

Supplementary materials

Table S1a The information of 347 healthy controls (test group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
2	0.000	6.127	515.942	0.285	0.390	Female	43
4	0.000	8.380	425.294	0.000	0.338	Female	37
5	0.000	6.177	504.611	0.000	0.292	Male	33
6	0.000	11.423	512.364	0.000	0.334	Female	31
8	0.000	3.335	470.021	0.000	0.253	Female	27
9	5.057	7.472	175.415	0.000	0.395	Female	45
14	0.000	10.465	345.976	1.373	0.296	Female	31
18	1.253	9.153	315.562	0.000	0.364	Female	24
19	0.000	3.201	394.879	0.000	0.235	Female	30
20	0.000	10.633	721.689	0.000	0.372	Male	68
24	0.000	13.592	501.033	0.000	0.500	Male	45
25	10.323	4.950	337.031	0.000	0.429	Female	25
27	25.244	11.171	437.221	0.000	0.271	Female	25
28	0.000	5.151	438.414	0.000	0.262	Female	34
30	11.786	5.017	353.133	0.000	0.346	Female	27
33	0.000	5.026	573.241	0.000	0.454	Male	40
34	0.000	1.719	531.221	0.000	0.307	Female	24
38	0.000	3.587	869.350	0.000	0.245	Female	26
39	8.157	3.548	888.569	0.000	0.280	Female	48
41	4.650	5.551	611.978	0.000	0.571	Female	25
43	0.000	8.255	737.381	0.000	0.417	Female	24
44	0.000	8.877	947.723	0.000	0.394	Female	25
46	0.000	6.757	1,483.200	0.000	0.351	Male	43
47	0.000	8.138	704.553	0.000	0.330	Female	29
48	0.000	8.955	826.017	0.000	0.635	Female	28
51	3.375	7.360	741.732	0.000	0.153	Male	28
52	0.000	8.177	857.532	0.000	0.209	Female	35
54	0.000	4.929	1,234.749	12.793	0.173	Female	23
55	0.000	6.504	1,814.282	0.000	0.130	Male	32
56	0.000	7.127	855.562	0.000	0.234	Female	29
60	2.418	5.882	867.380	0.000	0.212	Female	26
61	0.000	8.994	833.239	0.000	0.184	Female	28
63	21.864	9.675	1,582.157	0.000	0.199	Male	37
64	0.000	3.606	1,368.139	0.000	0.240	Female	26

Table S1a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
68	0.000	4.326	824.047	0.000	0.229	Female	41
71	0.000	4.442	711.119	0.000	0.210	Female	30
72	0.825	5.609	827.330	0.000	0.193	Female	27
73	13.275	8.540	548.900	0.558	0.211	Male	26
78	19.292	2.717	530.420	0.000	0.222	Female	29
80	6.829	0.000	290.177	0.000	0.232	Female	31
81	24.449	9.319	397.664	0.156	0.220	Male	48
83	12.416	15.598	513.448	1.906	0.368	Male	54
84	3.391	4.349	407.093	0.558	0.172	Female	24
85	4.680	13.466	350.144	0.582	0.383	Female	33
86	39.062	16.186	372.018	0.000	0.316	Male	42
87	10.267	7.614	263.400	0.000	0.275	Female	29
88	20.581	4.143	443.299	1.078	0.164	Male	33
92	2.961	9.510	579.072	0.440	0.191	Female	25
93	13.705	6.026	434.248	0.000	0.155	Female	33
95	16.284	15.406	642.433	0.535	0.270	Male	32
96	30.466	6.746	568.889	0.000	0.186	Female	28
98	8.978	2.908	457.631	0.000	0.598	Female	26
101	4.250	3.879	235.491	0.000	0.412	Female	48
103	18.862	4.746	543.997	0.000	0.477	Male	26
105	8.548	1.100	491.197	0.000	0.384	Female	69
106	12.846	4.820	422.556	0.000	0.405	Male	83
111	4.250	2.776	375.790	0.416	0.416	Female	58
112	11.127	2.306	257.743	2.426	0.472	Female	63
116	0.000	3.031	1,194.775	0.000	0.414	Female	56
118	11.324	12.467	502.778	0.000	0.538	Male	68
119	0.000	3.672	415.533	0.000	0.357	Male	51
121	0.000	2.454	681.926	0.000	0.594	Female	66
122	0.000	1.589	601.881	0.000	0.441	Female	56
124	0.000	3.367	831.427	0.000	0.471	Female	64
125	3.074	3.928	760.276	0.000	0.379	Male	64
128	16.365	2.021	1,183.854	0.000	0.519	Female	59
129	0.000	3.095	567.576	0.000	0.741	Male	62
131	18.657	2.822	615.010	0.000	0.371	Female	65
132	0.000	4.697	738.253	0.133	0.450	Female	57

Table S1a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
135	1.241	3.127	456.614	0.000	0.386	Female	42
138	0.000	5.081	742.912	0.000	0.565	Female	63
141	0.000	2.614	744.183	0.000	0.385	Female	59
142	0.000	4.489	895.802	0.000	0.496	Female	58
145	0.000	5.081	902.313	0.000	0.167	Male	75
146	0.000	0.515	842.015	0.000	0.162	Female	62
147	20.032	3.287	602.728	0.000	0.236	Male	63
151	5.824	2.117	534.965	0.000	0.119	Female	25
155	0.000	1.486	412.283	0.000	0.222	Female	68
158	0.000	1.612	361.943	0.000	0.105	Male	19
159	0.000	1.517	331.942	0.000	0.137	Female	59
161	0.000	1.722	417.368	0.000	0.171	Female	63
162	0.000	5.505	490.590	0.000	0.179	Male	72
163	0.000	4.307	643.645	0.000	0.206	Female	73
164	0.000	5.378	621.780	0.000	0.178	Female	51
165	0.000	2.825	497.709	0.000	0.172	Female	61
166	0.000	6.387	460.589	0.000	0.188	Female	63
170	0.000	2.132	327.366	0.000	0.203	Male	67
173	0.000	5.410	440.758	0.000	0.169	Male	79
174	0.000	5.142	360.926	0.000	0.227	Female	69
182	0.000	0.000	250.075	0.000	0.149	Male	79
183	0.000	4.795	178.887	0.000	0.159	Female	61
184	0.000	3.172	329.399	0.421	0.166	Male	62
185	0.000	0.000	485.505	0.000	0.151	Female	58
186	0.000	5.898	345.671	0.000	0.192	Female	65
191	0.000	1.990	276.517	0.356	0.259	Female	69
193	0.000	7.058	733.206	0.000	0.511	Female	60
196	0.000	5.215	1,042.845	0.000	0.763	Female	70
200	5.258	9.515	458.420	0.000	0.650	Female	60
201	0.000	6.414	703.338	0.000	0.681	Male	68
202	0.000	5.858	624.828	0.000	0.581	Male	72
203	0.000	9.691	641.042	0.000	0.654	Female	77
207	0.000	6.999	6,310.173	0.184	0.489	Female	64
209	0.000	5.420	984.543	0.000	0.853	Female	61
212	0.000	6.034	910.708	0.000	0.506	Male	75
214	0.000	9.164	767.341	0.000	0.534	Male	85

Table S1a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
216	0.000	9.077	940.576	0.000	0.421	Male	74
217	31.529	4.366	2,609.853	0.000	0.782	Female	68
218	3.798	4.922	709.312	0.000	0.591	Female	64
220	0.000	3.284	633.361	0.000	0.458	Female	64
221	0.000	5.039	699.071	0.000	0.451	Female	50
222	0.000	5.478	839.024	0.000	0.471	Female	76
223	0.000	10.686	840.731	0.000	0.484	Male	40
224	7.204	6.882	751.980	0.000	0.433	Male	71
225	17.907	2.845	593.253	0.000	0.719	Male	70
228	9.150	8.608	752.834	0.000	0.601	Female	67
229	0.393	8.433	623.974	0.000	0.487	Male	68
234	0.000	8.158	373.547	0.000	0.499	Male	55
236	7.064	7.813	352.357	0.000	0.546	Female	57
237	0.000	11.062	563.081	0.000	0.787	Female	58
238	7.972	5.209	406.510	0.000	0.477	Female	63
239	0.707	8.366	703.171	0.000	0.671	Female	62
240	7.518	1.844	332.344	0.000	0.536	Male	66
241	12.059	10.785	591.334	0.000	0.757	Female	74
243	22.502	16.753	525.410	0.000	0.576	Male	75
246	4.340	12.744	697.285	0.000	0.791	Female	62
248	8.880	4.633	592.512	0.000	0.587	Female	65
249	9.789	12.905	467.726	0.000	0.936	Female	66
250	3.886	16.247	860.920	0.000	0.974	Male	55
251	12.513	7.767	531.296	0.000	0.688	Male	52
257	1.162	17.952	840.907	9.686	0.892	Male	50
258	1.162	15.325	651.373	15.446	0.951	Male	45
259	7.972	13.043	770.273	4.281	0.857	Male	59
261	0.000	14.080	767.919	5.973	0.711	Male	52
263	0.000	12.537	943.528	5.673	0.798	Male	58
265	26.588	17.952	544.245	14.354	1.176	Male	52
266	7.518	10.209	716.121	9.823	0.819	Male	47
267	7.064	14.380	777.447	29.521	0.707	Male	41
270	0.000	14.703	707.880	15.638	0.489	Male	50
274	26.315	9.557	394.531	0.000	0.855	Male	45
275	0.000	1.454	570.850	0.000	0.747	Female	41
277	5.034	0.968	431.558	0.000	0.527	Male	60

Table S1a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
278	20.313	3.443	406.874	40.221	0.689	Female	30
279	8.308	4.226	376.018	152.273	0.504	Female	30
285	7.217	5.939	1,741.841	58.902	0.617	Male	44
287	5.580	1.750	491.506	61.529	0.627	Male	28
289	6.671	1.708	577.902	55.979	0.221	Female	39
291	13.765	8.245	596.416	8.754	0.287	Female	44
292	8.308	7.209	469.467	32.677	0.376	Female	31
293	5.580	9.218	560.271	16.261	0.377	Male	26
298	31.772	4.204	515.309	42.915	0.443	Male	62
302	2.306	9.642	555.863	17.633	0.490	Male	56
303	14.856	8.076	372.492	2.366	0.457	Female	35
304	14.311	10.297	228.792	24.291	0.482	Male	51
306	4.489	7.272	632.561	27.777	0.465	Male	27
308	8.308	7.949	423.624	2.727	0.408	Male	30
310	0.000	12.455	507.375	6.372	0.451	Male	33
312	43.231	4.310	207.634	32.631	0.348	Male	54
314	0.000	2.864	352.573	25.491	0.302	Male	27
317	0.000	7.899	2,416.889	23.458	0.438	Male	31
320	0.000	7.899	674.299	23.967	0.650	Female	31
323	67.991	9.235	761.287	18.944	0.313	Female	62
324	0.000	7.248	773.440	10.672	0.305	Female	65
326	0.000	2.916	474.100	69.076	0.517	Female	30
330	0.000	2.881	797.745	14.659	0.307	Male	68
331	0.000	7.847	1,419.580	51.709	0.288	Male	40
332	0.000	6.974	827.807	22.966	0.459	Female	40
334	0.000	4.851	731.865	51.983	0.458	Female	33
335	0.000	3.875	764.485	36.921	0.471	Female	57
337	56.645	5.621	495.847	23.091	0.343	Female	70
339	0.000	6.152	702.602	23.722	0.319	Female	62
340	0.000	5.981	511.198	53.962	0.379	Female	43
341	0.000	3.977	564.286	1.438	0.258	Female	38
342	0.000	12.968	739.540	169.094	0.338	Male	41
343	0.000	3.412	685.173	49.386	0.359	Male	38
345	0.000	7.625	473.461	24.516	0.314	Male	58

