Supplementary

Table S1 The total BCAA-related genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F statistic
BCAA	rs13389219	2	165528876	−0.035018	0.00409375	1.20E−17	115051	T	C	0.392546	0.000635585	73.16990521
BCAA	rs1260326	2	27730940	−0.0514666	0.00408515	2.20E−36	115051	C	T	0.603976	0.001377672	158.7184422
BCAA	rs72538440	2	65225088	0.0469431	0.00407567	1.10E−30	115051	GC	G	0.424047	0.00115174	132.659378
BCAA	rs2943652	2	227108446	0.0243001	0.00416842	5.60E−09	115051	T	C	0.644803	0.000295294	33.98330631
BCAA	rs1471740	3	136328270	0.0269188	0.00457284	3.90E−09	115051	C	T	0.740186	0.000301105	34.65228119
BCAA	rs7656569	4	89166761	0.0644479	0.00514003	4.60E−36	115051	A	C	0.192299	0.001364592	157.209463
BCAA	rs10018448	4	89225171	0.0968618	0.00401218	9.10E−129	115051	G	A	0.535307	0.005040334	582.823029
BCAA	rs2977929	8	76454025	0.0289356	0.00505178	1.00E−08	115051	T	C	0.196769	0.000285077	32.80715544
BCAA	rs17096421	10	88820592	0.0539934	0.00878589	8.00E−10	115051	T	A	0.056398	0.000328153	37.76611224
BCAA	rs36181536	12	122528263	−0.0257492	0.00427191	1.70E−09	115051	C	T	0.673508	0.000315686	36.33086537
BCAA	rs2657879	12	56865338	0.0446283	0.00516389	5.50E−18	115051	G	A	0.182493	0.000648776	74.68943482
BCAA	rs56272145	16	70201962	−0.0905486	0.00622466	6.10E−48	115051	A	G	0.125887	0.001835878	211.6043839
BCAA	rs6499561	16	72148404	0.0237944	0.00420911	1.60E−08	115051	G	A	0.362099	0.000277689	31.95666244
BCAA	rs117643180	17	7185779	−0.1485140	0.01266700	9.50E−32	115051	A	C	0.025853	0.001193379	137.4610636
BCAA	rs12974412	19	14151809	−0.0279079	0.00496455	1.90E−08	115051	G	A	0.779949	0.00027459	31.59999316
BCAA	rs4801776	19	49304215	−0.0392475	0.00446204	1.40E−18	115051	T	C	0.299247	0.000672008	77.3658904

Table S2 Heterogeneity and pleiotropy tests for MR analyses

Exposure	Outcome	Method	Heterogeneity analysis		Pleiotropy analysis			MR-PRESSO global test
			Q	P	Egger intercept	SE	P	P
Total-BCAA	Prostate cancer	MR-Egger	10.29545	0.3271009	1.224157E−05	0.0001366837	0.9305972	0.476
Total-BCAA	Prostate cancer	IVW	10.30462	0.4141865				
Total-BCAA	Bladder cancer	MR-Egger	2.854998	0.4145262	8.068211E−05	9.39967E-05	0.4538085	0.598
Total-BCAA	Bladder cancer	IVW	3.591763	0.4640634				
Total-BCAA	Kidney cancer	MR-Egger	11.25245	0.3381908	0.01473334	0.04362292	0.7425396	0.386
Total-BCAA	Kidney cancer	IVW	11.38081	0.4119333				
Leucine	Prostate cancer	MR-Egger	6.321903	0.5027049	−1.327857E−05	0.000143063	0.9286501	0.672
Leucine	Prostate cancer	IVW	6.330518	0.6102616				
Leucine	Bladder cancer	MR-Egger	0.4662514	0.4947168	−9.841065E−06	0.0001172327	0.9466841	NA
Leucine	Bladder cancer	IVW	0.4732982	0.7892682				
Leucine	Kidney cancer	MR-Egger	6.553930	0.8339722	0.04525525	0.04221917	0.3067137	0.76
Leucine	Kidney cancer	IVW	7.702926	0.8078936				
Valine	Prostate cancer	MR-Egger	7.885614	0.7235123	2.136752E−05	0.0001119052	0.8520488	0.805
Valine	Prostate cancer	IVW	7.922073	0.7911901				
Valine	Bladder cancer	MR-Egger	3.021396	0.3883381	7.045474E−05	7.045474E-05	0.5022875	0.601
Valine	Bladder cancer	IVW	3.603815	0.4622696				
Valine	Kidney cancer	MR-Egger	16.57483	0.3449094	0.009295066	0.03184797	0.7743933	0.351
Valine	Kidney cancer	IVW	16.66895	0.4073251				
Isoleucine	Prostate cancer	MR-Egger	5.786036	0.3275985	−0.0001312705	0.0002486353	0.6201072	0.477
Isoleucine	Prostate cancer	IVW	6.108603	0.4111351				
Isoleucine	Bladder cancer	MR-Egger	0.8869812	0.3462967	1.598471E−05	0.0001744363	0.9418249	NA
Isoleucine	Bladder cancer	IVW	0.8953785	0.6391033				
Isoleucine	Kidney cancer	MR-Egger	5.664011	0.4618595	0.1126129	0.05333353	0.07921012	0.191
Isoleucine	Kidney cancer	IVW	10.122377	0.1817439				

