We claim:

1. A method of predicting whether a cancer patient is likely to benefit from administration of a yeast-based immune response generating therapy for cancer, either alone or in addition to another anti-cancer therapy, comprising the steps of:

(a) obtaining a blood-derived sample of the patient;

(b) conducting mass-spectrometry on the sample and obtaining a mass spectrum from the sample;

(c) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients and classifying the mass spectrum with a class label;

wherein the class label predicts whether the patient is likely to benefit from the yeast-based immune response generating therapy, either alone or in addition to other anti-cancer therapies.

2. The method of claim 1, wherein the yeast-based immunotherapy comprises a yeast-based immunotherapy for mutated Ras-positive cancer.

3. The method of claim 2, wherein the yeast-based immunotherapy for mutated Ras-positive cancer comprises GI-4000 or the equivalent.

4. The method of claim 3, wherein the yeast-based immunotherapy for mutated Ras-positive cancer therapy is to be administered to the patient in conjunction with gemcitabine or the equivalent.

5. The method of claim 1, wherein the cancer patient comprises a pancreatic cancer patient.

6. The method of claim 2, wherein the cancer patient comprises a pancreatic cancer patient.

7. The method of claim 1, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast-based immune response generating therapy or immunotherapy either alone or in combination with another anti-cancer therapy.

8. The method of claim 1, wherein the selected features include one or more features listed below in Tables 1, 2, 3, 4, 5, or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.521
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408

21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43

64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280

3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540

44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920

85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		

11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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9. A method of predicting whether a cancer patient is not likely to benefit from administration of a yeast-based immune response generating therapy, either alone or in combination with another anti-cancer therapy, comprising the steps of:

(a) obtaining a blood-derived sample of the patient;

(b) conducting mass-spectrometry on the sample and obtaining a mass spectrum from the sample;

(c) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients and classifying the mass spectrum with a class label;

wherein the class label predicts whether the patient is not likely to benefit from the yeast-based immune response generating therapy either alone or in addition to another anti-cancer therapy.

10. The method of claim 9, wherein the yeast-based immunotherapy for cancer comprises a yeast-based immunotherapy for mutated Ras-positive cancer.

11. The method of claim 10, wherein the yeast-based immunotherapy for mutated Ras-positive cancer comprises GI-4000 or the equivalent.

12. The method of claim 10, wherein the patient is predicted to not likely benefit from administration of the yeast-based immunotherapy for mutated Ras-positive cancer therapy in conjunction with gemcitabine or the equivalent.

13. The method of claim 9, wherein the cancer patient comprises a pancreatic cancer patient.

14. The method of claim 9, wherein the training set comprises class-labeled spectra from other cancer patients that obtained benefit and did not obtain benefit from administration of the immunotherapy either alone or in combination with another anti-cancer therapy.

15. The method of claim 9, wherein the selected features comprise one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.263	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825

26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78

69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640

8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080

49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470

90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				

11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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16. A system for predicting whether a cancer patient is likely to benefit from administration of a yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy, comprising, in combination:

a mass spectrometer generating a mass spectrum from a blood-derived sample from the cancer patient;

a machine readable memory storing a training set of class-labeled spectra from other cancer patients, the training set including class-labeled spectra from plurality of patients that did not benefit from the yeast-based immune response generating either alone or in combination with the another anti-cancer therapy and class-labeled spectra from plurality of patients that did benefit from the immune response generating therapy either alone or in combination with the another anti-cancer agent; and

a computer system configured to operate on the mass spectrum and classify the mass spectrum using the training set, producing a class label for the mass spectrum, wherein the class label predicts whether the patient is likely to benefit from administration of the yeast-based immune response generating therapy either alone or in combination with another anti-cancer agent.

17. The system of claim 16, wherein the class label predicts whether the patient is likely to benefit from administration of a yeast-based immunotherapy for mutated Ras-positive cancer.

18. The system of claim 16, wherein the yeast-based immunotherapy for mutated Ras-positive cancers comprises GI-4000 or the equivalent.

19. The system of claim 16, wherein the class label predicts whether patient is likely to benefit from administration of GI-4000 and gemcitabine to the patient.

20. The system of claim 16, wherein the cancer patient comprises a pancreatic cancer patient.

21. The system of claim 16, wherein the computer is configured to obtain integrated intensity values of features in the spectrum in m/z ranges which include one or more of the features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429

30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4

73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620

12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950

53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740

94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					

					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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22. A system for predicting whether a cancer patient is not likely to obtain benefit from administration of a yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy, comprising, in combination:

a mass spectrometer generating a mass spectrum from a blood-derived sample from the cancer patient;

a machine readable memory storing a training set of class-labeled spectra from other cancer patients, the training set including class-labeled spectra from plurality of patients that did not benefit from the immune response generating therapy either alone or in combination with the another anti-cancer therapy and class-labeled spectra from plurality of patients that did benefit from the immune response generating therapy either alone or in combination with the another anti-cancer agent; and

a computer system configured to operate on the mass spectrum and classify the mass spectrum using the training set, producing a class label for the mass spectrum, wherein the class label predicts whether the patient is not likely to obtain benefit from a yeast-based immunotherapy either alone or in combination with another anti-cancer agent.

23. The system of claim 22, wherein the yeast-based immunotherapy for cancer comprises a yeast-based immunotherapy for mutated Ras-positive cancer.

