Table S1. Sequences and positions of primers used in MS-HRM.

Gene	Primer Sequence (5'-3')	Position	Annealing temperature (℃)
FAT4	F-CGAGGCGTTGATTTAGTTGT R-ACCACCACGATACCCACTTA	chr4:125316412-125491768	61-54
SOX11*	F-TTCGAGGAATATGGTATGGTTTTTG R-CCCACGCCCTCACCAATAATT	chr2:5836585-5836671	67-64

*Primers selected from previously published study.

Table S2. Associations between environmental factors and GC risk.

Environmental factors		Control (%)	Case (%)	OR (95% CI)	*P*	OR[a] (95% CI)	*P*[a]
Diet	Regular	331 (84.2)	239 (63.7)	1.000	<0.001*	1.000	<0.001*
	Irregular	62 (15.8)	136 (36.3)	3.038 (2.155-4.282)		3.540 (2.373-5.280)	
Salt	No	254 (64.6)	170 (45.3)	1.000	<0.001*	1.000	<0.001*
	Yes	139 (35.4)	205 (54.7)	2.204 (1.649-2.945)		2.143 (1.531-2.999)	
Overnight food (times/week)	<1	130 (33.3)	71 (18.9)	1.000	<0.001*	1.000	<0.001*
	≥1	260 (66.7)	304 (81.1)	2.141 (1.534-2.988)		2.378 (1.602-3.532)	
Green vegetables (g /day)	<250	24 (6.1)	73 (19.5)	1.000	<0.001*	1.000	<0.001*
	≥250	369 (93.9)	302 (80.5)	0.269 (0.166-0.437)		0.270 (0.156-0.465)	
Fruits (g/week)	<1000	228 (58.0)	230 (61.3)	1.000	0.349	1.000	0.207
	≥1000	165 (42.0)	145 (38.7)	0.871 (0.653-1.163)		0.806 (0.576-1.127)	
Pork (g/week)	<250	155 (40.5)	137 (36.5)	1.000	0.265	1.000	0.262
	≥250	228 (59.5)	238 (63.5)	1.181 (0.881-1.583)		1.222 (0.861-1.735)	
Freshwater fish (times/week)	<1	338 (86.0)	211 (56.7)	1.000	<0.001*	1.000	<0.001*
	≥1	55 (14.0)	161 (43.3)	4.689 (3.301-6.662)		4.989 (3.298-7.548)	
Bean Products (times/week)	<3	166 (42.2)	199 (53.1)	1.000	0.003*	1.00	0.003*
	≥3	227 (57.8)	176 (46.9)	0.647 (0.486-0.860)		0.610 (0.438-0.850)	
Fried food (times/month)	<1	221 (56.4)	176 (46.9)	1.000	0.009*	1.000	0.002*
	≥1	171 (43.6)	199 (53.1)	1.461 (1.099-1.942)		1.687 (1.204-2.364)	
Garlic (times/week)	<1	203 (51.7)	298 (79.5)	1.000	<0.001*	1.000	<0.001*
	≥1	190 (48.3)	77 (20.5)	0.276 (0.201-0.380)		0.306 (0.212-0.442)	
tea	No	267 (67.9)	270 (72.0)	1.000	0.220	1.000	0.688
	Yes	126 (32.1)	105 (28.0)	0.824 (0.605-1.123)		0.926 (0.637-1.346)	
Smoking	No	188 (47.8)	146 (38.9)	1.000	0.013	1.000	0.002*
	Yes	205 (52.2)	229 (61.1)	1.438 (1.080-1.916)		1.777 (1.224-2.580)	
Drinking	No	204 (52.2)	158 (42.1)	1.000	0.005*	1.000	0.003*
	Yes	187 (47.8)	217 (57.9)	1.498 (1.126-1.993)		1.845 (1.237-2.751)	
H.pylori infection	Negative	213 (54.1)	154 (41.1)	1.000	<0.001*	1.000	<0.001*
	Positive	181 (45.9)	221 (58.9)	1.689 (1.269-2.247)		1.893 (1.356-2.643)	

CI, confidence interval; OR odds ratio. [a] Adjusted for BMI, occupation, family history of GC, age, gender. *Statistically significant.

Table S3. Multivariate analysis of the association between environmental factors and GC.

