

**Supplementary Table S2** Sensitivity of MNR and PNA method

Variant (%)	MNR method					Result
	<i>NR21</i>	<i>NR24</i>	<i>NR27</i>	<i>BAT25</i>	<i>BAT26</i>	MSS/MSI-H
5%	—	—	—	—	—	MSS
10%	○	—	○	—	—	MSI-H
20%	○	○	○	○	○	MSI-H
40%	○	○	○	○	○	MSI-H
100%	○	○	○	○	○	MSI-H
Variant (%)	PNA method					Result
	<i>NR21</i>	<i>NR24</i>	<i>NR27</i>	<i>BAT25</i>	<i>BAT26</i>	MSS/MSI-H
1%	○	—	—	○	—	MSI-H
5%	○	○	○	○	○	MSI-H
10%	○	○	○	○	○	MSI-H
20%	○	○	○	○	○	MSI-H
100%	○	○	○	○	○	MSI-H

**Supplementary Table S3** MSI-H detection rate for each marker used in PNA and MNR method

Marker	PNA method (n = 76)		MNR method (n = 76)		p-value*
	Number of samples	Detection rate (%)	Number of samples	Detection rate (%)	
<b>NR21</b>	74	97.37%	71	93.42%	0.375
<b>NR24</b>	71	93.42%	64	84.21%	0.039
<b>BAT26</b>	71	93.42%	63	82.89%	0.077
<b>BAT25</b>	72	94.74%	72	94.74%	1
<b>NR27</b>	75	98.78%	74	97.37%	1

\* McNemar analysis was used to compare two different test results in the same cases.

**Supplementary Table S4** Clinicopathologic characteristics of 76 MSI-H CRC patients and 90 MSS CRC patients

Clinicopathologic factor	Classification	MSI-H (n=76)		MSS (n=90)		p-value*
Age, years		54.39±15.11		61.16±12.61		0.002
Gender	Female	26	34.2%	34	37.8%	0.634
	Male	50	65.8%	56	62.2%	
Location	Right side	53	69.7%	25	27.8%	<0.01
	Left side	23	30.3%	65	72.2%	
Pre OP CEA	≤5ng/ml	68	89.5%	61	67.8%	0.001
	>5ng/ml	8	10.5%	29	32.2%	
Gross type	Non-exophytic	18	23.7%	35	38.9%	0.036
	Exophytic	58	76.3%	55	61.1%	
Size (cm)		6.13±2.8		4.43±2.05		<0.001
Histologic diagnosis	Adenocarcinoma	63	82.9%	84	93.3%	0.031
	Mucinous adenocarcinoma	11	14.5%	5	5.6%	
	Signet ring cell carcinoma	2	2.6%	0	0.0%	
	Neuroendocrine carcinoma	0	0.0%	1	1.2%	
T stage	pT1	2	2.6%	10	11.1%	0.002
	pT2	13	17.1%	13	14.4%	
	pT3	57	75.0%	48	53.3%	
	pT4a and pT4b	4	5.3%	19	21.1%	

\* Fisher's exact test and Mann-Whitney test were used for the statistical analysis of categorical variables and continuous variables, respectively.

**Supplementary Table S5** Clinicopathologic characteristics of patients with MSI-H CRCs associated with sporadic conditions or Lynch syndrome

Clinicopathologic factor	Classification	MSI-H CRCs associated with sporadic condition (n=67)		MSI-H CRCs associated with Lynch syndrome (n=9)		p-value*
Age, years		56.50±14.37		38.66±11.10		0.001
Gender	Female	24	35.8%	2	22.2%	0.488
	Male	43	64.2%	7	77.8%	
Location	Right side	49	73.1%	4	44.4%	0.119
	Left side	18	26.9%	5	55.6%	
Pre OP CEA	≤5ng/ml	59	88.1%	8	88.9%	1
	>5ng/ml	8	11.9%	1	11.1%	
Gross type	Non-exophytic	16	23.9%	2	22.2%	1
	Exophytic	51	76.1%	7	77.8%	
Size		6.36±2.80		4.34±2.12		0.041
Histologic diagnosis	Adenocarcinoma	56	83.6%	7	77.8%	0.321
	Mucinous carcinoma	10	14.9%	1	11.1%	
	Signet ring cell carcinoma	1	1.5%	1	11.1%	
T stage	pT1	2	3.0%	0	0.0%	0.644
	pT2	11	16.4%	2	22.2%	
	pT3	50	74.6%	7	77.8%	
	pT4a and pT4b	4	6.0%	0	0.0%	
Lymphovascular invasion	Absent	50	75.8%	6	66.7%	0.684
	Present	16	24.2%	3	33.3%	
Mucin formation	Absent	27	40.9%	5	42.7%	0.789
	Focal	30	45.5%	3	44.0%	
	Predominant	9	13.6%	1	13.3%	
Invasion pattern	Expanding	36	55.4%	4	44.4%	0.724
	Infiltrative	29	44.6%	5	55.6%	
Crohn-like reaction	Absent	25	38.5%	2	22.2%	0.472
	Present	40	61.5%	7	77.8%	
Tumor budding	Absent	63	96.9%	8	88.9%	0.326
	Present	2	3.1%	1	11.1%	
MMR protein expression by IHC	MLH1/PMS2 loss	42	62.7%	7	77.8%	1
	MSH2/MSH6 loss	15	22.4%	2	22.2%	
	PMS2 loss	1	1.5%	0	0.0%	
	MSH6 loss	5	7.5%	0	0.0%	
	MLH1/PMS2/MSH2/MSH6 loss	1	1.5%	0	0.0%	
	MLH1/MSH2/MSH6 loss	1	1.5%	0	0.0%	

	MLH1/PMS2/MSH6 loss	1	1.5%	0	0.0%	
	No loss	1	1.5%	0	0.0%	
Instabililty of MSI makers in PNA-PCR	NR21	65	97.00%	8	88.90%	0.319
	NR24	63	94.00%	9	100%	1
	BAT26	62	92.50%	9	100%	1
	BAT25	64	95.50%	9	100%	1
	NR27	66	98.50%	9	100%	1
Instabililty of MSI makers in PCR-MNR	NR21	63	94.00%	9	100%	1
	NR24	55	82.10%	8	88.90%	1
	BAT26	54	80.60%	9	100%	0.344
	BAT25	63	94.00%	8	88.90%	0.477
	NR27	65	97.00%	9	100%	1

\* Fisher's exact test and Mann-Whitney test were used for the statistical analysis of categorical variables and continuous variables, respectively.

**Supplementary Table S6** IHC-mediated MSI-H detection rate depending on the combination of markers and variable cut-off values for loss of MMR protein expression

Combination of MMR markers	MSI-H detection rate (n = 76)					
	Cut off value: complete loss		Cut off value: $\geq 99\%$ loss		Cut off value: $\geq 95\%$ loss	
	Number of samples	Detection rate (%)	Number of samples	Detection rate (%)	Number of samples	Detection rate (%)
<b>MLH1</b>	50	65.79%	50	65.79%	51	67.11%
<b>MSH2</b>	15	19.74%	15	19.74%	19	25.00%
<b>PMS2</b>	48	63.16%	51	67.11%	52	68.42%
<b>MSH6</b>	8	10.53%	17	22.37%	25	32.89%
<b>MLH1 and MSH2</b>	64	84.21%	64	84.21%	69	90.79%
<b>PMS2 and MSH6</b>	56	73.68%	68	89.47%	75	98.68%
<b>MLH1, PMS2, MSH2, and MSH6</b>	69	90.79%	73	96.05%	75	98.68%