Table S1b The information of 347 healthy controls (validation group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
1	0.000	2.209	322.718	0.000	0.358	Female	24
3	0.000	6.362	502.822	0.000	0.263	Female	27
7	10.323	11.305	423.504	0.000	0.302	Female	42
10	0.000	7.001	512.960	0.000	0.424	Female	27
11	0.000	9.304	442.588	0.000	0.457	Male	52
12	0.000	10.196	523.695	0.000	0.347	Female	30
13	0.000	9.019	337.627	0.984	0.261	Female	24
15	0.000	5.219	567.230	0.000	0.310	Female	28
16	0.000	4.058	552.917	0.000	0.242	Female	26
17	36.947	2.579	279.779	0.000	0.307	Female	31
21	7.105	15.711	738.984	0.000	0.472	Male	54
22	12.956	3.100	246.383	0.000	0.236	Female	28
23	0.000	7.690	569.019	0.285	0.404	Female	55
26	12.371	5.958	384.144	0.000	0.314	Male	57
29	0.000	5.605	224.913	0.000	0.258	Female	31
31	55.964	10.212	383.548	0.000	0.222	Female	31
32	12.078	4.428	319.736	0.000	0.296	Female	48
35	0.000	5.357	494.454	0.000	0.353	Female	23
36	0.000	7.379	837.835	0.000	0.341	Female	24
37	35.572	8.099	622.483	0.000	0.382	Female	28
40	0.000	2.322	728.189	0.000	0.194	Female	26
42	0.000	5.357	1,445.981	0.000	0.459	Female	32
45	0.000	6.932	834.552	0.000	0.363	Female	35
49	34.616	4.870	803.037	0.000	0.189	Male	37
50	14.851	5.240	1,399.506	0.000	0.232	Male	28
53	0.000	9.519	726.689	0.000	0.256	Male	50
57	11.663	8.410	847.027	0.000	0.349	Male	45
58	0.000	3.840	742.634	0.000	0.166	Female	31
59	4.331	10.919	785.967	0.000	0.229	Female	27
62	0.000	5.901	1,380.162	0.000	0.228	Male	54
65	18.995	3.275	606.069	0.000	0.167	Female	35
66	9.750	2.206	795.158	0.000	0.211	Male	40
67	0.000	5.473	828.643	0.000	0.188	Male	43
69	0.000	6.115	908.743	0.000	0.223	Female	27

Table S1b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
70	0.000	11.950	857.532	0.000	0.271	Female	41
74	27.458	13.348	402.567	0.464	0.305	Female	43
75	4.250	4.937	451.973	0.000	0.117	Female	25
76	8.978	1.350	501.380	0.000	0.163	Female	42
77	19.292	1.247	411.619	0.000	0.129	Female	25
79	14.565	2.379	329.401	0.298	0.211	Male	31
82	5.110	8.996	618.295	0.133	0.200	Female	27
89	5.110	5.908	467.436	1.409	0.168	Female	56
90	0.000	7.863	364.852	0.298	0.221	Male	51
91	3.820	12.451	308.658	0.000	0.288	Female	30
94	4.680	19.200	454.613	0.606	0.389	Female	29
97	5.539	9.510	387.104	0.984	0.599	Male	27
99	5.969	11.745	387.858	0.653	0.746	Male	80
100	3.391	7.319	455.745	0.000	0.538	Female	41
102	5.539	3.291	516.088	0.000	0.479	Male	67
104	22.301	2.320	387.481	0.000	0.406	Female	62
107	6.829	6.820	469.322	0.000	0.501	Female	69
108	9.407	2.453	535.323	0.000	0.441	Female	77
109	16.284	2.350	597.929	0.000	0.413	Male	77
110	11.127	0.615	424.442	0.000	0.440	Male	63
113	0.000	2.406	407.063	0.000	0.471	Female	47
114	0.000	4.425	692.090	0.000	0.575	Female	68
115	0.000	2.854	586.211	0.000	0.371	Female	58
117	0.000	5.514	565.458	0.000	0.429	Female	75
120	7.657	1.525	509.977	0.000	0.435	Female	70
123	0.000	3.415	526.918	0.000	0.488	Female	80
126	3.532	5.049	533.694	0.000	0.498	Female	55
127	3.532	4.681	598.493	0.000	0.379	Male	63
130	0.000	1.044	731.901	0.000	0.449	Female	64
133	0.000	3.736	690.819	0.000	0.376	Female	59
134	0.000	7.292	529.459	0.000	0.384	Female	74
136	36.990	4.761	483.719	0.026	0.386	Male	43
137	3.991	4.809	745.030	0.000	0.626	Female	84
139	0.000	6.027	621.363	0.000	0.456	Female	63
140	0.000	3.015	576.470	0.000	0.487	Female	71

Table S1b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
143	0.000	5.658	537.930	0.000	0.462	Female	58
144	0.000	2.983	644.656	0.000	0.522	Female	80
148	0.000	0.000	566.305	0.000	0.171	Female	63
149	1.699	4.232	3,051.854	0.000	0.332	Female	75
150	0.000	2.630	472.284	0.000	0.203	Male	68
152	24.157	2.390	582.822	0.000	0.316	Female	62
153	8.780	1.722	442.792	0.000	0.153	Female	58
154	0.000	1.439	309.568	0.000	0.172	Male	48
156	47.907	5.962	457.030	0.726	0.178	Female	63
157	0.000	2.037	456.521	0.639	0.159	Female	61
160	0.000	2.274	486.014	0.000	0.170	Female	69
167	0.000	10.280	643.137	0.000	0.192	Female	51
168	0.000	12.108	516.523	0.465	0.208	Male	58
169	0.000	4.055	626.356	0.000	0.276	Male	80
171	0.000	2.967	467.200	0.000	0.150	Male	73
172	0.000	4.086	736.698	0.182	0.135	Female	59
175	0.000	19.168	222.109	0.508	0.366	Male	77
176	0.000	3.078	316.179	0.030	0.147	Male	56
177	33.392	3.802	482.454	0.008	0.222	Male	66
178	0.000	2.211	377.197	0.000	0.300	Female	60
179	0.000	5.126	529.235	0.008	0.237	Male	78
180	0.000	3.566	362.451	0.000	0.178	Female	74
181	0.000	2.164	629.407	0.000	0.154	Female	77
187	0.000	0.588	359.400	0.000	0.172	Female	52
188	0.000	0.000	408.724	0.000	0.157	Female	57
189	0.000	4.196	474.827	0.000	0.180	Female	61
190	0.000	3.755	319.230	0.000	0.186	Female	60
192	1.838	4.228	296.856	0.247	0.192	Female	56
194	0.000	7.906	612.027	0.000	0.782	Male	53
195	0.000	9.106	657.256	0.000	0.761	Male	46
197	0.000	9.984	637.628	0.499	0.688	Female	82
198	11.582	1.616	658.963	0.000	0.477	Female	62
199	0.000	6.005	616.294	0.000	0.595	Female	56
204	0.000	6.209	516.449	0.000	0.499	Female	63
205	2.825	6.092	806.596	0.000	0.452	Male	68

Table S1b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
206	5.744	9.106	760.514	0.355	0.489	Female	61
208	0.000	3.986	577.892	0.000	0.458	Female	73
210	0.393	5.215	1,589.362	0.000	0.589	Female	59
211	2.825	9.925	850.971	0.000	0.534	Female	67
213	0.000	8.550	842.438	0.000	0.506	Female	66
215	3.312	6.970	829.637	0.000	0.416	Female	61
219	7.204	7.204	677.737	0.000	0.494	Male	62
226	1.366	7.848	733.206	0.000	0.638	Female	56
227	58.774	2.845	749.420	0.000	0.484	Female	63
230	12.069	9.749	810.010	0.000	0.518	Female	61
231	11.096	1.616	891.080	0.000	0.451	Male	66
232	2.339	3.723	651.282	0.000	0.471	Female	73
233	17.053	8.757	520.701	0.000	0.959	Female	55
235	4.340	6.822	460.662	0.000	0.749	Female	57
242	5.248	11.799	1,428.173	0.000	0.870	Male	49
244	5.248	7.467	690.222	0.000	0.515	Male	70
245	0.000	8.435	530.119	0.000	0.586	Female	61
247	7.972	12.583	620.765	0.377	0.790	Female	70
252	1.162	24.018	714.943	0.000	0.763	Male	52
253	10.697	16.477	458.308	0.000	0.854	Male	53
254	0.000	12.191	606.638	0.000	0.841	Female	74
255	5.702	13.182	790.286	9.195	0.801	Male	58
256	7.972	10.324	786.754	0.000	0.592	Male	51
260	24.772	14.587	692.576	2.779	0.604	Male	51
262	0.000	9.449	664.323	4.881	0.532	Male	45
264	0.000	3.411	344.117	1.551	0.451	Male	51
268	12.967	20.486	742.020	52.528	0.729	Male	51
269	0.000	13.251	701.994	14.873	0.566	Male	52
271	0.000	8.343	586.626	23.363	0.688	Male	43
272	0.000	12.168	672.563	68.580	0.716	Male	46
273	0.000	5.664	361.031	23.083	0.995	Male	46
276	2.306	7.991	470.348	1.464	0.663	Male	46
280	15.948	8.457	351.333	7.924	0.548	Male	71
281	0.123	6.532	517.073	15.106	0.938	Female	20
282	7.763	2.893	506.493	37.261	0.793	Female	23

Table S1b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
283	1.215	3.189	305.491	54.828	0.711	Female	26
284	12.674	5.030	805.353	52.333	0.509	Male	40
286	5.034	2.639	592.008	267.161	0.627	Female	28
288	6.126	3.041	153.857	39.622	0.653	Female	22
290	10.491	34.149	1,097.318	335.264	0.897	Male	27
294	18.676	10.234	851.196	9.909	0.467	Male	30
295	23.041	8.901	354.860	13.446	0.411	Male	34
296	21.950	2.173	223.503	4.207	0.235	Male	33
297	7.217	1.095	606.995	10.054	0.218	Male	42
299	25.769	8.266	536.468	16.586	0.338	Male	25
300	14.856	7.314	356.623	22.649	0.373	Female	37
301	9.945	5.156	420.979	13.410	0.252	Male	33
305	0.000	8.922	500.322	15.539	0.675	Male	62
307	6.671	14.782	366.320	23.263	0.418	Male	41
309	0.000	8.372	466.822	15.828	0.489	Male	28
311	14.856	9.070	199.700	21.603	0.699	Male	51
313	0.000	11.170	576.439	44.420	0.391	Male	47
315	0.000	2.590	865.776	38.233	0.395	Male	30
316	0.000	4.868	898.607	12.528	0.318	Female	35
318	0.000	5.621	742.099	16.973	0.415	Female	66
319	0.000	13.995	532.305	40.362	0.379	Male	60
321	0.000	2.642	570.682	1.094	0.475	Female	47
322	0.000	5.056	513.756	23.366	0.540	Female	41
325	57.185	0.000	878.336	4.806	0.344	Female	40
327	0.000	3.121	634.004	0.063	0.578	Female	46
328	0.000	1.871	680.056	7.487	0.369	Female	31
329	0.000	6.032	738.901	22.679	0.291	Male	31
333	0.000	5.227	576.439	106.452	0.337	Female	42
336	0.000	12.933	641.040	176.700	0.283	Female	33
338	0.000	1.152	593.708	66.447	0.271	Female	47
344	0.000	17.249	843.158	110.541	0.384	Male	35
346	0.000	2.196	478.578	12.528	0.209	Male	61
347	0.000	8.156	728.027	20.090	0.323	Male	69