24. The system of claim 23, wherein the yeast-based immunotherapy for mutated Ras-positive cancer comprises GI-4000 or the equivalent.

25. The system of claim 24, wherein the class label predicts whether the patient is not likely to benefit from administration of GI-4000 and gemcitabine.

26. The system of claim 24, wherein the cancer patient comprises a pancreatic cancer patient.

27. The system of claim 22, wherein the computer is configured to obtain integrated intensity values of features in the spectrum in m/z ranges which include one or more of the features listed below in Table 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22

11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681

38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3
m/z ranges

5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220

19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840

60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42	Subset of 32	Subset of 25	Subset of 13	Subset of 22	Eight features

features from Tables 3, 4, 5 and additional features K=3	features from Table 5 K=3	features from Tables 3, 4, 5 and additional features K=5	features from Tables 3, 4, 5 and additional features K=5	features (no features from Table 3) K=7	(4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			

13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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28. The method of claim 1, wherein the step of conducting mass spectrometry on the sample comprises conducting MALDI TOF mass spectrometry.

29. The method of claim 28, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

30. The method of claim 1, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of blood-derived samples of cancer patients , each of the mass spectra obtained by DeepMALDI mass spectrometry in which the blood-derived samples are subject to more than 20,000 laser shots.

31. The system of claim 16, wherein the mass spectrometer comprises a MALDI-TOF mass spectrometer configured to obtain spectra by subjecting the blood-derived sample to more than 20,000 laser shots.

32. A non-transitory computer readable medium storing data in the form of a training set for a classifier comprising class-labeled mass spectra from a plurality of cancer patients, including class-labeled mass spectra from plurality of cancer patients that did not benefit from a yeast-based immune response generating therapy either alone or in combination with the another anti-cancer therapy and class-labeled mass spectra from a plurality of cancer patients that did benefit from the yeast-based immune response generating therapy either alone or in combination with the another anti-cancer therapy, the class label indicating the status of benefit or non-benefit.

33. The non-transitory computer readable medium of claim 32, wherein the medium stores data in the form of a training set for a classifier comprising class-labeled mass spectra from a plurality of cancer patients, including class-labeled mass spectra from plurality of cancer patients that did not benefit from yeast-based immunotherapy for mutated Ras-positive cancer either alone or in conjunction with the another anti-cancer therapy and class-labeled mass spectra from plurality of cancer patients that did benefit from the yeast-based immunotherapy for mutated Ras-positive cancer either alone or in conjunction with the another anti-cancer therapy, the class label indicating the status of benefit or non-benefit.

34. The medium of claim 33, wherein the class labels indicate whether the patients in the training set benefitted, or did not benefit, from administration of the combination of GI-4000 and gemcitabine.

35. The medium of claim 32, wherein the cancer patients in the training set comprise pancreatic cancer patients.

36. The medium of claim 32, wherein the medium stores code in the form of a classifier for comparing features in the training set including one or more of features listed below in Tables 1, 2, 3 or 4 with a test mass spectrum to thereby produce a class label for the test mass spectrum:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039

29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55

72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

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37. A system for classifying a mass spectrum comprising:

a non-transitory computer-readable as recited in claim 32 and

a general purpose computer configured as a classifier to classify a spectrum of a cancer patient using the training set of claim 32.

38. The system of claim 37, wherein the computer implements a K nearest neighbor classifier.

39. A method of creating a classifier for predicting, in advance of treatment, whether a cancer patient is likely to benefit from a yeast-based immune response generating therapy, either alone or in combination with another anti-cancer therapy, comprising the steps of:

a) performing mass spectrometry on a multitude of patient samples obtained after treatment by the yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy and generating a corresponding set of mass spectra;

b) creating a training set for a classifier by separating the patients from which the samples in step a) were obtained into two groups corresponding to whether or not such patients obtained benefit from the treatment and assigning a class label to the respective spectra (e.g., "good"/ "poor", "Quick"/ "Slow");

c) analyzing the spectra from the two groups to identify distinguishing features in the spectra characteristic of the patients in the two groups; and

d) testing the ability of such distinguishing features to predict patient benefit from the treatment by applying a classification algorithm using the class labeled spectra and distinguishing features identified in step c) to a test set of spectra from other patients that were administered the treatment and evaluating the performance of the classification algorithm.

40. The method of claim 39, comprising repeating the steps b), c) and d) using different distinguishing features in the spectra in the two groups of patients.

41. The method of claim 39, wherein the classification algorithm comprises a K-nearest neighbor algorithm.

42. The method of claim 39, wherein the mass spectrometry of step a) comprises DeepMALDI mass spectrometry in a MALDI-TOF mass spectrometer in which the sample is subject to more than 20,000 laser shots.

43. The method of claim 39, wherein the distinguishing features comprise one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature

5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279

32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29

75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700

14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140

55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650

96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				

11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

.

44. The method of claim 39, further comprising performing a partial ion current normalization of the spectra based on features in the spectra in the training set.

45. The method of claim 39, wherein the class labels are determined by investigation of clinical data for the patients in the training set.