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Table S3 The prostate cancer genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R2	F
Prostate cancer	rs2539981	2	63104904	0.00118028	0.000174233	1.30E−11	462933	C	T	0.545371	9.91E−05	45.88887288
Prostate cancer	rs934859	2	171370372	−0.00100501	0.000173409	6.80E−09	462933	G	A	0.500412	7.26E−05	33.58888769
Prostate cancer	rs73142674	3	87200497	0.00145607	0.000253783	9.60E−09	462933	C	T	0.135147	7.11E−05	32.91831357
Prostate cancer	rs78416326	3	170074517	−0.00127024	0.000217898	5.60E−09	462933	C	G	0.199895	7.34E−05	33.98311654
Prostate cancer	rs1015521	4	106115450	−0.00106403	0.000184467	8.00E−09	462933	T	G	0.330464	7.19E−05	33.27120267
Prostate cancer	rs62402376	6	28507446	0.00124312	0.000221611	2.00E−08	462933	C	A	0.188748	6.80E−05	31.46600477
Prostate cancer	rs10486567	7	27976563	−0.00125681	0.000204899	8.60E−10	462933	A	G	0.233119	8.13E−05	37.62337066
Prostate cancer	rs2394817	7	97690438	−0.00102449	0.000173367	3.40E−09	462933	T	C	0.517214	7.54E−05	34.92052006
Prostate cancer	rs7017300	8	128525268	−0.0017466	0.000256199	9.30E−12	462933	A	C	0.867467	1.00E−04	46.47615322
Prostate cancer	rs6983267	8	128413305	−0.00158008	0.000173423	8.20E−20	462933	T	G	0.481195	1.79E−04	83.01238399
Prostate cancer	rs62529913	8	128101331	−0.00127005	0.000182359	3.30E−12	462933	G	A	0.642127	1.05E−04	48.50487139
Prostate cancer	rs10993994	10	51549496	−0.00171335	0.000177333	4.40E−22	462933	C	T	0.607569	2.02E−04	93.34932438
Prostate cancer	rs10743182	11	2229782	−0.00195827	0.000238493	2.20E−16	462933	T	C	0.841928	1.46E−04	67.42050357
Prostate cancer	rs10896450	11	69008114	0.00148806	0.000173455	9.60E−18	462933	G	A	0.509676	1.59E−04	73.59788983
Prostate cancer	rs10908278	17	36099952	0.00146483	0.000174447	4.60E−17	462933	A	T	0.514074	1.52E−04	70.50916392
Prostate cancer	rs6501436	17	69119290	−0.00126515	0.000173822	3.40E−13	462933	A	G	0.532863	1.14E−04	52.97520892
Prostate cancer	rs174776	19	51359852	0.0017374	0.000252412	5.90E−12	462933	C	T	0.859757	1.02E−04	47.37811329
Prostate cancer	rs61307529	22	43498826	0.0011186	0.000174749	1.50E−10	462933	A	T	0.489763	8.85E−05	40.97494274

Table S4 The bladder cancer genetic variants used for the MR analyses.

SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F
rs1338300	1	232457185	0.000456114	0.000101906	7.60E−06	462933	T	G	0.485659	4.32723E−05	20.03297362
rs36209093	1	110229787	0.000701036	0.00012033	5.70E−09	462933	T	C	0.673817	7.33133E−05	33.9414922
rs1346755	2	16683838	0.000479043	0.000105446	5.50E−06	462933	A	G	0.634458	4.45812E−05	20.63891683
rs2619738	5	180326571	0.000510404	0.000104872	1.10E−06	462933	A	T	0.397997	5.11645E−05	23.6868419
rs31489	5	1342714	−0.000514417	0.000102872	5.70E−07	462933	A	C	0.408686	5.40125E−05	25.00543314
rs10094872	8	128719884	0.000619587	0.000105838	4.80E−09	462933	T	A	0.364222	7.40237E−05	34.27042329
rs2717559	8	143882420	0.0005564	0.000102853	6.30E−08	462933	G	A	0.441218	6.32113E−05	29.26432013