Table S2a The information of 54 NBNC-HCC patients (test group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
9	1,895.072	479.602	14,431.953	38.260	4.291	Female	68
620	103.799	8.725	711.468	4.045	0.238	Female	49
545	88.895	9.277	7,278.588	3.062	0.508	Female	65
395	1,303.483	174.560	12,793.993	16.906	2.034	Female	77
590	1,245.818	36.586	4,023.670	30.478	0.311	Male	54
586	427.605	16.869	1,507.894	51.215	0.570	Male	60
574	435.096	17.330	9,471.676	13.364	0.346	Male	73
543	893.821	32.685	1,643.010	26.444	1.053	Male	69
132	55.332	32.535	702.669	22.067	0.525	Male	62
94	0.000	33.453	291.770	5.691	1.195	Male	40
72	5,887.511	49.575	921.998	21.104	0.733	Male	56
45	9,630.275	192.102	5,128.398	5.418	1.461	Male	61
19	0.000	253.009	7,026.921	31.044	1.578	Male	72
18	0.000	43.676	762.983	6.796	1.029	Male	49
65	3,208.245	29.461	1,296.319	0.720	0.848	Male	57
589	9.957	7.497	724.291	10.818	0.223	Male	47
473	11.526	78.777	1,401.820	6.096	0.392	Male	49
459	367.386	30.063	9,080.726	8.021	0.441	Male	79
367	14.006	26.425	538.084	1.084	0.371	Male	66
195	5,966.582	384.668	13,014.503	15.682	1.325	Male	73
193	0.000	202.639	634.542	7.732	1.137	Male	64
157	7.859	14.117	671.018	22.448	0.616	Male	67
129	2.584	21.124	842.257	19.302	0.703	Male	52
115	0.000	21.124	711.596	1.007	0.475	Male	57
8	0.000	26.625	638.297	18.225	0.936	Male	61
598	6,626.332	28.049	15,256.585	18.983	0.299	Male	58
87	7,673.842	71.793	1,768.286	12.708	1.100	Male	58

Table S2b The information of 54 NBNC-HCC patients (validation group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
636	7,357.865	8.035	599.087	19.989	0.218	Female	62
628	0.000	8.280	451.785	1.467	0.208	Female	39
542	3.727	17.651	687.167	5.365	0.398	Female	62
393	182.199	18.098	977.582	5.289	0.474	Female	52
294	0.000	487.276	5,452.020	10.940	2.870	Female	55
231	7.795	321.586	625.718	129.202	1.794	Female	76
229	0.000	80.686	584.808	17.504	1.036	Female	72
80	44.989	47.079	1,860.445	12.291	0.631	Female	50
646	64.684	10.706	729.246	2.868	0.236	Male	40
616	0.000	76.231	2,331.890	236.046	1.306	Male	70
603	0.000	12.614	811.063	6.311	0.321	Male	21
572	3,304.545	8.781	6,867.373	20.216	0.297	Male	65
556	0.000	17.386	906.014	4.151	0.374	Male	77
524	892.291	14.432	8,949.422	139.367	0.605	Male	63
523	5,804.144	66.970	2,510.479	16.133	1.118	Male	60
486	33.048	19.702	618.687	2.651	0.538	Male	47
463	0.000	13.065	636.543	55.485	0.302	Male	54
422	65.080	18.596	765.263	6.572	0.350	Male	66
373	735.086	59.020	805.772	3.048	0.519	Male	63
203	375.112	625.725	5,492.826	13.993	0.983	Male	72
185	0.000	169.128	1,489.102	13.794	0.749	Male	52
138	0.000	69.744	784.637	18.358	1.418	Male	59
73	72.010	21.360	248.074	1.597	0.479	Male	66
57	2.921	32.959	294.995	0.000	0.920	Male	58
23	9,294.590	36.968	743.033	58.214	0.705	Male	70
11	6,119.195	76.334	2,671.297	37.285	1.083	Male	62
5	10,817.572	121.048	1,639.530	10.541	1.482	Male	77

Table S3a The information of 154 hepatitis patients (test group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
4	0.000	33.712	2,296.099	6.708	0.930	Female	56
91	0.000	15.270	771.755	47.542	0.826	Female	62
148	0.000	13.256	370.937	0.000	0.802	Female	75
80	0.000	19.843	258.479	0.288	0.722	Female	55
149	0.000	8.476	436.495	14.507	0.612	Female	73
6	0.000	3.930	360.443	0.193	0.601	Female	81
55	0.000	20.249	503.238	24.519	0.591	Female	27
30	19.281	4.121	2,852.941	1.052	0.588	Female	55
28	0.000	10.349	2,130.785	8.013	0.548	Female	62
43	448.103	18.947	330.408	16.005	0.510	Female	63
10	0.000	0.834	4,419.132	14.608	0.506	Female	58
111	0.000	11.457	192.518	2.551	0.476	Female	30
12	1.934	6.681	630.131	10.183	0.451	Female	60
64	0.000	3.870	1,340.159	21.521	0.441	Female	58
74	0.000	5.246	812.586	0.000	0.415	Female	33
152	0.000	5.107	79.650	124.536	0.406	Female	49
103	0.000	14.961	575.769	249.865	0.387	Female	88
21	0.000	0.624	924.221	0.537	0.374	Female	34
75	0.000	6.984	475.170	0.354	0.365	Female	63
145	0.000	9.730	1,012.364	16.331	0.360	Female	67
31	8.892	7.483	525.635	15.489	0.352	Female	66
41	0.000	0.000	528.137	0.000	0.342	Female	66
127	0.000	12.848	266.911	11.830	0.331	Female	53
63	0.000	8.924	593.415	6.157	0.308	Female	55
46	0.000	3.261	525.635	4.189	0.295	Female	57
132	15.551	5.629	238.331	8.599	0.275	Female	56
51	0.000	4.254	457.254	0.000	0.274	Female	62
123	0.000	12.719	260.241	12.164	0.270	Female	82
113	0.000	16.945	295.642	6.144	0.267	Female	36
118	0.000	7.721	329.504	43.163	0.254	Female	36
102	0.000	14.652	426.471	15.304	0.246	Female	71
146	0.000	5.420	296.439	33.829	0.211	Female	68
88	0.000	2.593	396.200	0.029	0.193	Female	54
47	0.000	6.961	620.288	0.000	0.188	Female	58
119	0.000	3.160	144.804	2.979	0.159	Female	43
84	0.000	0.509	5,386.430	0.000	0.070	Female	50

Table S3a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
8	0.000	10.598	712.101	28.676	0.988	Male	22
20	9.691	17.820	661.417	0.665	0.987	Male	63
7	0.000	12.145	2,690.393	89.557	0.966	Male	80
83	0.000	13.052	742.714	0.000	0.865	Male	40
33	0.000	12.413	2,794.616	1.675	0.782	Male	38
106	0.000	26.504	657.857	58.107	0.739	Male	62
141	0.000	18.559	445.435	29.456	0.703	Male	60
77	0.000	16.730	1,547.571	81.292	0.665	Male	37
16	11.689	12.566	3,408.180	91.712	0.568	Male	66
99	0.000	25.978	674.788	14.424	0.537	Male	43
67	0.000	10.413	2,306.657	9.036	0.523	Male	33
62	0.000	30.063	426.199	0.442	0.519	Male	44
85	0.000	12.353	690.758	13.191	0.515	Male	53
128	0.232	9.234	569.101	2.665	0.492	Male	77
44	49.250	7.713	4,151.063	1.632	0.447	Male	43
130	0.000	12.891	1,631.498	63.595	0.428	Male	40
140	0.000	19.264	814.944	12.041	0.426	Male	30
32	0.000	13.846	3,416.174	8.550	0.418	Male	49
122	0.000	15.296	864.618	14.781	0.417	Male	69
14	0.901	3.605	830.363	10.612	0.404	Male	29
155	20.338	6.805	228.646	24.076	0.396	Male	54
95	0.000	7.206	328.477	3.289	0.389	Male	56
36	0.000	8.133	2,345.740	0.601	0.369	Male	27
109	0.000	16.172	392.096	8.928	0.348	Male	64
164	5.328	0.000	768.046	29.778	0.343	Male	63
169	0.000	0.124	1,351.050	19.362	0.337	Male	49
79	0.000	18.895	2,140.239	9.806	0.330	Male	25
150	0.000	13.256	877.523	199.148	0.322	Male	44
86	0.000	4.863	332.440	0.794	0.317	Male	55
171	401.717	7.307	2,615.363	39.726	0.314	Male	41
131	0.000	6.387	510.993	24.850	0.302	Male	62
161	0.000	2.981	1,060.837	23.174	0.297	Male	49
69	0.000	6.036	1,064.152	17.147	0.283	Male	25
135	0.000	3.488	328.473	0.918	0.277	Male	57
129	0.000	6.700	420.851	0.000	0.271	Male	20

Table S3a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
170	0.000	4.629	2,065.907	10.217	0.250	Male	52
66	0.000	4.096	1,257.576	4.706	0.243	Male	29
37	0.000	3.968	1,944.007	3.437	0.240	Male	30
163	0.000	2.582	820.856	21.575	0.237	Male	66
138	0.000	4.349	486.409	0.000	0.222	Male	61
162	0.000	2.417	850.125	7.125	0.210	Male	42
120	0.000	6.046	266.911	0.243	0.202	Male	31
42	0.000	1.255	4,137.875	0.687	0.202	Male	61
53	13.169	2.765	5,400.203	0.000	0.156	Male	30
90	63.563	17.795	1,243.409	21.300	0.513	Male	40
100	42.340	84.894	4,935.180	5.597	0.876	Male	46