46. A method of selecting a cancer patient to be treated with yeast-based immunotherapy,

wherein the patient is to be selected by a mass spectrometry and classification test, the test comprising the steps of:

(a) conducting mass-spectrometry on a blood-derived sample from the patient and obtaining a mass spectrum from the sample;

(b) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients treated with the yeast-based immunotherapy and classifying the mass spectrum with a class label;

and wherein the class label for the mass spectrum indicates that the patient is likely to benefit from the yeast-based immunotherapy for cancer.

47. The method of claim 46, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for cancer.

48. The method of claim 47, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

49. The method of claim 46, wherein the yeast-based immunotherapy is a whole, heat-inactivated recombinant yeast that has expressed one or more cancer antigens from the patient's cancer.

50. The method of claim 49, wherein the yeast is from *Saccharomyces cerevisiae*.

51. The method of claim 46, wherein the patient has mutated Ras-positive cancer and wherein the patient is to be administered a yeast-based immunotherapy for mutated Ras-positive cancer.

52. The method of claim 51, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for mutated Ras-positive cancer.

53. The method of claim 52, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

54. The method of claim 51, wherein the mutated Ras-positive cancer is selected from: pancreas cancer, non-small cell lung cancer (NSCLC), colorectal cancer (CRC), endometrial cancers, ovarian cancers, melanoma or multiple myeloma.

55. The method of claim 51, wherein the mutated Ras-positive cancer is pancreas cancer.

56. The method of claim 51, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a whole, heat-inactivated recombinant yeast that has expressed a mutated Ras antigen.

57. The method of claim 55, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a product in the GI-4000 series of yeast-based immunotherapy products, or the equivalent.

58. The method of claim 57, wherein the product is selected from GI-4014, GI-4015, GI-4016 or GI-4020.

59. The method of claim 51, wherein the yeast-based immunotherapy is to be administered in conjunction with gemcitabine or the equivalent.

60. The method of claim 51, wherein the cancer patient's tumor has been surgically resected prior to treatment with the yeast-based immunotherapy.

61. The method of claim 49, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast-based immunotherapy either alone or in combination with another anti-cancer therapy.

62. The method of claim 46, wherein the predefined features include one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296

22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32

65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770

4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650

45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960

86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					

11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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63. The method of claim 49, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

64. The method of claim 63, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

65. The method of claim 49, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by DeepMALDI mass spectrometry in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.

66. A method of making a decision on whether to treat a cancer patient with yeast-based immunotherapy, comprising:

a) conducting mass-spectrometry on a blood-derived sample from a cancer patient and obtaining a mass spectrum from the sample;

b) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients treated with the yeast-based immunotherapy and classifying the mass spectrum with a class label, and

c) basing a decision to administer the yeast-based immunotherapy for cancer to the cancer patient when the class label for the mass spectrum indicates that the patient is likely to benefit from the yeast-based immunotherapy for cancer.

67. The method of claim 66, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for cancer.

68. The method of claim 66, wherein the yeast-based immunotherapy is a whole, heat-inactivated recombinant yeast from *Saccharomyces cerevisiae* that has expressed one or more cancer antigens from the patient's cancer.

69. The method of claim 66, wherein the patient has mutated Ras-positive cancer and wherein the patient is to be administered a yeast-based immunotherapy for mutated Ras-positive cancer.

70. The method of claim 69, wherein the product is selected from GI-4014, GI-4015, GI-4016 or GI-4020.

71. The method of claim 66, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast based immunotherapy either alone or in combination with another anti-cancer therapy.

72. The method of claim 66, wherein the predefined features include one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187

7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49

50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140

31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190

72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			

7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			

14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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73. The method of claim 66, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

74. The method of claim 73, wherein the MALDI-TOF mass spectrometry comprises conducting multi-shot mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

75. The method of claim 66, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by multi-shot mass spectrometry in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.

76. Use of yeast-based immunotherapy comprising a yeast vehicle expressing one or more heterologous target antigens, in the preparation of a medicament for the treatment of cancer in a cancer patient who has been selected for treatment by a mass spectrometry and classification test, the test comprising the steps of:

(a) conducting mass-spectrometry on a blood-derived sample from the patient and obtaining a mass spectrum from the sample;

(b) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass

spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients treated with the yeast-based immunotherapy and classifying the mass spectrum with a class label;

and wherein the class label for the mass spectrum indicates that the patient is likely to benefit from the yeast-based immunotherapy for cancer.

77. The use of claim 76, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for cancer.

78. The use of claim 77, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

79. The use of claim 76, wherein the yeast-based immunotherapy is a whole, heat-inactivated recombinant yeast that has expressed one or more cancer antigens from the patient's cancer.

80. The use of claim 79, wherein the yeast is from *Saccharomyces cerevisiae*.

81. The use of claim 76, wherein the patient has mutated Ras-positive cancer and wherein the yeast-based immunotherapy is a yeast-based immunotherapy for mutated Ras-positive cancer.

82. The use of claim 81, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for mutated Ras-positive cancer.

83. The use of claim 82, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

84. The use of claim 81, wherein the mutated Ras-positive cancer is selected from: pancreas cancer, non-small cell lung cancer (NSCLC), colorectal cancer (CRC), endometrial cancers, ovarian cancers, melanoma or multiple myeloma.

85. The use of claim 81, wherein the mutated Ras-positive cancer is pancreas cancer.

86. The use of claim 81, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a whole, heat-inactivated recombinant yeast that has expressed a mutated Ras antigen.