Environmental factors		β-coefficient	OR(95% CI)	P
Gender	Male		1.000	
	Female	0.358	1.431(0.817-2.505)	0.21
Age (years)	<60		1.000	
	≥60	-0.316	0.729(0.476-1.118)	0.147
BMI (kg/m²)	≤18.5		1.000	
	18.5-23.00	-0.186	0.830(0.381-1.808)	0.640
	≥23.00	-1.135	0.322(0.147-0.704)	<0.001*
Occupation	Non-manual worker		1.000	
	Light manual worker	-2.396	0.091(0.049-0.168)	<0.001*
	Medium and heavy manual worker	-1.666	0.189(0.107-0.333)	<0.001*
Family history of GC	No		1.000	
	Yes	2.616	13.68(4.870-38.427)	<0.001*
Diet	Regular		1.000	
	Irregular	1.433	4.189(2.597-6.758)	<0.001*
Salt	No		1.000	
	Yes	0.659	1.934(1.291-2.897)	0.001*
Green vegetables (g/day)	<250		1.000	
	≥250	-1.316	0.268(0.139-0.517)	<0.001*
Freshwater fish (times/week)	<1		1.000	
	≥1	1.691	5.423(3.370-8.727)	<0.001*
Garlic (times/week)	<1		1.000	
	≥1	-1.341	0.262(0.167-0.409)	<0.001*
H.pylori infection	Negative		1.000	
	Positive	0.645	1.907(1.279-2.843)	0.002*
Drinking	No		1.000	
	Yes	0.498	1.645(1.020-2.654)	0.041*
Overnight food (times/week)	<1		1.000	
	≥1	1.049	2.854(1.749-4.659)	<0.001*
Fried food (times/month)	<1		1.000	
	≥1	0.518	1.678(1.119-2.515)	0.012*
Constant		-5.534		

CI, confidence interval; OR, odds ratio. *Statistically significant

Table S4. Relationship between *FAT4*, *SOX11* methylation status and environmental factors.

Environmental Factors		FAT4		SOX11	
		OR[a] (95% CI)	*P* [a]	OR[a] (95% CI)	*P* [a]
Diet	Regular	1.000	0.208	1.000	0.368
	Irregular	0.789 (0.546-1.141)		1.188 (0.817-1.726)	
Salt	No	1.000	0.236	1.000	0.147
	Yes	0.825 (0.600-1.134)		0.792 (0.578-1.085)	
Green vegetables (g/day)	<250	1.000	0.004*	1.000	0.333
	≥250	0.450 (0.262-0.772)		1.260 (0.789-2.012)	
Freshwater fish (times/week)	<1	1.000	0.027*	1.000	0.217
	≥1	0.661 (0.458-0.953)		0.796 (0.555-1.143)	
Garlic (times/week)	<1	1.000	0.177	1.000	0.855
	≥1	1.265 (0.899-1.779)		1.032 (0.737-1.445)	
H.pylori infection	Negative	1.000	0.239	1.000	0.935
	Positive	1.205 (0.883-1.645)		0.987 (0.725-1.345)	
Drinking	No	1.000	0.036*	1.000	0.001*
	Yes	1.480 (1.025-2.136)		1.835 (1.272-2.646)	
Overnight food (times/week)	<1	1.000	0.577	1.000	0.311
	≥1	0.904 (0.633-1.290)		1.197 (0.845-1.696)	
Fried food (times/month)	<1	1.000	0.313	1.000	0.483
	≥1	1.176 (0.858-1.611)		1.118 (0.818-1.529)	

CI, confidence interval; OR, odds ratio. *Statistically significant.

[a] Adjusted for BMI, occupation, family history of GC, age, gender, case-control status.

Table S5. Interactions between environmental factors and *FAT4* methylation status on the risk of GC.