Table S3b The information of 154 hepatitis patients (validation group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
98	474.436	25.202	486.498	23.513	0.600	Female	32
48	27.915	7.660	3,236.716	6.245	0.437	Female	46
15	25.275	7.866	1,239.505	11.859	0.843	Female	26
78	9.072	10.458	686.577	11.894	0.731	Female	60
17	2.499	4.445	785.310	7.927	0.421	Female	48
73	0.000	7.277	3,029.426	3.607	0.987	Female	27
19	0.000	22.024	790.942	0.000	0.970	Female	43
2	0.000	8.036	722.910	34.394	0.791	Female	64
26	0.000	23.017	5,820.360	5.972	0.763	Female	29
49	0.000	13.052	620.886	12.443	0.715	Female	38
114	0.000	24.031	950.297	15.399	0.611	Female	66
96	0.000	12.307	543.960	83.425	0.572	Female	35
13	0.000	6.089	561.301	7.261	0.549	Female	30
112	0.000	11.869	285.894	0.434	0.485	Female	27
168	0.000	10.081	830.400	14.776	0.464	Female	46
156	0.000	8.738	843.999	31.749	0.388	Female	47
158	0.000	2.129	1,126.420	3.099	0.371	Female	57
157	0.000	13.283	1,495.704	0.071	0.366	Female	81
68	0.000	7.954	948.309	5.871	0.350	Female	57
94	0.000	9.937	343.869	9.070	0.333	Female	27
154	0.000	5.499	382.112	0.000	0.315	Female	32
151	0.000	11.167	596.666	7.597	0.277	Female	47
167	0.000	2.802	902.299	4.379	0.274	Female	67
52	0.000	1.140	554.597	0.000	0.253	Female	20
133	0.000	4.167	373.172	49.701	0.250	Female	30
124	0.000	6.278	385.939	24.917	0.238	Female	55
72	0.000	1.637	607.747	0.000	0.221	Female	25
45	0.000	1.350	1,093.725	2.406	0.204	Female	44
153	0.000	10.279	408.186	0.000	0.190	Female	68
101	219.763	17.589	518.307	100.118	0.535	Male	28
136	17.466	14.745	2,471.872	59.010	0.397	Male	49
11	13.288	0.000	718.417	14.403	0.312	Male	30
38	8.493	6.413	787.188	21.891	0.346	Male	17
142	5.019	7.327	471.509	27.539	0.321	Male	57
87	4.976	0.000	388.576	0.000	0.180	Male	28
39	0.101	3.968	2,220.762	3.910	0.198	Male	36

Table S3b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
104	0.000	16.610	222.275	294.007	0.963	Male	20
22	0.000	6.394	825.357	0.000	0.632	Male	28
126	0.000	20.295	288.459	71.460	0.542	Male	71
60	0.000	12.646	3,580.859	18.686	0.519	Male	42
125	0.000	11.818	2,476.641	0.291	0.518	Male	45
58	0.000	2.898	15,138.761	91.864	0.510	Male	38
82	0.000	6.374	722.409	236.751	0.502	Male	63
59	0.000	14.947	1,801.335	0.000	0.449	Male	44
35	0.000	7.694	851.637	1.353	0.443	Male	40
166	0.000	5.357	1,247.496	1.260	0.427	Male	51
108	0.000	17.331	502.402	22.689	0.417	Male	29
144	0.000	10.775	315.064	102.886	0.416	Male	51
5	0.000	4.217	502.243	64.780	0.414	Male	24
137	0.000	16.939	622.740	38.144	0.404	Male	43
50	0.000	7.164	449.490	0.000	0.390	Male	48
34	0.000	20.075	17,961.375	17.229	0.382	Male	43
81	0.000	5.630	423.811	0.000	0.361	Male	40
143	0.000	18.115	382.857	222.017	0.355	Male	88
40	0.000	7.292	728.369	2.320	0.342	Male	57
56	0.000	29.960	810.948	0.000	0.339	Male	50
70	0.000	9.059	924.720	18.642	0.331	Male	52
93	0.000	8.700	236.128	7.833	0.328	Male	66
165	0.000	0.000	876.848	10.644	0.305	Male	42
147	0.000	10.331	394.031	20.402	0.300	Male	42
27	0.000	15.852	904.824	1.740	0.297	Male	59
139	0.000	8.529	309.849	0.000	0.289	Male	28
76	0.000	5.224	776.754	0.926	0.283	Male	25
116	0.000	14.446	491.115	15.447	0.272	Male	51
134	0.000	6.230	1,461.243	31.083	0.271	Male	23
89	0.000	4.964	308.981	2.051	0.270	Male	54
160	0.000	1.566	754.685	22.801	0.264	Male	60
110	0.000	22.356	597.317	1.671	0.246	Male	32
29	0.000	2.688	1,038.700	1.396	0.234	Male	24
121	0.000	4.912	495.733	0.077	0.211	Male	30
92	0.000	13.209	635.283	18.469	0.128	Male	62
54	46.758	18.805	611.928	6.047	0.812	Male	42

Table S4a The information of 122 liver cirrhosis patients (test group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
66	0.000	25.480	750.370	7.247	0.770	Female	58
132	11.959	16.730	791.360	0.137	0.678	Female	66
88	40.886	17.747	756.035	63.879	0.674	Female	52
64	0.000	18.221	2,808.378	4.731	0.586	Female	60
111	0.000	20.965	806.361	151.712	0.584	Female	58
50	0.000	8.039	517.043	4.731	0.488	Female	68
109	0.000	5.481	1,767.259	113.406	0.470	Female	53
130	38.686	10.771	607.834	5.060	0.446	Female	58
97	0.000	9.132	371.566	66.681	0.439	Female	47
34	0.000	15.931	4,091.807	2.003	0.420	Female	57
113	23.837	5.865	799.924	14.529	0.402	Female	61
12	0.000	20.872	5,950.131	42.933	0.377	Female	56
131	29.390	9.690	2,284.608	2.372	0.374	Female	63
93	0.000	9.996	537.759	27.150	0.353	Female	52
28	0.000	12.159	1,389.649	0.000	0.320	Female	67
39	15.573	11.011	8,781.347	1.249	0.317	Female	58
36	0.000	8.862	687.157	0.000	0.309	Female	55
15	0.000	9.781	9,807.197	52.948	0.307	Female	34
17	0.000	11.154	3,213.889	37.136	0.276	Female	64
134	74.709	22.569	1,444.856	65.761	0.227	Female	44
25	11.067	17.448	6,662.214	33.222	0.730	Female	62
61	0.000	20.843	1,918.679	7.499	0.631	Female	61
44	0.000	11.341	3,559.411	0.000	0.537	Female	43
3	0.000	16.444	2,139.721	109.676	0.425	Female	69
42	0.000	21.064	3,182.935	8.757	0.386	Female	74
2	0.000	14.763	3,843.661	71.194	0.344	Female	55
128	19.319	16.054	10,257.127	0.089	0.330	Female	52
136	20.481	6.928	441.131	96.684	0.157	Female	56
86	0.000	14.928	634.315	148.098	0.736	Male	48
147	86.717	10.276	866.809	30.909	0.697	Male	51
59	0.000	8.972	746.686	0.094	0.566	Male	58
125	26.678	22.857	790.340	30.523	0.550	Male	71
30	18.953	13.942	3,593.142	1.788	0.537	Male	50
96	0.000	10.188	626.708	34.205	0.494	Male	61
92	0.000	12.398	3,653.862	1.139	0.485	Male	53
168	0.000	7.051	730.635	16.419	0.466	Male	57

Table S4a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
107	31.144	14.736	4,670.679	20.631	0.451	Male	63
90	0.000	23.095	503.818	22.036	0.446	Male	37
77	0.000	3.125	328.540	3.006	0.443	Male	55
149	37.524	4.242	661.872	5.298	0.415	Male	39
20	0.000	153.755	2,824.100	7.284	0.375	Male	81
41	0.000	6.149	536.078	17.563	0.327	Male	51
116	0.000	7.466	686.982	0.000	0.269	Male	60
7	0.000	15.296	1,336.447	13.823	0.195	Male	40
114	0.000	7.098	493.870	61.342	0.165	Male	63
148	58.828	27.544	5,168.250	86.835	1.565	Male	48
68	0.000	19.825	596.252	0.000	0.919	Male	36
85	0.000	38.537	13,256.484	55.564	0.873	Male	83
115	150.484	21.077	3,670.743	19.226	0.711	Male	53
95	0.000	16.882	8,772.287	115.475	0.608	Male	59
45	0.000	8.316	767.562	189.195	0.526	Male	51
89	45.757	12.622	4,459.584	33.976	0.518	Male	49
84	0.000	12.959	695.760	105.751	0.513	Male	64
83	5.977	19.188	2,134.075	7.724	0.484	Male	63
35	1.678	78.515	4,407.081	4.302	0.464	Male	58
80	0.000	11.038	4,075.448	2.790	0.456	Male	69
119	35.203	4.055	926.606	38.065	0.396	Male	52
72	0.000	4.385	537.306	2.287	0.382	Male	53
102	0.000	13.487	857.857	263.322	0.283	Male	64
122	13.896	12.602	1,884.033	0.588	0.259	Male	62
156	35.200	6.013	620.069	9.365	0.461	Male	47

Table S4b The information of 122 liver cirrhosis patients (validation group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
144	84.393	14.929	612.932	53.989	0.389	Female	66
31	35.854	22.471	6,648.916	1.895	0.419	Female	56
158	20.093	8.444	843.869	12.719	0.349	Female	41
129	19.319	6.673	665.441	0.000	0.353	Female	57
159	14.670	19.687	401.877	4.870	0.375	Female	69
38	13.696	4.391	4,390.777	0.351	0.532	Female	56
123	12.346	10.261	694.499	23.946	0.314	Female	58
1	8.438	57.606	13,737.133	2.686	0.539	Female	62
127	6.923	12.152	556.345	1.397	0.276	Female	64
10	4.307	55.399	9,944.413	244.758	0.739	Female	67
26	4.307	14.332	12,638.712	2.758	0.503	Female	79
106	2.324	9.100	926.324	168.472	0.429	Female	58
108	1.512	21.174	10,330.802	41.274	0.634	Female	79
33	0.000	95.614	3,015.989	22.481	0.584	Female	64
73	0.000	12.878	732.563	2.898	0.488	Female	62
57	0.000	17.138	789.667	176.297	0.472	Female	56
164	0.000	7.203	910.142	4.170	0.454	Female	57
5	0.000	48.923	1,265.965	13.248	0.448	Female	80
51	0.000	10.887	848.613	115.078	0.440	Female	65
58	0.000	16.886	793.965	2.682	0.412	Female	68
13	0.000	11.544	5,664.016	13.284	0.278	Female	62
69	0.000	15.903	1,466.135	23.710	0.901	Female	77
60	0.000	53.580	1,309.998	15.658	0.842	Female	78
37	0.000	7.649	2,003.123	2.111	0.722	Female	60
65	0.000	6.754	2,124.246	1.927	0.521	Female	38
54	0.000	19.154	2,491.420	6.313	0.516	Female	76
100	0.000	7.786	1,080.498	11.193	0.509	Female	50
43	0.000	9.047	1,619.109	0.777	0.482	Female	56
121	7,087.474	45.786	2,327.570	4.442	0.551	Male	63
56	529.387	17.339	5,001.452	4.300	0.587	Male	55
135	155.277	11.762	791.870	57.486	0.246	Male	52
126	84.005	10.921	7,268.692	0.000	0.249	Male	65
137	63.476	15.769	694.499	55.374	0.733	Male	41
120	46.569	9.420	589.841	0.086	0.318	Male	48
19	33.225	15.193	4,705.558	54.897	0.676	Male	61
32	26.089	56.840	6,366.152	10.410	0.683	Male	59