87. The use of claim 85, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a product in the GI-4000 series of yeast-based immunotherapy products, or the equivalent.

88. The use of claim 87, wherein the product is selected from GI-4014, GI-4015, GI-4016 or GI-4020.

89. The use of claim 81, wherein the yeast-based immunotherapy is to be administered in conjunction with gemcitabine or the equivalent.

90. The use of claim 81, wherein the cancer patient's tumor has been surgically resected prior to use of the yeast-based immunotherapy.

91. The use of claim 76, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast-based immunotherapy either alone or in combination with another anti-cancer therapy.

92. The method of claim 76, wherein the predefined features include one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197

9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734

34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37

77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730

16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410

57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104

13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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93. The use of claim 76, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

94. The use of claim 93, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

95. The use of claim 76, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by DeepMALDI mass spectrometry, in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.

Claims

1. A method of predicting whether a cancer patient is likely or is not likely to benefit from administration of a yeast-based immune response generating therapy for cancer, either alone or in addition to another anti-cancer therapy, comprising the steps of:

(a) obtaining a blood-derived sample of the patient;

(b) conducting mass-spectrometry on the sample and obtaining a mass spectrum from the sample;

(c) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients who obtained benefit and who did not obtain benefit from administration of the immune response generating therapy and classifying the mass spectrum with a class label;

wherein the class label predicts whether the patient is likely to benefit from the yeast-based immune response generating therapy, either alone or in addition to other anti-cancer therapies.

2. The method of claim 1, wherein the yeast-based immunotherapy comprises a yeast-based immunotherapy for mutated Ras-positive cancer.

3. The method of claim 2, wherein the yeast-based immunotherapy for mutated Ras-positive cancer comprises GI-4000 or the equivalent.

4. The method of claim 3, wherein the yeast-based immunotherapy for mutated Ras-positive cancer therapy is to be administered to the patient in conjunction with gemcitabine or the equivalent.

5. The method of claim 1, wherein the cancer patient comprises a pancreatic cancer patient.

6. The method of claim 2, wherein the cancer patient comprises a pancreatic cancer patient.

7. The method of claim 1, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast-based immune response generating therapy or immunotherapy either alone or in combination with another anti-cancer therapy.

8. The method of claim 1, wherein the selected features include one or more features listed below in Tables 1, 2, 3, 4, 5, or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333

18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32

61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510

41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980

82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					

11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	

28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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9. The method of claim 2, wherein the patient is predicted to not likely benefit from administration of the yeast-based immunotherapy for mutated Ras-positive cancer therapy in conjunction with gemcitabine or the equivalent.

10. The method of claim 1, wherein the training set comprises class-labeled spectra from other cancer patients that obtained benefit and did not obtain benefit from administration of the immunotherapy either alone or in combination with another anti-cancer therapy.

11. A system to predict whether a cancer patient is likely to benefit from administration of a yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy, comprising, in combination:

a mass spectrometer generating a mass spectrum from a blood-derived sample from the cancer patient;

a machine readable memory storing a training set of class-labeled spectra from other cancer patients, the training set including class-labeled spectra from plurality of patients that did not benefit from the yeast-based immune response generating either alone or in combination with the another anti-cancer therapy and class-labeled spectra from plurality of patients that did benefit from the immune response generating therapy either alone or in combination with the another anti-cancer agent; and

a computer system configured to operate on the mass spectrum and classify the mass spectrum using the training set, producing a class label for the mass spectrum, wherein the class label predicts whether the patient is likely to benefit from administration of the yeast-based

immune response generating therapy either alone or in combination with another anti-cancer agent.

12. The system of claim 11, wherein the class label predicts whether the patient is likely to benefit from administration of a yeast-based immunotherapy for mutated Ras-positive cancer.

13. The system of claim 11, wherein the yeast-based immunotherapy for mutated Ras-positive cancers comprises GI-4000 or the equivalent.

14. The system of claim 11, wherein the class label predicts whether patient is likely to benefit from administration of GI-4000 and gemcitabine to the patient.

15. The system of claim 11, wherein the cancer patient comprises a pancreatic cancer patient.

16. The system of claim 11, wherein the computer is configured to obtain integrated intensity values of features in the spectrum in m/z ranges which include one or more of the features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187

7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49

50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140

31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190

72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			

7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			

14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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17. A system for predicting whether a cancer patient is not likely to obtain benefit from administration of a yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy, comprising, in combination:

a mass spectrometer generating a mass spectrum from a blood-derived sample from the cancer patient;

a machine readable memory storing a training set of class-labeled spectra from other cancer patients, the training set including class-labeled spectra from plurality of patients that did not benefit from the immune response generating therapy either alone or in combination with the another anti-cancer therapy and class-labeled spectra from plurality of patients that did benefit from the immune response generating therapy either alone or in combination with the another anti-cancer agent; and

a computer system configured to operate on the mass spectrum and classify the mass spectrum using the training set, producing a class label for the mass spectrum, wherein the class label predicts whether the patient is not likely to obtain benefit from a yeast-based immunotherapy either alone or in combination with another anti-cancer agent.

18. The system of claim 17, wherein the yeast-based immunotherapy for cancer comprises a yeast-based immunotherapy for mutated Ras-positive cancer.