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Table S5 The kidney cancer genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F–statistic
Kidney cancer	rs11548393	2	7.28E–06	0.2093	0.0467	7.28E–06	218792	T	C	0.4294	9.1798E–05	20.08633611
Kidney cancer	rs77773048	2	4.59E–06	–0.2866	0.0625	4.59E–06	218792	A	G	0.1693	9.60991E–05	21.02753514
Kidney cancer	rs59410819	3	9.30E–06	–0.277	0.0625	9.30E–06	218792	T	G	0.1691	8.97696E–05	19.64244444
Kidney cancer	rs60112148	3	7.21E–06	–0.2087	0.0465	7.21E–06	218792	G	A	0.4882	9.20593E–05	20.14350415
Kidney cancer	rs73037382	3	3.07E–06	–0.2679	0.0574	3.07E–06	218792	G	A	0.2107	9.95513E–05	21.78299905
Kidney cancer	rs116779755	4	5.98E–06	0.622	0.1374	5.98E–06	218792	C	G	0.03198	9.36559E–05	20.4928959
Kidney cancer	rs148538710	4	8.38E–06	1.0797	0.2423	8.38E–06	218792	T	C	0.01116	9.07462E–05	19.85616644
Kidney cancer	rs114822306	5	3.09E–06	0.7987	0.1712	3.09E–06	218792	A	G	0.02186	9.94684E–05	21.76486001
Kidney cancer	rs80214846	7	5.45E–06	0.4031	0.0887	5.45E–06	218792	G	C	0.07684	9.43856E–05	20.6525835
Kidney cancer	rs61250449	7	2.09E–06	–0.2673	0.0563	2.09E–06	218792	C	T	0.2237	0.000103016	22.54120651
Kidney cancer	rs12337878	9	1.60E–06	0.27	0.0563	1.60E–06	218792	A	G	0.2216	0.000105107	22.99888431
Kidney cancer	rs61863785	10	7.58E–06	0.5736	0.1281	7.58E–06	218792	G	A	0.03764	9.16323E–05	20.05007751
Kidney cancer	rs10833641	11	3.84E–07	–0.2345	0.0462	3.84E–07	218792	A	C	0.5112	0.000117739	25.76307946
Kidney cancer	rs242012	12	9.85E–06	–0.2046	0.0463	9.85E–06	218792	A	G	0.4811	8.9244E–05	19.52743976
Kidney cancer	rs882542	12	2.64E–06	0.2229	0.0474	2.64E–06	218792	T	C	0.4192	0.000101062	22.11360173
Kidney cancer	rs12302621	12	2.13E–06	1.189	0.2508	2.13E–06	218792	G	A	0.0107	0.000102715	22.47525744
Kidney cancer	rs78367258	14	8.23E–06	1.0934	0.2452	8.23E–06	218792	G	A	0.01073	9.08754E–05	19.88443418
Kidney cancer	rs138641655	15	7.71E–06	0.9824	0.2196	7.71E–06	218792	T	G	0.01268	9.1462E–05	20.01280972
Kidney cancer	rs17477930	15	8.36E–07	1.4725	0.2989	8.36E–07	218792	C	T	0.007338	0.000110912	24.26916347
Kidney cancer	rs8097036	18	2.00E–06	–0.3803	0.08	2.00E–06	218792	T	G	0.9041	0.000103275	22.59793249
Kidney cancer	rs57444278	20	9.78E–06	–0.2342	0.053	9.78E–06	218792	G	C	0.2616	8.92384E–05	19.52621524

Table S6 Two-sample MR estimates for the effect of urologic cancers on total BCAAs

Exposure	Outcome	No. of SNP	Method	OR	95% CI	P value
Prostate cancer	Total-BCAA	15	MR-Egger	111.297101	0.01406334, 880804.01071	0.3222850
			Weighted median	3.811657	0.33995321, 42.73744	0.2778945
			Inverse variance weighted	3.999359	0.72762136, 21.98241	0.1108738
			Simple mode	6.856990	0.11658455, 403.29792	0.3700570
			Weighted mode	4.997238	0.07681358, 325.10378	0.4626096
Bladder cancer	Total-BCAA	7	MR-Egger	73874.550502	1.131539E–14, 4.823031E+23	0.6336084
			Weighted median	17.692493	6.947993E–03, 4.505248E+04	0.4646648
			Inverse variance weighted	3.445349	1.201083E–02, 9.883102E+02	0.6683257
			Simple mode	27.055149	1.323354E–04, 5.531258E+06	0.6121057
			Weighted mode	63.525112	7.494902E–04, 5.384246E+06	0.5144467
Kidney cancer	Total-BCAA	21	MR-Egger	0.9968743	0.9798920, 1.014151	0.7249429
			Weighted median	1.0009959	0.9905668, 1.011535	0.8522305
			Inverse variance weighted	0.9956372	0.9862209, 1.005144	0.3671496
			Simple mode	0.9899736	0.9712326, 1.009076	0.3137461
			Weighted mode	1.0011738	0.9882080, 1.014310	0.8617638