Table S4b (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
22	13.320	193.434	4,003.065	281.905	0.599	Male	71
29	9.565	13.409	2,483.094	0.351	0.327	Male	77
11	5.433	12.774	2,646.735	19.858	0.621	Male	49
27	4.682	7.485	701.973	0.000	0.304	Male	58
105	3.947	3.399	1,976.577	1.534	0.174	Male	71
99	1.918	9.820	725.605	0.000	0.384	Male	60
162	0.961	187.848	10,392.088	37.033	1.954	Male	53
82	0.700	18.724	825.087	125.973	1.050	Male	46
87	0.294	9.820	1,356.832	3.773	0.375	Male	31
91	0.000	14.336	533.078	324.506	0.581	Male	60
46	0.000	51.457	645.373	134.265	0.569	Male	59
76	0.000	2.797	366.609	14.867	0.491	Male	56
75	0.000	5.620	291.699	0.274	0.469	Male	24
55	0.000	17.339	739.932	130.167	0.446	Male	65
101	0.000	9.180	755.449	22.519	0.443	Male	63
94	0.000	12.062	845.568	37.708	0.422	Male	29
79	0.000	5.796	1,029.354	2.215	0.400	Male	39
118	0.000	11.646	612.078	4.563	0.326	Male	55
71	0.000	11.895	601.164	35.859	0.309	Male	28
62	0.000	35.971	574.147	7.714	0.397	Male	64
110	0.000	51.260	1,465.170	67.278	0.338	Male	51
48	0.000	7.737	824.666	1.424	0.265	Male	50
98	52.840	39.656	631.885	6.032	0.200	Male	60
141	49.919	13.022	1,056.713	3.704	0.135	Male	58
103	51.440	9.932	1,608.696	17.075	0.572	Male	53

Table S5a The information of 244 hepatitis HCC (test group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
553	545.774	21.156	770.980	9.449	0.822	Female	61
625	0.000	34.861	2,334.766	7.940	0.764	Female	66
215	5,139.339	20.564	738.022	9.984	0.729	Female	61
205	0.000	252.200	282.390	13.529	0.695	Female	60
641	1,353.368	10.239	482.896	8.193	0.656	Female	60
166	0.000	15.244	341.524	7.952	0.621	Female	60
549	0.000	19.994	1,715.524	9.524	0.619	Female	62
548	11.712	12.761	1,783.750	2.914	0.605	Female	62
219	781.657	14.984	187.734	9.951	0.470	Female	59
158	57.593	18.964	2,396.014	20.125	0.446	Female	51
405	2,430.981	16.024	552.622	14.863	0.386	Female	35
660	12.794	2.033	2,245.969	27.692	0.363	Female	54
624	129.614	6.922	1,094.828	4.886	0.304	Female	67
645	4,673.718	9.103	434.008	3.709	0.286	Female	35
189	386.961	14.101	400.309	8.229	0.266	Female	60
571	5,963.545	48.031	12,111.739	70.245	1.571	Female	23
271	9,559.211	49.808	3,695.517	1.829	1.314	Female	51
175	0.000	52.577	526.249	44.585	1.120	Female	53
256	2,560.416	20.516	2,304.106	1.490	1.074	Female	57
28	71.590	18.400	673.209	10.364	0.974	Female	38
51	1,748.145	16.248	467.061	0.000	0.920	Female	52
482	1,151.405	18.790	3,324.837	10.040	0.829	Female	59
183	1,856.493	287.940	618.499	67.007	0.830	Female	56
597	0.000	13.276	1,648.955	9.989	0.521	Female	63
528	6,504.857	12.680	2,383.991	16.876	0.448	Female	53
105	117.866	19.286	360.675	5.440	0.809	Male	52
103	116.709	34.349	668.226	23.360	0.793	Male	50
177	185.529	174.699	770.911	48.421	0.791	Male	59
202	2,908.996	132.040	6,253.708	33.533	0.786	Male	57
591	77.380	12.795	934.489	11.626	0.761	Male	63
452	5,886.027	95.877	9,974.303	13.723	0.740	Male	41
551	5,035.737	18.670	596.368	34.794	0.721	Male	61
38	68.843	19.788	357.338	1.072	0.710	Male	56
223	0.000	15.126	358.596	11.541	0.681	Male	51
377	2,110.446	92.937	6,199.594	2.438	0.677	Male	58
638	15.399	15.270	842.041	54.896	0.664	Male	56

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
477	5,622.440	16.328	1,590.350	13.794	0.663	Male	45
442	278.796	34.689	1,690.819	9.185	0.655	Male	57
3	6,457.829	22.518	748.647	30.870	0.634	Male	35
99	3,577.713	14.260	482.519	13.418	0.623	Male	54
27	22.148	21.332	759.658	15.382	0.588	Male	49
557	476.144	12.537	10,369.306	10.588	0.582	Male	65
131	0.000	14.380	601.223	19.254	0.574	Male	59
479	21.536	6.344	499.056	12.582	0.568	Male	47
252	2,644.511	21.016	1,610.891	2.811	0.556	Male	53
208	0.000	8.976	655.398	15.748	0.551	Male	48
540	37.661	18.364	12,459.634	2.740	0.545	Male	60
303	0.000	20.168	1,204.981	0.169	0.542	Male	62
14	63.350	28.140	672.378	3.580	0.538	Male	58
275	6,387.175	61.427	8,111.757	10.195	0.522	Male	60
633	0.000	16.740	827.658	6.679	0.512	Male	45
546	6,887.685	11.580	1,643.010	2.864	0.504	Male	49
554	27.681	16.958	9,656.203	9.226	0.499	Male	70
110	47.043	17.555	1,416.192	0.837	0.491	Male	54
159	0.000	17.724	814.162	9.598	0.480	Male	48
140	108.080	21.816	4,109.390	7.904	0.475	Male	60
413	5,416.129	49.280	3,943.944	1.226	0.464	Male	53
651	25.691	7.664	3,760.865	12.804	0.462	Male	57
560	1.731	9.114	612.083	36.287	0.455	Male	61
55	5.668	11.730	349.025	0.000	0.445	Male	60
500	5.520	6.842	773.137	24.284	0.432	Male	54
511	0.000	2.527	828.489	14.507	0.430	Male	47
601	10.893	6.794	722.047	12.738	0.426	Male	58
555	17.700	15.064	1,704.274	19.228	0.421	Male	67
460	427.446	8.722	1,043.711	3.459	0.416	Male	55
567	60.284	16.571	697.061	123.702	0.414	Male	52
649	0.000	7.224	2,963.970	27.836	0.410	Male	51
647	0.000	8.012	1,154.634	18.336	0.404	Male	44
541	0.000	14.045	548.059	11.355	0.395	Male	44
588	12.766	10.989	667.584	8.292	0.363	Male	82
609	67.813	15.849	788.293	5.727	0.362	Male	56

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
527	0.000	8.462	894.955	33.432	0.354	Male	46
509	54.069	0.867	479.415	23.321	0.347	Male	63
612	0.000	9.460	845.436	13.573	0.338	Male	59
372	567.464	48.923	706.861	2.201	0.317	Male	39
592	194.434	23.411	4,312.584	10.272	0.307	Male	57
584	10.893	15.404	2,227.369	49.970	0.301	Male	59
596	110.155	96.378	20,084.400	19.205	0.299	Male	59
648	373.209	6.661	2,776.921	0.000	0.298	Male	66
613	0.000	7.990	823.849	5.783	0.289	Male	44
659	0.000	11.894	876.212	6.672	0.274	Male	52
582	0.000	9.303	847.717	16.436	0.265	Male	69
583	0.000	8.099	677.165	70.670	0.263	Male	50
570	428.541	5.951	700.031	13.021	0.258	Male	53
278	0.000	21.713	1,840.606	2.642	3.730	Male	45
21	9,797.067	195.955	1,708.972	355.697	2.633	Male	44
7	2.921	60.984	3,854.782	49.639	2.309	Male	50
190	9.770	135.316	678.661	20.088	2.238	Male	62
283	138.925	75.798	14,314.019	19.238	1.842	Male	40
59	7.972	129.682	4,795.568	18.890	1.725	Male	52
32	0.000	38.262	1,235.579	0.047	1.511	Male	55
136	0.000	51.914	453.519	137.894	1.495	Male	52
191	215.151	434.019	742.033	8.891	1.444	Male	55
58	6,094.917	97.200	5,485.909	9.234	1.398	Male	66
70	6,531.637	105.350	2,163.427	22.357	1.346	Male	60
197	6,102.796	156.701	1,691.291	6.805	1.231	Male	43
79	0.000	22.205	456.470	73.586	1.217	Male	61
181	3,087.239	343.843	406.726	16.245	1.197	Male	72
34	9,823.263	115.061	1,487.400	20.222	1.176	Male	38
139	102.806	0.000	576.877	3.160	1.141	Male	53
301	120.418	76.502	1,234.232	1.998	1.108	Male	56
114	1.077	34.375	1,154.684	2.822	1.024	Male	44
42	16.655	48.972	505.299	2.167	1.008	Male	50
85	71.595	13.032	334.625	2.809	0.968	Male	50
296	42.923	99.391	870.927	64.424	0.954	Male	63
146	254.268	71.919	4,562.507	12.018	0.945	Male	44

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
212	0.000	34.467	340.948	45.022	0.935	Male	60
68	4,451.586	39.734	4,399.074	18.431	0.926	Male	60
67	0.000	18.376	352.272	0.177	0.903	Male	50
398	0.000	13.756	3,484.362	32.309	0.900	Male	43
124	0.000	46.230	964.002	18.673	0.880	Male	45
259	10.536	57.183	1,214.695	26.935	0.854	Male	58
312	0.000	25.792	727.271	2.540	0.844	Male	57
407	56.071	124.458	3,782.968	18.166	0.837	Male	56
387	7.413	86.047	2,383.693	2.254	1.018	Male	56
563	161.421	70.705	5,493.725	20.317	0.808	Male	84
17	0.000	51.062	3,893.093	42.721	1.033	Male	60
199	0.000	45.361	764.494	15.450	0.800	Male	57
269	17.476	21.930	351.253	2.608	1.285	Male	78
173	858.104	20.280	630.531	16.941	1.299	Male	65
371	4,716.357	17.166	1,172.866	1.795	0.428	Male	73
84	0.000	14.340	183.371	1.430	0.343	Male	67
656	12.794	4.230	3,153.492	4.939	0.266	Male	59