19. The system of claim 17, wherein the yeast-based immunotherapy for mutated Ras-positive cancer comprises GI-4000 or the equivalent.

20. The system of claim 19, wherein the class label predicts whether the patient is not likely to benefit from administration of GI-4000 and gemcitabine.

21. The system of claim 19, wherein the cancer patient comprises a pancreatic cancer patient.

22. The system of claim 17, wherein the computer is configured to obtain integrated intensity values of features in the spectrum in m/z ranges which include one or more of the features listed below in Table 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648

17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18

60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510

41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980

82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					

11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	

28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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23. The method of claim 1, wherein the step of conducting mass spectrometry on the sample comprises conducting MALDI TOF mass spectrometry.

24. The method of claim 23, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

25. The method of claim 1, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of blood-derived samples of cancer patients , each of the mass spectra obtained by DeepMALDI mass spectrometry in which the blood-derived samples are subject to more than 20,000 laser shots.

26. The system of claim 11, wherein the mass spectrometer comprises a MALDI-TOF mass spectrometer configured to obtain spectra by subjecting the blood-derived sample to more than 20,000 laser shots.

27. A non-transitory computer readable medium storing data in the form of a training set for a classifier comprising class-labeled mass spectra from a plurality of cancer patients, including class-labeled mass spectra from plurality of cancer patients that did not benefit from a yeast-based immune response generating therapy either alone or in combination with the another anti-cancer therapy and class-labeled mass spectra from a plurality of cancer patients that did benefit from the yeast-based immune response generating therapy either alone or in combination with the another anti-cancer therapy, the class label indicating the status of benefit or non-benefit.

28. The non-transitory computer readable medium of claim 27, wherein the medium stores data in the form of a training set for a classifier comprising class-labeled mass spectra from a plurality of cancer patients, including class-labeled mass spectra from plurality of cancer patients that did not benefit from yeast-based immunotherapy for mutated Ras-positive cancer either

alone or in conjunction with the another anti-cancer therapy and class-labeled mass spectra from plurality of cancer patients that did benefit from the yeast-based immunotherapy for mutated Ras-positive cancer either alone or in conjunction with the another anti-cancer therapy, the class label indicating the status of benefit or non-benefit.

29. The medium of claim 28, wherein the class labels indicate whether the patients in the training set benefitted, or did not benefit, from administration of the combination of GI-4000 and gemcitabine.

30. The medium of claim 27, wherein the cancer patients in the training set comprise pancreatic cancer patients.

31. The medium of claim 27, wherein the medium stores code in the form of a classifier for comparing features in the training set including one or more of features listed below in Tables 1, 2, 3 or 4 with a test mass spectrum to thereby produce a class label for the test mass spectrum:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092

8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16

51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak	m/z

Number	
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

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33. A system for classifying a mass spectrum comprising:

a non-transitory computer-readable as recited in claim 27 and

a general purpose computer configured as a classifier to classify a spectrum of a cancer patient using the training set of claim 27.

33. The system of claim 32, wherein the computer implements a K nearest neighbor classifier.

34. A method of creating a classifier for predicting, in advance of treatment, whether a cancer patient is likely to benefit from a yeast-based immune response generating therapy, either alone or in combination with another anti-cancer therapy, comprising the steps of:

a) performing mass spectrometry on a multitude of patient samples obtained after treatment by the yeast-based immune response generating therapy either alone or in combination with another anti-cancer therapy and generating a corresponding set of mass spectra;

b) creating a training set for a classifier by separating the patients from which the samples in step a) were obtained into two groups corresponding to whether or not such patients obtained benefit from the treatment and assigning a class label to the respective spectra (e.g., “good”/ “poor”, “Quick”/ “Slow”);

c) analyzing the spectra from the two groups to identify distinguishing features in the spectra characteristic of the patients in the two groups; and

d) testing the ability of such distinguishing features to predict patient benefit from the treatment by applying a classification algorithm using the class labeled spectra and distinguishing features identified in step c) to a test set of spectra from other patients that were administered the treatment and evaluating the performance of the classification algorithm.

35. The method of claim 34, comprising repeating the steps b), c) and d) using different distinguishing features in the spectra in the two groups of patients.

36. The method of claim 34, wherein the classification algorithm comprises a K-nearest neighbor algorithm.

37. The method of claim 34, wherein the mass spectrometry of step a) comprises DeepMALDI mass spectrometry in a MALDI-TOF mass spectrometer in which the sample is subject to more than 20,000 laser shots.

38. The method of claim 34, wherein the distinguishing features comprise one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52
4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994

12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22

55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622
65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685

5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960

36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550

77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	

9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	

17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

.

39. The method of claim 34, further comprising performing a partial ion current normalization of the spectra based on features in the spectra in the training set.

40. The method of claim 34, wherein the class labels are determined by investigation of clinical data for the patients in the training set.

41. A method of making a decision on whether to treat a cancer patient with yeast-based immunotherapy, comprising:

a) conducting mass-spectrometry on a blood-derived sample from a cancer patient and obtaining a mass spectrum from the sample;

b) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients treated with the yeast-based immunotherapy and classifying the mass spectrum with a class label; and

c) basing a decision to administer the yeast-based immunotherapy for cancer to the cancer patient when the class label for the mass spectrum indicates that the patient is likely to benefit from the yeast-based immunotherapy for cancer.