Environmental factors	*FAT4* methylation status		Interactions	
	Nm	Tpm		
	OR_{eg}^{a}(95% CI)		OR_i^a (95% CI)	P^a
Diet				
Regular	1.000	1.597 (1.050-2.428)		
Irregular	3.552 (1.926-6.549)	5.658 (3.169-10.103)	0.998 (0.448-2.224)	0.996
Salt				
No	1.000	1.231 (0.765-1.983)		
Yes	1.634 (0.943-2.834)	3.248 (1.961-5.379)	1.614 (0.800-3.254)	0.181
Green vegetables (g /day)				
<250	1.000	0.955 (0.252-3.619)		
≥250	0.216 (0.063-0.741)	0.292 (0.086-0.991)	1.413 (0.355-5.623)	0.624
Freshwater fish (times/week)				
<1	1.000	2.215 (1.423-3.448)		
≥1	10.232 (5.202-20.127)	7.446 (4.143-13.380)	0.328 (0.142-0.762)	0.009*
Garlic (times/week)				
≥1	1.000	1.566 (0.826-2.967)		
<1	3.312 (1.788-6.134)	5.046 (2.804-9.080)	0.973 (0.452-2.094)	0.944
H.pylori infection				
Negative	1.000	1.325 (0.806-2.179)		
Positive	1.683 (0.974-2.909)	2.612 (1.611-4.235)	1.172 (0.585-2.345)	0.655
Drinking				
No	1.000	1.303 (0.782-2.171)		
Yes	1.571 (0.875-2.822)	2.454 (1.449-4.158)	1.199 (0.599-2.402)	0.609
Overnight food (times/week)				
<1	1.000	1.259 (0.609-2.603)		
≥1	2.045 (1.059-3.951)	3.245 (1.728-6.093)	1.260 (0.550-2.886)	0.585
Fried food				
<1	1.000	1.230 (0.757-1.996)		
≥1	1.326 (0.760-2.313)	2.390 (1.466-3.896)	1.466 (0.731-2.938)	0.281

Nm, negative methylation; Tpm, total positive methylation; CI, confidence interval. OR_{eg}, odds ratio for the combined effect of the gene methylation and the environmental factor; OR_i, odds ratio for the interaction between the gene methylation and the environmental factor.

[a] Adjusted for BMI, occupation, family history of GC, age, gender.

*Statistically significant.

Table S6. Interactions between environmental factors and *SOX11* methylation status on the risk of GC

Environmental factors	*SOX11* methylation status		Interaction	
	Nm	Tpm		
	OR_{eg}[a](95% CI)		OR_i[a] (95% CI)	*P* [a]
Diet				
Regular	1.000	1.228 (0.816-1.846)		
Irregular	4.401 (2.273-8.520)	3.628 (2.109-6.242)	0.672 (0.294-1.533)	0.345
Salt				
No	1.000	1.651 (1.026-2.658)		
Yes	3.189 (1.828-5.564)	2.581 (1.550-4.298)	0.490 (0.242-0.995)	0.048
Green vegetables (g/day)				
≥250	1.000	1.189 (0.819-1.726)		
<250	3.362 (1.479-7.642)	5.025 (2.287-11.043)	1.257 (0.411-3.845)	0.688
Freshwater fish				
<1	1.000	1.175 (0.773-1.787)		
≥1	4.653 (2.454-8.823)	5.946 (3.314-10.667)	1.087 (0.475-2.491)	0.843
Garlic (times/week)				
≥1	1.000	1.137 (0.601-2.151)		
<1	3.150 (1.719-5.774)	3.733 (2.102-6.632)	1.042 (0.486-2.235)	0.916
H.pylori infection				
Negative	1.000	1.416 (0.845-2.372)		
Positive	2.473 (1.422-4.303)	2.481 (1.489-4.133)	0.708 (0.352-1.425)	0.334
Drinking				
No	1.000	1.278 (0.776-2.107)		
Yes	2.123 (1.185-3.801)	2.043 (1.222-3.414)	0.753 (0.376-1.508)	0.423
Overnight food (times/week)				
<1	1.000	0.620 (0.306-1.257)		
≥1	1.454 (0.794-2.664)	1.995 (1.125-3.538)	2.212 (0.984-4.972)	0.055
Fried food				
<1	1.000	1.349 (0.831-2.190)		
≥1	2.087 (1.204-3.619)	2.070 (1.262-3.397)	0.735 (0.368-1.468)	0.384

Nm, negative methylation; Tpm, total positive methylation; CI, confidence interval. OR_{eg}, odds ratio for the combined effect of the gene methylation and the environmental factor; OR_i, odds ratio for the interaction between the gene methylation and the environmental factor.

[a] Adjusted for BMI, occupation, family history of GC, age, gender.

*Statistically significant.