Table S5b The information of 244 hepatitis HCC (validation group)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
650	9,852.325	12.210	4,283.284	10.591	0.514	Female	44
47	9,633.117	18.021	614.191	0.000	0.764	Female	55
46	5,382.944	14.497	1,169.839	0.000	0.974	Female	42
69	4,984.456	16.111	2,242.602	3.769	0.642	Female	59
579	4,560.545	8.460	746.732	5.422	0.270	Female	67
31	903.122	155.249	7,233.668	10.753	1.037	Female	57
537	554.388	8.258	3,400.518	1.948	0.411	Female	63
569	456.925	6.774	713.819	13.728	0.423	Female	62
587	318.043	12.313	11,851.811	13.647	0.680	Female	49
247	184.034	12.468	529.449	3.014	0.446	Female	65
610	129.614	15.537	920.992	10.939	0.352	Female	63
307	126.202	8.814	896.832	3.658	1.439	Female	70
402	58.073	132.238	15,918.837	14.744	1.003	Female	71
606	24.940	6.874	1,219.911	1.542	0.309	Female	57
566	19.031	9.298	1,444.578	23.857	0.426	Female	63
43	16.655	96.260	226.833	1.354	1.146	Female	56
575	9.957	7.336	872.402	7.989	0.285	Female	64
453	9.024	10.769	864.200	0.000	0.420	Female	65
562	0.000	6.629	6,833.949	5.216	0.347	Female	59
62	59.375	60.795	311.097	1.765	2.049	Female	77
167	0.000	13.722	1,802.633	4.007	0.574	Female	34
644	4,831.734	11.063	4,400.320	5.026	0.718	Female	56
654	10,340.953	1.841	657.336	6.432	0.288	Male	54
306	9,504.523	83.511	5,806.052	21.382	1.333	Male	49
615	7,589.057	17.519	5,724.224	76.724	0.468	Male	56
82	6,428.845	32.986	494.283	27.011	0.453	Male	36
64	6,373.376	43.353	1,238.855	15.047	0.924	Male	62
37	6,232.097	104.771	818.198	1.708	1.259	Male	69
16	6,214.831	39.433	875.201	17.254	1.213	Male	45
273	6,209.024	20.951	744.541	19.238	1.223	Male	55
178	6,136.615	159.149	3,136.487	39.649	0.663	Male	45
187	6,071.655	273.419	4,300.544	5.844	0.928	Male	55
397	5,999.737	21.141	5,464.136	2.699	0.302	Male	43
507	5,575.943	66.806	4,566.809	76.817	0.725	Male	48
370	5,285.960	80.587	4,093.100	2.303	0.792	Male	63

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
116	5,149.800	48.661	1,802.633	2.313	0.460	Male	53
385	5,111.872	21.484	2,932.634	7.726	0.788	Male	67
382	5,069.321	13.204	766.521	1.535	0.295	Male	65
180	4,713.706	703.627	2,962.245	116.129	1.832	Male	46
475	4,499.951	6.427	965.083	8.211	0.538	Male	31
169	3,518.442	17.517	857.541	5.701	0.667	Male	59
100	3,446.153	39.274	666.546	15.214	1.119	Male	59
388	2,610.837	19.865	10,162.328	8.240	0.738	Male	56
489	2,296.835	11.958	708.857	1.440	0.619	Male	51
96	2,195.566	26.766	342.188	13.209	0.843	Male	57
639	1,865.760	13.756	674.008	29.225	0.362	Male	27
577	1,837.225	20.401	13,565.523	13.708	0.526	Male	50
78	1,661.705	10.208	259.838	24.279	0.415	Male	53
246	1,553.839	18.211	2,735.734	3.725	0.585	Male	64
446	1,372.806	10.520	478.522	1.986	0.365	Male	57
75	1,063.240	32.939	830.405	4.104	0.710	Male	45
461	733.012	12.567	12,522.107	14.483	0.479	Male	48
147	550.388	36.054	1,346.208	18.044	0.906	Male	57
547	541.150	10.316	855.376	9.672	0.301	Male	34
176	519.243	53.613	569.566	14.721	0.403	Male	53
576	477.239	19.977	1,929.334	31.040	0.701	Male	50
456	454.474	13.065	1,013.741	0.000	0.464	Male	44
519	415.595	12.476	3,443.506	7.593	0.483	Male	51
317	404.954	20.603	767.306	21.466	0.945	Male	46
565	359.038	10.235	839.661	144.788	0.338	Male	58
66	305.264	41.759	1,289.495	2.809	1.075	Male	68
392	267.832	30.417	6,689.392	8.830	1.384	Male	58
201	260.572	185.869	995.518	60.244	0.566	Male	53
12	247.384	11.872	369.806	51.479	0.470	Male	59
89	198.840	50.325	593.439	45.623	2.258	Male	44
184	192.441	551.973	6,795.512	11.740	0.825	Male	56
76	185.720	11.915	144.717	36.082	0.388	Male	58
53	178.714	67.456	499.480	2.450	2.363	Male	45
260	164.371	33.079	881.132	23.490	0.902	Male	57
196	152.945	70.806	0.000	8.925	0.612	Male	65

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
274	147.021	32.624	4,467.932	3.725	0.570	Male	44
134	136.715	34.583	1,371.196	17.293	1.120	Male	62
573	136.375	7.276	2,349.475	34.995	0.548	Male	48
310	133.141	21.734	737.476	1.321	0.772	Male	48
593	95.172	123.940	2,512.192	48.343	0.575	Male	56
148	80.199	24.664	804.114	11.727	1.180	Male	62
653	67.094	7.128	7,067.529	5.339	0.952	Male	52
360	45.236	23.070	474.499	0.508	0.432	Male	56
261	32.513	22.376	4,726.772	12.362	0.657	Male	53
77	31.877	50.151	256.477	36.130	1.551	Male	55
81	25.188	98.377	827.044	33.375	2.118	Male	44
74	25.188	17.196	356.473	3.477	0.498	Male	51
450	10.025	16.964	610.652	43.078	0.695	Male	45
585	9.957	6.734	673.425	18.518	0.262	Male	52
561	8.385	14.289	645.260	9.350	0.552	Male	52
126	6.352	59.547	6,736.497	48.009	1.509	Male	50
41	5.668	16.019	378.950	4.499	0.894	Male	48
165	4.845	10.904	539.545	14.631	0.761	Male	56
534	4.392	4.815	651.662	4.226	0.298	Male	57
425	4.019	15.056	477.629	0.000	0.359	Male	36
118	2.584	17.254	805.625	10.396	0.820	Male	54
594	0.000	24.314	1,531.477	18.154	3.502	Male	50
617	0.000	316.716	15,108.376	30.733	1.689	Male	72
539	0.000	74.438	2,992.270	144.788	1.471	Male	54
88	0.000	21.376	473.276	8.072	1.009	Male	48
447	0.000	56.567	911.517	4.813	0.963	Male	66
172	0.000	206.436	649.783	62.461	0.864	Male	63
614	0.000	28.599	875.912	10.266	0.844	Male	54
171	0.000	20.598	652.352	37.079	0.795	Male	49
30	0.000	18.778	766.308	0.000	0.655	Male	55
455	0.000	38.916	867.771	0.751	0.624	Male	57
599	0.000	17.391	761.693	8.292	0.623	Male	70
499	0.000	18.458	895.447	65.053	0.601	Male	62
162	0.000	11.712	506.271	8.460	0.544	Male	49
108	0.000	17.686	853.619	2.725	0.506	Male	59

Table S5a (continued)

Number	AFP (ng/mL)	AFU (mU/mL)	GGT2 (mU/mL)	GPC3 (ng/mL)	HGF (ng/mL)	Gender	Age
163	0.000	11.130	289.584	1.394	0.501	Male	58
538	0.000	6.710	425.248	1.602	0.444	Male	63
396	0.000	18.430	846.344	2.960	0.405	Male	69
383	0.000	3.670	600.391	5.825	0.363	Male	59
564	0.000	6.608	382.759	34.513	0.305	Male	66
658	0.000	4.340	899.117	0.000	0.266	Male	64
605	0.000	8.119	737.756	2.249	0.265	Male	52
20	0.000	274.126	3,216.747	3.439	1.822	Male	69
44	123.779	121.444	300.813	4.146	0.890	Male	76
50	439.658	77.904	633.310	0.153	1.159	Male	55
130	70.403	47.763	4,285.802	12.187	1.028	Male	55
168	0.000	45.117	931.627	4.128	1.389	Male	61
611	0.000	21.927	3,670.746	17.888	0.548	Male	74
151	4,520.299	18.982	2,603.688	15.406	0.475	Male	73
107	0.000	15.188	722.958	5.798	0.528	Male	53
619	7,322.315	12.888	1,191.285	20.746	0.284	Male	61

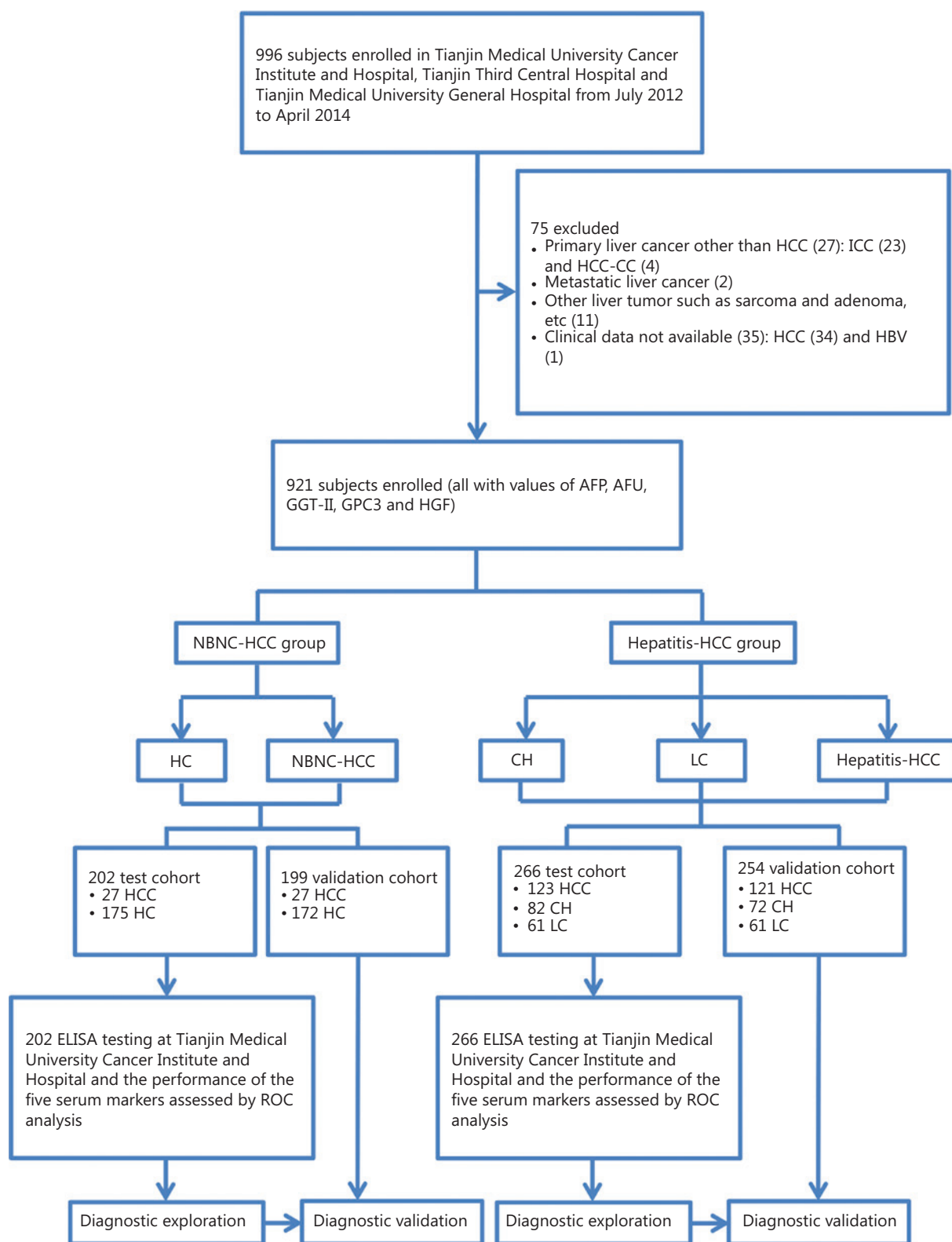


Figure S1 The study design. HC, healthy controls; CH, chronic hepatitis; LC, liver cirrhosis; HCC, hepatocellular carcinoma.