42. The method of claim 41, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for cancer.

43. The method of claim 42, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

44. The method of claim 41, wherein the yeast-based immunotherapy is a whole, heat-inactivated recombinant yeast from *Saccharomyces cerevisiae* that has expressed one or more cancer antigens from the patient's cancer.

45. The method of claim 41, wherein the patient has mutated Ras-positive cancer and wherein the patient is to be administered a yeast-based immunotherapy for mutated Ras-positive cancer.

46. The method of claim 44, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for mutated Ras-positive cancer.

47. The method of claim 46, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

48. The method of claim 45, wherein the mutated Ras-positive cancer is selected from: pancreas cancer, non-small cell lung cancer (NSCLC), colorectal cancer (CRC), endometrial cancers, ovarian cancers, melanoma or multiple myeloma.

49. The method of claim 45, wherein the mutated Ras-positive cancer is pancreas cancer.

50. The method of claim 45, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a whole, heat-inactivated recombinant yeast that has expressed a mutated Ras antigen.

51. The method of claim 49, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a product in the GI-4000 series of yeast-based immunotherapy products, or the equivalent.

52. The method of claim 51, wherein the product is selected from GI-4014, GI-4015, GI-4016 or GI-4020.

53. The method of claim 45, wherein the yeast-based immunotherapy is to be administered in conjunction with gemcitabine or the equivalent.

54. The method of claim 45, wherein the cancer patient's tumor has been surgically resected prior to treatment with the yeast-based immunotherapy.

55. The method of claim 44, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

56. The method of claim 55, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

57. The method of claim 44, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by DeepMALDI mass spectrometry in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.

58. The method of claim 41, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast based immunotherapy either alone or in combination with another anti-cancer therapy.

59. The method of claim 41, wherein the predefined features include one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
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8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296

22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1
47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32

65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
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5811 to 5875
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Table 5.

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3	3679.430	3674.080	3684.770

4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870
29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650

45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970
70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960

86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	
	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					

11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			
14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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60. The method of claim 41, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

61. The method of claim 60, wherein the MALDI-TOF mass spectrometry comprises conducting multi-shot mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

62. The method of claim 41, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by multi-shot mass spectrometry in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.

63. Use of yeast-based immunotherapy comprising a yeast vehicle expressing one or more heterologous target antigens, in the preparation of a medicament for the treatment of cancer in a cancer patient who has been selected for treatment by a mass spectrometry and classification test, the test comprising the steps of:

(a) conducting mass-spectrometry on a blood-derived sample from the patient and obtaining a mass spectrum from the sample;

(b) in a programmed computer, performing one or more predefined pre-processing steps on the mass spectrum, obtaining integrated intensity values of selected features in the mass spectrum over predefined m/z ranges after the pre-processing steps are performed, and comparing the integrated intensity values with a training set comprising class-labeled spectra from other cancer patients treated with the yeast-based immunotherapy and classifying the mass spectrum with a class label;

and wherein the class label for the mass spectrum indicates that the patient is likely to benefit from the yeast-based immunotherapy for cancer.

64. The use of claim 63, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for cancer.

65. The use of claim 64, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

66. The use of claim 63, wherein the yeast-based immunotherapy is a whole, heat-inactivated recombinant yeast that has expressed one or more cancer antigens from the patient's cancer.

67. The use of claim 66, wherein the yeast is from *Saccharomyces cerevisiae*.

68. The use of claim 63, wherein the patient has mutated Ras-positive cancer and wherein the yeast-based immunotherapy is a yeast-based immunotherapy for mutated Ras-positive cancer.

69. The use of claim 68, wherein the patient is additionally treated with one or more additional anti-cancer therapies, either prior to, concurrently with, or after, treatment with the yeast-based immunotherapy for mutated Ras-positive cancer.

70. The use of claim 69, wherein the additional anti-cancer therapies are selected from: surgery, chemotherapy, radiation therapy, targeted cancer therapy, palliative care, or any combination thereof.

71. The use of claim 68, wherein the mutated Ras-positive cancer is selected from: pancreas cancer, non-small cell lung cancer (NSCLC), colorectal cancer (CRC), endometrial cancers, ovarian cancers, melanoma or multiple myeloma.

72. The use of claim 68, wherein the mutated Ras-positive cancer is pancreas cancer.

73. The use of claim 68, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a whole, heat-inactivated recombinant yeast that has expressed a mutated Ras antigen.

74. The use of claim 72, wherein the yeast-based immunotherapy for mutated Ras-positive cancer is a product in the GI-4000 series of yeast-based immunotherapy products, or the equivalent.

75. The use of claim 74, wherein the product is selected from GI-4014, GI-4015, GI-4016 or GI-4020.

76. The use of claim 68, wherein the yeast-based immunotherapy is to be administered in conjunction with gemcitabine or the equivalent.

77. The use of claim 68, wherein the cancer patient's tumor has been surgically resected prior to use of the yeast-based immunotherapy.

78. The use of claim 63, wherein the training set comprises class-labeled spectra from other cancer patients who obtained benefit and did not obtain benefit from administration of the yeast-based immunotherapy either alone or in combination with another anti-cancer therapy.