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Table S7 Heterogeneity and pleiotropy tests for MR analyses

Exposure	Outcome	Method	Heterogeneity analysis		Pleiotropy analysis			MR-PRESSO global test
			Q	P	Egger intercept	SE	P	P
Prostate cancer	Total-BCAA	MR-Egger	9.133948	0.7627534	0.7851069	0.006167418	0.4726284	0.777
Prostate cancer	Total-BCAA	IVW	9.681106	0.7851069				
Bladder cancer	Total-BCAA	MR-Egger	5.534606	0.3541661	−0.005507756	0.01209105	0.6678319	0.463
Bladder cancer	Total-BCAA	IVW	5.764294	0.4501053				
Kidney cancer	Total-BCAA	MR-Egger	37.12484	0.00765449	−0.0005491635	0.003193746	0.8652954	0.222
Kidney cancer	Total-BCAA	IVW	37.18261	0.01112570				
Prostate cancer	Leucine	MR-Egger	8.125382	0.8353370	−0.005040076	0.006114029	0.4246101	0.818
Prostate cancer	Leucine	IVW	8.804928	0.8433402				
Bladder cancer	Leucine	MR-Egger	3.167324	0.6742072	−0.006175764	0.01139242	0.6110295	0.744
Bladder cancer	Leucine	IVW	3.461191	0.7491258				
Kidney cancer	Leucine	MR-Egger	32.38134	0.02829919	4.733954E−05	0.002956918	0.9873935	0.062
Kidney cancer	Leucine	IVW	32.38178	0.03939631				
Prostate cancer	Valine	MR-Egger	11.34667	0.5818004	−0.002901478	0.006196798	0.647379	0.647379
Prostate cancer	Valine	IVW	11.56590	0.6411193				
Bladder cancer	Valine	MR-Egger	8.649398	0.1238925	−0.003844778	0.01518669	0.8102184	0.206
Bladder cancer	Valine	IVW	8.760273	0.1875158				
Kidney cancer	Valine	MR-Egger	43.40055	0.001142367	−0.0007122194	0.003469723	0.8395467	0.001
Kidney cancer	Valine	IVW	43.49680	0.001756626				
Prostate cancer	Isoleucine	MR-Egger	9.120495	0.7637834	−0.008490161	0.006257106	0.1979125	0.702
Prostate cancer	Isoleucine	IVW	10.961627	0.6890479				
Bladder cancer	Isoleucine	MR-Egger	4.189837	0.5224205	−0.003660683	0.0116595	0.7662238	0.641
Bladder cancer	Isoleucine	IVW	4.288411	0.6377094				
Kidney cancer	Isoleucine	MR-Egger	19.98218	0.3956513	−0.001341812	0.002377141	0.5790413	0.459
Kidney cancer	Isoleucine	IVW	20.31727	0.4382468				