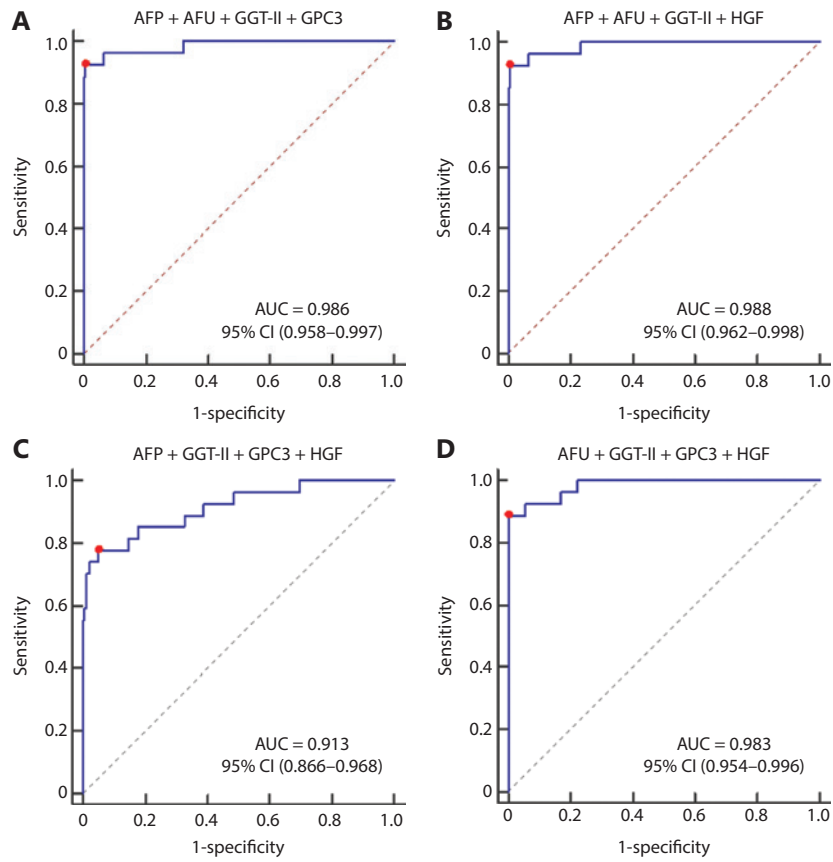


Figure S2 The 4 arrangements of serum biomarkers in the combination model. The sensitivity and specificity represented by the red dots were shown in detail below. (A). AFP + AFU + GGT-II + GPC3 sensitivity: 92.6% and specificity: 99.4%; (B). AFP + AFU + GGT-II + HGF sensitivity: 92.6% and specificity: 98.3%; (C). AFP + GPC3 + GGT-II + HGF sensitivity, 77.8% and specificity: 94.9%; (D). AFU + GPC3 + GGT-II + HGF sensitivity; 88.9% and specificity: 100.0%.

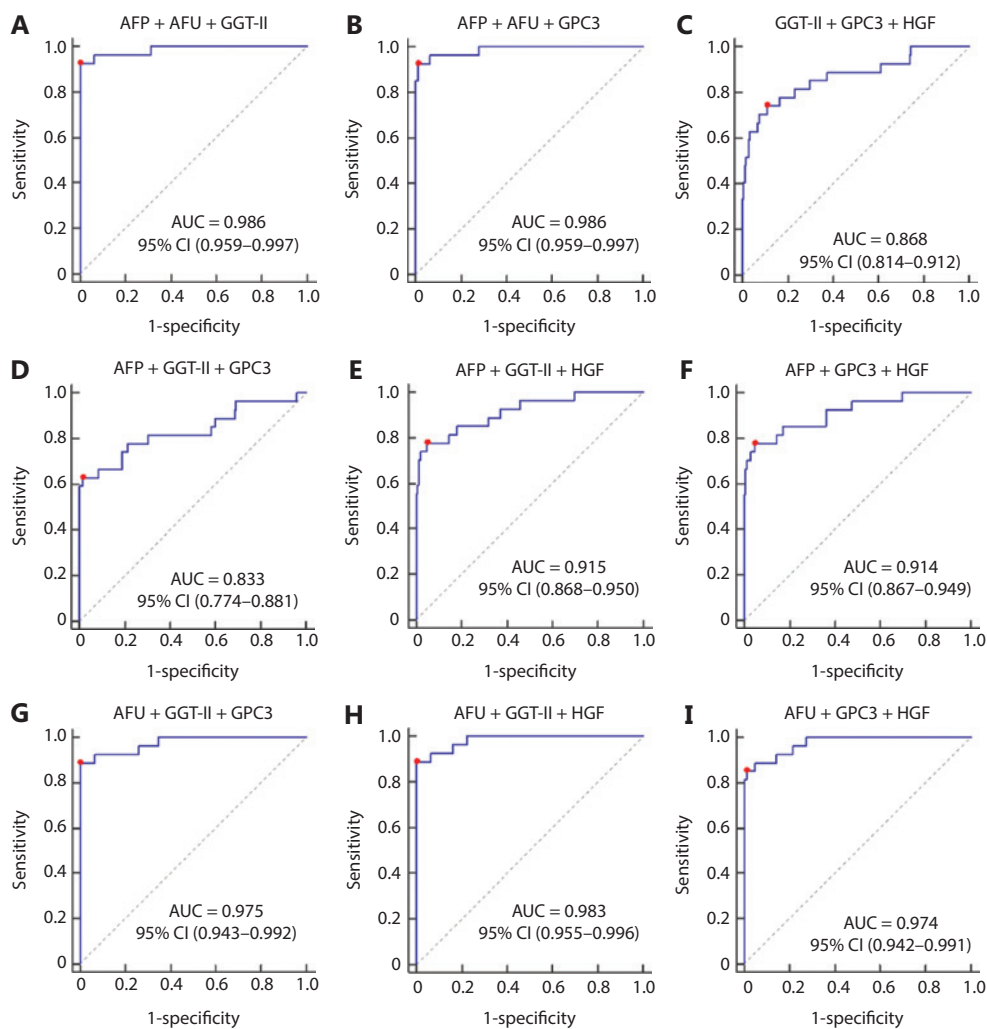


Figure S3 The 3 arrangements of serum biomarkers in the combination model. The sensitivity and specificity represented by the red dots are shown in detail below. (A). AFP + AFU + GGT-II sensitivity: 92.6% and specificity: 100.0%; (B). AFP + AFU + GPC3 sensitivity: 92.6% and specificity: 98.9%; (C). GGT-II + GPC3 + HGF sensitivity: 74.1% and specificity: 89.1%; (D). AFP + GGT-II + GPC3 sensitivity: 63.0% and specificity: 98.3%; (E). AFP + GGT-II + HGF sensitivity: 77.8% and specificity: 94.9%; (F). AFP + GPC3 + HGF sensitivity: 77.8% and specificity: 95.4%; (G). AFU + GGT-II + GPC3 sensitivity: 88.9% and specificity: 100.0%; (H). AFU + GGT-II + HGF sensitivity: 88.9% and specificity: 98.9%; (I). AFU + GPC3 + HGF sensitivity: 85.2% and specificity: 97.7%.

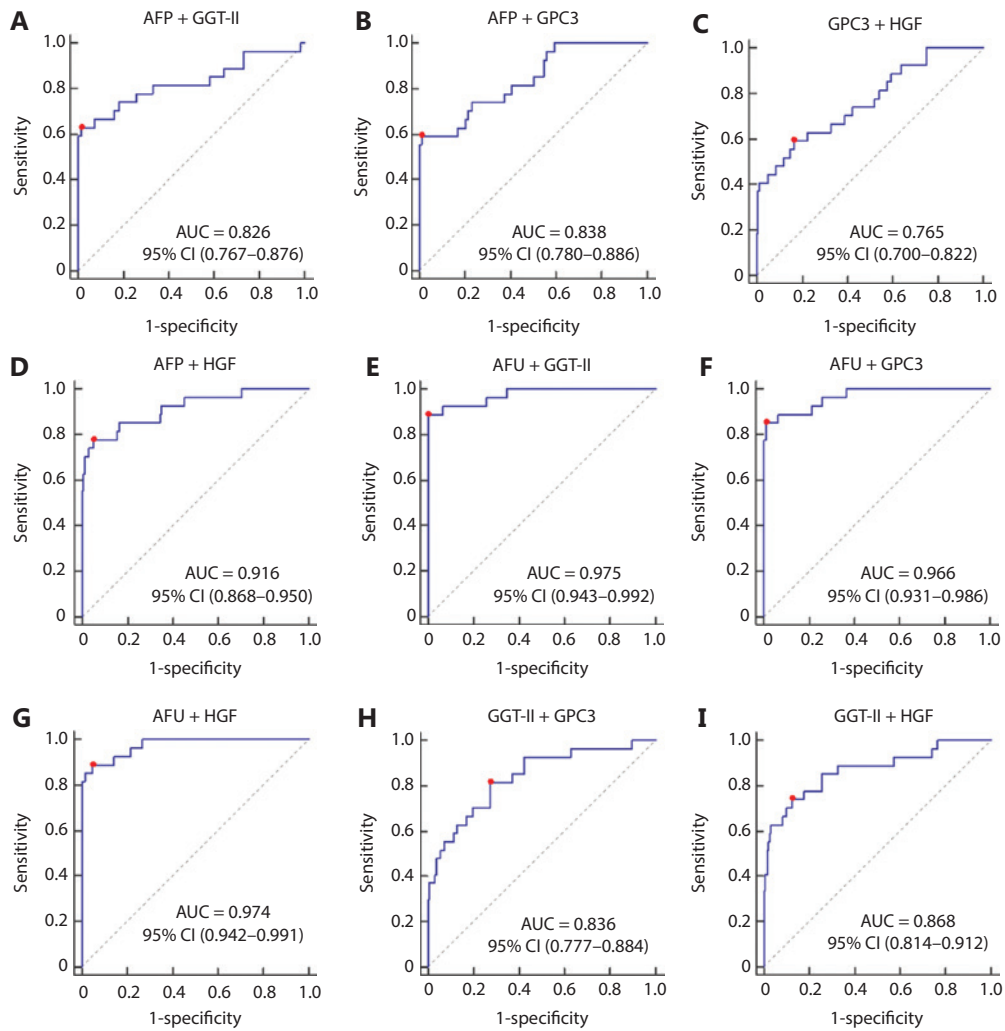


Figure S4 The 2 arrangements of serum biomarkers in the combination model. The sensitivity and specificity represented by the red dots are shown in detail below. (A). AFP + GGT-II sensitivity: 63.0% and specificity: 98.3%; (B). AFP + GPC3 sensitivity: 59.3% and specificity: 98.3%; (C). GPC3 + HGF sensitivity: 59.3% and specificity: 83.4%; (D). AFP + HGF sensitivity: 77.8% and specificity: 94.9%; (E). AFU + GGT-II sensitivity: 88.9% and specificity: 100.0%; (F). AFU + GPC3 sensitivity: 85.2% and specificity: 98.9%; (G). AFU + HGF sensitivity: 88.9% and specificity: 94.9%; (H). GGT-II + GPC3 sensitivity: 81.5% and specificity: 72.5%; (I). GGT-II + HGF sensitivity: 74.1% and specificity: 87.4%.