79. The method of claim 63, wherein the predefined features include one or more features listed below in Tables 1, 2, 3, 4, 5 or 6:

Table 1

m/Z center of feature	m/Z left edge of feature	m/Z right edge of feature
5841.168	5831.035	5851.302
6433.537	6427.831	6439.244
8765.432	8757.666	8773.197
9669.883	9618.946	9720.82
11442.47	11428.45	11456.49
11474.93	11460.88	11488.99
11529.59	11518.95	11540.22
11696.79	11650.43	11743.15
11900.24	11878.99	11921.49
12865.48	12856.36	12874.6

Table 2

Peak #	m/z center	m/z left edge	m/z right edge
1	3039.529	3037.053	3042.005
2	3366.615	3358.219	3375.011
3	3432.149	3412.777	3451.52

4	3473.153	3453.337	3492.969
5	3552.474	3543.957	3560.992
6	3680.091	3672.995	3687.187
7	3842.836	3836.58	3849.092
8	4203.838	4193.707	4213.969
9	5180.126	5176.524	5183.728
10	5291.206	5287.73	5294.682
11	5700.687	5689.381	5711.994
12	5843.129	5840	5846.258
13	5860.729	5851.114	5870.344
14	5866.576	5862.227	5870.926
15	6008.828	6004.271	6013.384
16	6192.594	6182.541	6202.648
17	6298.994	6294.655	6303.333
18	6873.363	6870.128	6876.598
19	6903.79	6894.561	6913.018
20	6971.019	6967.629	6974.408
21	6985.879	6982.461	6989.296
22	6995.012	6991.486	6998.538
23	7009.091	7002.267	7015.914
24	7023.426	7019.431	7027.422
25	7035.244	7031.664	7038.825
26	7045.484	7041.962	7049.005
27	7057.527	7050.655	7064.399
28	7074.719	7070.399	7079.039
29	7150.539	7136.65	7164.429
30	7245.544	7237.996	7253.093
31	7301.145	7297.011	7305.279
32	7783.506	7778.087	7788.925
33	8361.169	8355.605	8366.734
34	8476.978	8470.468	8483.489
35	8767.557	8761.746	8773.368
36	9362.525	9353.951	9371.098
37	9671.94	9664.199	9679.681
38	9759.032	9751.081	9766.982
39	9788.134	9772.707	9803.561
40	9871.152	9861.387	9880.918
41	11302.64	11295.53	11309.76
42	10485.61	10471.48	10499.73
43	10776.72	10762.23	10791.21
44	11475.86	11468.27	11483.45
45	11494.79	11487.31	11502.27
46	11529.86	11522.63	11537.1

47	11555.31	11541.01	11569.61
48	11655.18	11616.93	11693.44
49	11709.95	11701.41	11718.49
50	11761.94	11724.72	11799.16
51	11858.02	11814.24	11901.79
52	11909.8	11902.01	11917.58
53	11939.01	11929.83	11948.2
54	12348.32	12339.42	12357.22
55	12866.6	12858.57	12874.62
56	13072.62	13064.42	13080.81
57	13090.91	13082.14	13099.68
58	13360.65	13351.7	13369.59
59	13807.33	13786.47	13828.18
60	13913.92	13897.53	13930.32
61	14043.98	14035.87	14052.09
62	14092.28	14084.11	14100.46
63	14125.28	14117.13	14133.43
64	14148.15	14139.99	14156.32
65	14197.84	14181.99	14213.69
66	14258.28	14249.88	14266.69
67	14429.84	14414.32	14445.35
68	14384.69	14357.6	14411.78
69	14530.4	14520.1	14540.7
70	18801.94	18784.71	18819.18
71	18861.88	18844.22	18879.55
72	18904.03	18884.67	18923.4
73	19860.06	19771.09	19949.03
74	21710.89	21683.49	21738.29
75	22998.95	22839.61	23158.29
76	28314	28282.63	28345.37
77	28518.76	28486.77	28550.75

Table 3

m/z ranges
5732 to 5795
5811 to 5875
6398 to 6469
11376 to 11515
11459 to 11599
11614 to 11756
11687 to 11831
11830 to 11976
12375 to 12529
12502 to 12656
23183 to 23525
23279 to 23622

65902 to 67502

Table 4

Peak Number	m/z
1	5843
2	11445
3	11529
4	11685
5	11759
6	11903
7	12452
8	12579

Table 5.

	m/z center	m/z left edge	m/z right edge
1	3463.350	3459.400	3467.300
2	3609.960	3605.630	3614.280
3	3679.430	3674.080	3684.770
4	3840.800	3834.810	3846.780
5	3892.750	3889.050	3896.440
6	4077.700	4072.100	4083.300
7	4492.020	4485.400	4498.640
8	4597.040	4592.710	4601.370
9	5405.660	5400.820	5410.500
10	5555.430	5549.440	5561.410
11	5582.800	5578.980	5586.620
12	5635.590	5631.640	5639.530
13	5706.610	5701.520	5711.700
14	5762.000	5758.050	5765.940
15	5840.660	5836.580	5844.730
16	5873.770	5870.200	5877.330
17	5890.570	5885.730	5895.410
18	6107.260	6102.290	6112.220
19	6129.670	6125.720	6133.610
20	6328.570	6323.730	6333.410
21	6892.580	6888.250	6896.900
22	6951.990	6948.040	6955.930
23	6981.660	6977.580	6985.730
24	7004.170	6999.330	7009.000
25	7054.210	7048.220	7060.190
26	7153.620	7148.910	7158.330
27	7295.310	7289.320	7301.290
28	7421.920	7417.970	7425.870

