identified in gel slice 5 of Figure 19 after searching the Human (SwissProt) database.

[0041] Figure 22 illustrates the identified protein of fusion transcript P0064 based on the peptides KGPNVVGPYGLLQPFADAMK and WAIIEEFTK.

[0042] Figure 23a illustrates the identified protein of fusion transcript P0176 based on the peptides KGPNVVGPYGLLQPFADAMK, VFSWLATLHGSNMK and VLMVEEPSMNLEWLYGCPPPYHTFEEPVYMK.

[0043] Figure 23b illustrates the wild-type CO1 protein identified in mitochondrial NA22 cell line gel slice 4 of Figure 19 after searching the Human (SwissProt) database.

[0044] Figures 24a to 24d illustrate the results of quantitative measurements of fusion transcripts P0026, P0062, P0064 and P0176, respectively.

CLAIMS

1. An isolated mitochondrial fusion protein, the fusion protein having an amino acid sequence resulting from the translation of a mitochondrial fusion transcript corresponding to a mutation in mitochondrial DNA, wherein the fusion protein has an amino acid sequence as set forth in SEQ ID NO: 58.

2. A method of detecting the presence of a cancer in a mammal, the method comprising assaying a tissue sample from the mammal for the presence of at least one mitochondrial fusion protein, the fusion protein having an amino acid sequence resulting from the translation of a mitochondrial fusion transcript corresponding to a mutation in mitochondrial DNA, wherein the fusion protein has an amino acid sequence as set forth in SEQ ID NO: 58.

3. The method of claim 2, wherein the cancer is selected from the group consisting of prostate cancer, testicular cancer, ovarian cancer, breast cancer, colorectal cancer, lung cancer and melanoma skin cancer.

4. The method of claim 2 or 3, wherein said assaying comprises an immunological assay, and wherein said assaying is conducted with an antibody, or an antigen-binding fragment thereof, having a specificity to the fusion protein of claim 1.

5. A kit for conducting an assay for detecting the presence of a cancer in a mammal, said kit comprising an antibody, or an antigen-binding fragment thereof, having a specificity to the fusion protein of claim 1 and instructions for detecting cancer.

6. A kit according to claim 5, wherein the cancer is selected from the group consisting of prostate cancer, testicular cancer, ovarian cancer, breast cancer, colorectal cancer, lung cancer and melanoma skin cancer.

7. An isolated mitochondrial fusion transcript having a nucleic acid sequence as set forth in SEQ ID NO: 56.

8. An isolated mtDNA encoding the fusion transcript of claim 7.

9. The isolated mtDNA of claim 8 having a sequence as set forth in SEQ ID NO: 57.

10. A method of detecting the presence of a cancer in a mammal, the method comprising assaying a tissue sample from the mammal for the presence of the mitochondrial fusion transcript according to claim 7, by quantifying the amount of the fusion transcript in the sample and comparing the quantity detected with a reference value.

11. The method of claim 10, wherein the cancer is selected from the group consisting of prostate cancer, testicular cancer, ovarian cancer, breast cancer, colorectal cancer, lung cancer and melanoma skin cancer.

12. The method of claim 4, wherein the antibody is a polyclonal or monoclonal antibody.

13. The kit of claim 5, wherein the antibody is a polyclonal or monoclonal antibody.