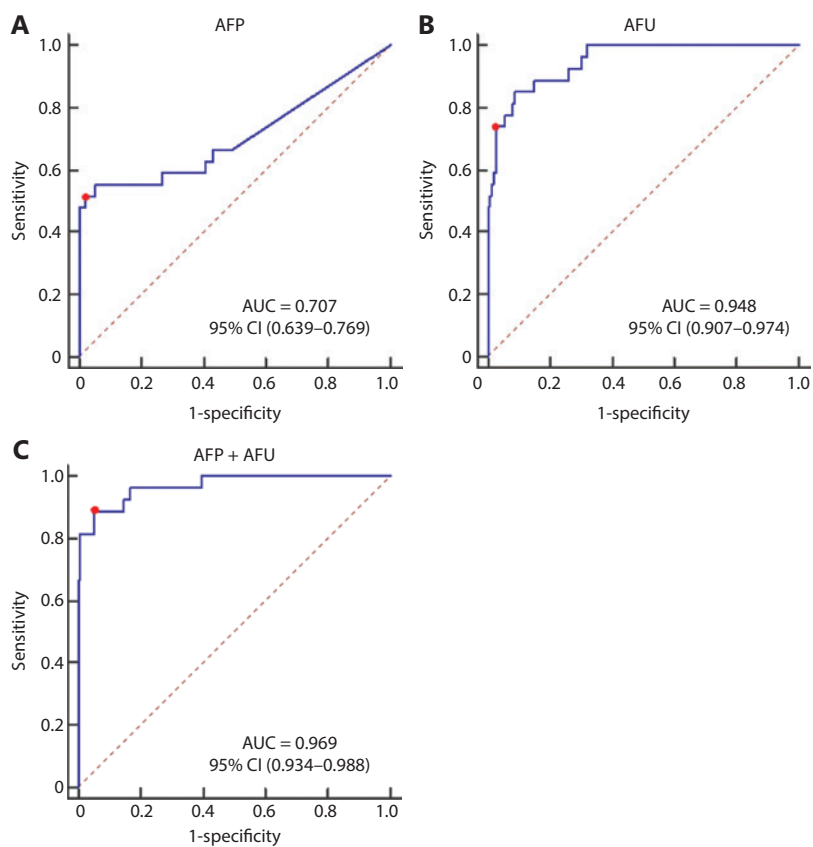


Figure S5 The receiver operating characteristic curves of AFP (A) AFU (B) and AFP + AFU (C) in the detection of the NBNC-HCC validation group. The sensitivity and specificity represented by the red dots are shown in detail below. (A). AFP sensitivity: 51.9% and specificity: 97.7%; (B). AFU sensitivity: 74.1% and specificity: 96.5%; (C). AFP + AFU sensitivity: 88.9% and specificity: 94.8%.

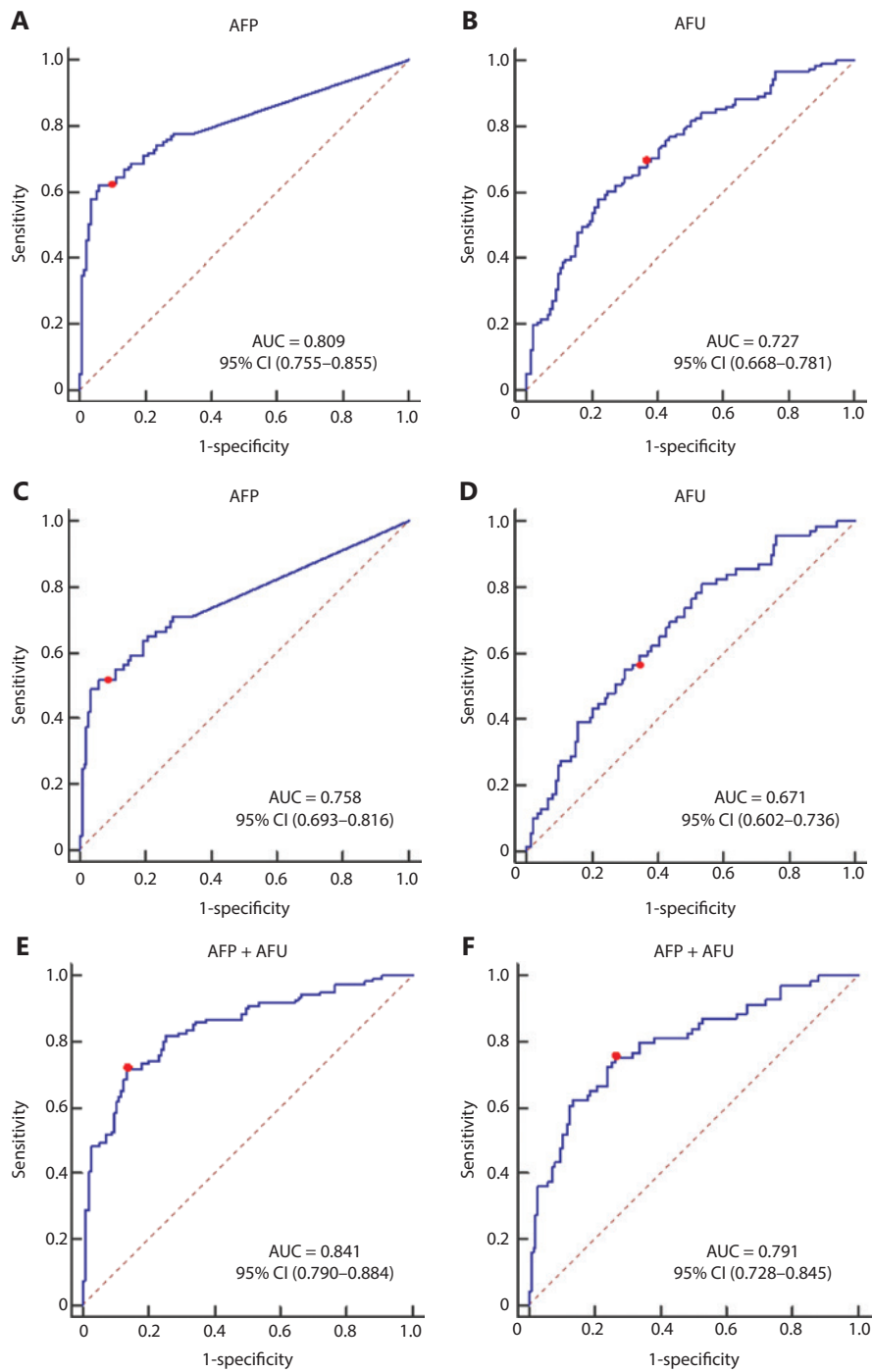


Figure S6 The serum biomarkers AFP, AFU, and combination model of all-stage and early-stage hepatitis-hepatocellular carcinoma (HCC) in the validation cohort. (A), (B), and (E) show the AFP, AFU, and the combination model of all-stage hepatitis-HCC; (C), (D), and (F) show AFP, AFU, and the combination model of early-stage hepatitis-HCC. The sensitivity and specificity represented by the red dots are shown in detail below. (A). AFP sensitivity: 62.8% and specificity: 90.2%; (B). AFU sensitivity: 69.4% and specificity: 65.4%; (C). AFP sensitivity: 52.2% and specificity: 90.2%; (D). AFU sensitivity: 56.5% and specificity: 65.4%; (E). AFP + AFU sensitivity: 71.9% and specificity: 86.5%; (F). AFP + AFU sensitivity: 75.4% and specificity: 73.7%.

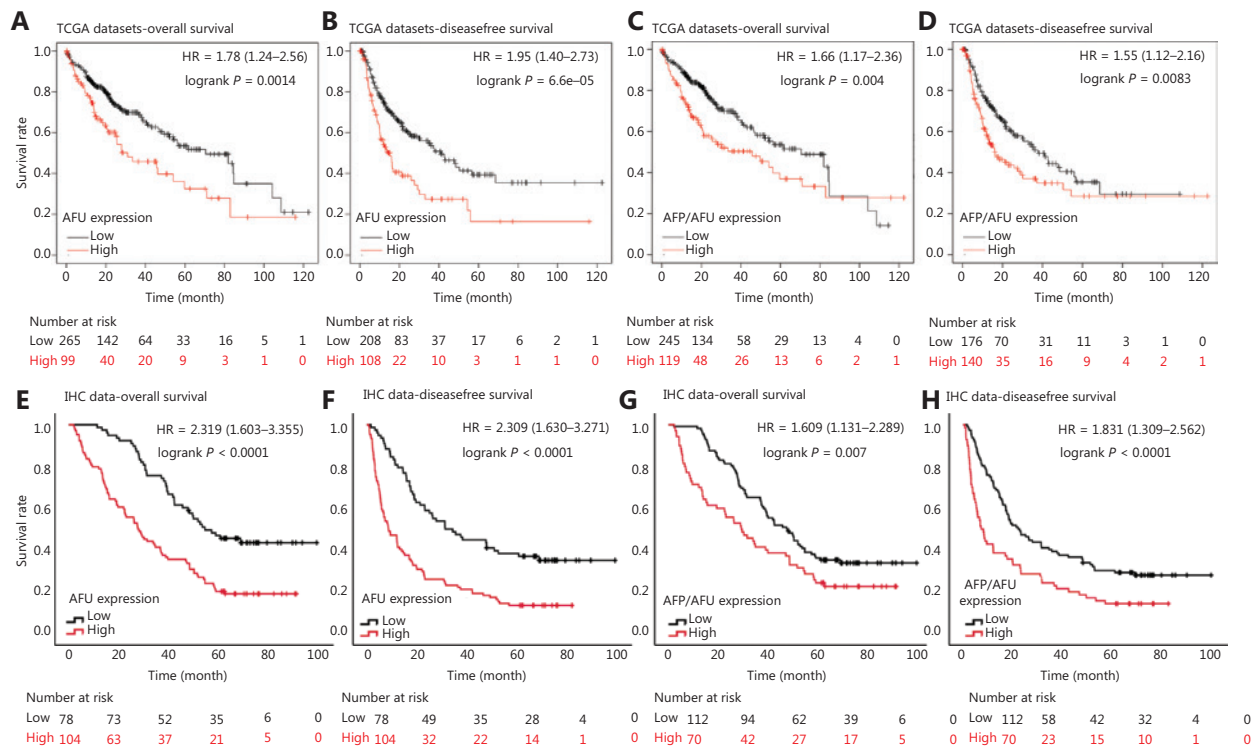


Figure S7 The AFU and AFP/AFU combination model for predicting hepatocellular carcinoma (HCC) prognosis. (A), (B) The survival curves [overall survival (OS) and disease-free survival (DFS)] of HCC patients with different expressions of AFU based on The Cancer Genome Atlas (TCGA) database. (C), (D) The survival curves (OS and DFS) of HCC patients with different expressions of AFP/AFU based on TCGA database. (E), (F) The survival curves (OS and DFS) of HCC patients with different expressions of AFU based on our immunohistochemistry (IHC) data. (G), (H) The survival curves (OS and DFS) of HCC patients with different expressions of AFP/AFU based on our IHC data.