29	8357.210	8351.730	8362.680
30	8762.290	8756.430	8768.140
31	8992.440	8987.350	8997.530
32	9199.780	9193.160	9206.400
33	9794.720	9791.280	9798.160
34	10000.020	9993.530	10006.510
35	10018.610	10013.260	10023.960
36	10090.630	10083.880	10097.370
37	10174.760	10168.520	10181.000
38	10200.610	10191.950	10209.270
39	10657.440	10651.960	10662.910
40	10713.840	10704.160	10723.510
41	10912.750	10905.490	10920.000
42	11402.140	11396.410	11407.870
43	11432.410	11425.280	11439.540
44	11466.160	11459.660	11472.650
45	11488.190	11481.820	11494.550
46	11520.580	11514.720	11526.430
47	11543.880	11538.400	11549.350
48	11563.080	11556.070	11570.080
49	11620.250	11613.120	11627.380
50	11676.220	11670.870	11681.570
51	11699.260	11694.040	11704.480
52	11723.200	11716.450	11729.950
53	11744.210	11739.370	11749.050
54	11775.740	11767.330	11784.140
55	11821.600	11814.600	11828.600
56	11839.680	11833.950	11845.410
57	11882.560	11877.850	11887.270
58	11900.770	11894.660	11906.880
59	12401.800	12392.760	12410.840
60	12975.740	12968.730	12982.740
61	13104.010	13098.150	13109.860
62	13145.130	13138.380	13151.880
63	13399.430	13388.090	13410.760
64	13475.490	13468.100	13482.870
65	13622.780	13616.670	13628.890
66	13648.070	13642.590	13653.540
67	13677.100	13670.860	13683.340
68	13735.490	13731.670	13739.310
69	13781.970	13774.960	13788.970

70	13800.220	13794.870	13805.570
71	14007.100	14002.010	14012.190
72	14030.530	14023.400	14037.660
73	14057.140	14051.410	14062.870
74	14078.920	14073.060	14084.770
75	14096.180	14091.340	14101.020
76	14112.220	14107.890	14116.550
77	14137.690	14129.540	14145.840
78	14186.020	14178.130	14193.910
79	14244.340	14232.110	14256.560
80	14280.730	14272.960	14288.490
81	14408.640	14403.290	14413.980
82	14423.030	14418.310	14427.740
83	14436.400	14431.050	14441.740
84	14518.120	14508.310	14527.920
85	14537.850	14531.740	14543.960
86	14653.490	14645.820	14661.150
87	14715.700	14706.780	14724.610
88	15618.160	15597.660	15638.660
89	17443.590	17430.700	17456.470
90	18734.930	18724.840	18745.010
91	21675.550	21649.880	21701.220
92	22987.930	22971.630	23004.220
93	23020.930	23009.110	23032.740
94	28038.090	27994.740	28081.430
95	28231.950	28203.250	28260.650
96	28438.910	28393.220	28484.590
97	28804.560	28750.090	28859.030

Table 6

Subset of 42 features from Tables 3, 4, 5 and additional features K=3	Subset of 32 features from Table 5 K=3	Subset of 25 features from Tables 3, 4, 5 and additional features K=5	Subset of 13 features from Tables 3, 4, 5 and additional features K=5	Subset of 22 features (no features from Table 3) K=7	Eight features (4 not used in the other classifiers) K=3
	4492			4492	
					5636
	5762				
5841	5841				
					5891
	6893	6893		6893	

	7004			7004	
7295		7295			
7422	7422			7422	
8357		8357			8357
	8762	8762	8762	8762	
	8992			8992	
9795					9795
10000		10000			
	10175			10175	
11402					
11432					
11466	11466	11466	11466		11466
11488					
11521	11521	11521	11521		
11544					
11563					
11620	11620	11620	11620		
11676	11676				
11699	11699				
11723	11723	11723			
11744					
11776					
					11822
11883	11883				
11901					
	12976				
					13104
13145		13145			
13623		13623			
13648	13648	13648	13648	13648	13648
	13677			13677	
13735	13735	13735	13735	13735	
13782	13782	13782	13782	13782	
	14007			14007	
14057	14057	14057	14057	14057	
14096		14096			
14112		14112			
14138		14138			

14244		14244			
14281		14281			
14423	14423	14423	14423	14423	
14436	14436			14436	
14538	14538	14538	14538	14538	
	14716			14716	
17444					
18735					
22988	22988	22988	22988	22988	
23021					
28038	28038	28038	28038	28038	
28232	28232	28232	28232	28232	
	28439			28439	
28805	28805			28805	

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80. The use of claim 63, wherein the mass spectrometry conducted on the sample comprises conducting MALDI-TOF mass spectrometry.

81. The use of claim 80, wherein the MALDI-TOF mass spectrometry comprises conducting DeepMALDI mass spectrometry in which the blood-derived sample is subject to more than 20,000 laser shots.

82. The use of claim 63, wherein the predefined m/z regions are obtained from investigation of a plurality of mass spectra of cancer patients obtained by DeepMALDI mass spectrometry in which blood-derived samples of such cancer patients are subject to more than 20,000 laser shots.