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Table S8 The leucine-related genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F statistic
Leucine	rs11166420	1	100702216	−0.0376304	0.00674657	2.40E−08	115078	A	T	0.904404	2.70E−04	31.11029004
Leucine	rs72538440	2	65225088	0.0270867	0.00404039	2.00E−11	115078	GC	G	0.424074	3.90E−04	44.94258748
Leucine	rs13389219	2	165528876	−0.032325	0.00405851	1.70E−15	115078	T	C	0.392537	5.51E−04	63.43607128
Leucine	rs2943652	2	227108446	0.023147	0.00413238	2.10E−08	115078	T	C	0.644804	2.73E−04	31.37482943
Leucine	rs34894639	3	135798658	−0.0261434	0.0047385	3.40E−08	115078	T	C	0.231582	2.64E−04	30.43931099
Leucine	rs7656569	4	89166761	0.0562345	0.00509579	2.60E−28	115078	A	C	0.192289	1.06E−03	121.7797516
Leucine	rs150277164	4	89258580	0.11662	0.0167959	3.80E−12	115078	A	G	0.014177	4.19E−04	48.20942657
Leucine	rs10018448	4	89225171	0.0880953	0.00397749	1.10E−108	115078	G	A	0.535308	4.24E−03	490.5459979
Leucine	rs2977929	8	76454025	0.028423	0.00500802	1.40E−08	115078	T	C	0.196774	2.80E−04	32.21070075
Leucine	rs2638315	12	56865056	0.0417348	0.00511782	3.50E−16	115078	C	G	0.182489	5.78E−04	66.49961195
Leucine	rs35350651	12	111907431	−0.0233501	0.00396732	4.00E−09	115078	AC	A	0.502583	3.01E−04	34.63980819
Leucine	rs56272145	16	70201962	−0.0936928	0.00617072	4.60E−52	115078	A	G	0.125871	2.00E−03	230.5330558
Leucine	rs117643180	17	7185779	−0.117926	0.012555	5.80E−21	115078	A	C	0.025864	7.66E−04	88.22225481
Leucine	rs12974412	19	14151809	−0.0289007	0.00492156	4.30E−09	115078	G	A	0.779946	3.00E−04	34.48288611
Leucine	rs4801776	19	49304215	−0.0323134	0.00442329	2.80E−13	115078	T	C	0.299246	4.64E−04	53.36628096
Leucine	rs5747934	22	18915282	−0.0567781	0.00987699	9.00E−09	115078	T	C	0.042292	2.87E−04	33.04493749

Table S9 Two-sample MR estimates for the effect of urologic cancers on leucine

Exposure	Outcome	No. of SNP	Method	OR	95% CI	P value
Prostate cancer	Leucine	15	MR-Egger	99.14657	0.01354016, 725991.57111	0.3298044
			Weighted median	2.250969	0.24128210, 20.99974	0.4763914
			Inverse variance weighted	2.514327	0.46424810, 13.61738	0.2847432
			Simple mode	3.184188	0.03969478, 255.42534	0.6127367
			Weighted mode	2.697182	0.06022355, 120.79643	0.6169631
Bladder cancer	Leucine	7	MR-Egger	4.685705E+05	8.770170E−13, 2.503467E+23	0.5581927
			Weighted median	2.741887E+00	1.941759E−03, 3.871720E+03	0.7855378
			Inverse variance weighted	6.518906E+00	2.387179E−02, 1.780182E+03	0.5124644
			Simple mode	2.381117E−01	3.816744E−06, 1.485485E+04	0.8170963
			Weighted mode	2.737277E−01	6.127036E−06, 1.222889E+04	0.8170963
Kidney cancer	Leucine	21	MR-Egger	0.9957294	0.9800144, 1.011696	0.6040941
			Weighted median	1.0011285	0.9902448, 1.012132	0.8397367
			Inverse variance weighted	0.9958360	0.9871198, 1.004629	0.3522101
			Simple mode	0.9967214	0.9798325, 1.013901	0.7104088
			Weighted mode	0.9995755	0.9874832, 1.011816	0.9461636

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Table S10 The isoleucine-related genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F statistic
Isoleucine	rs72538440	2	65225088	0.0242404	0.00413532	4.60E−09	115079	GC	G	0.424074	2.98E−04	34.36004884
Isoleucine	rs1128249	2	165528624	−0.0302623	0.00415506	3.30E−13	115079	T	G	0.392005	4.61E−04	53.04466582
Isoleucine	rs7656569	4	89166761	0.0455643	0.00521573	2.40E−18	115079	A	C	0.192288	6.63E−04	76.31530682
Isoleucine	rs10018448	4	89225171	0.0668681	0.00407109	1.30E−60	115079	G	A	0.535312	2.34E−03	269.7795412
Isoleucine	rs2941456	8	76443463	0.0290201	0.00509347	1.20E−08	115079	A	G	0.198439	2.82E−04	32.46106441
Isoleucine	rs7302925	12	56861458	−0.0425633	0.00507292	4.80E−17	115079	G	A	0.801119	6.11E−04	70.39584224
Isoleucine	rs12325419	16	70368909	−0.074157	0.00634476	1.50E−31	115079	A	G	0.115325	1.19E−03	136.6049255
Isoleucine	rs117643180	17	7185779	−0.100079	0.0128467	6.70E−15	115079	A	C	0.025868	5.27E−04	60.68693467
Isoleucine	rs545587	19	49319664	0.0362055	0.00407282	6.10E−19	115079	C	A	0.514768	6.86E−04	79.02256417

Table S11 Two-sample MR estimates for the effect of urologic cancers on isoleucine

Exposure	Outcome	No. of SNP	Method	OR	95% CI	P value
Prostate cancer	Isoleucine	15	MR-Egger	2515.499168	0.27898676, 2.268113E+07	0.11577989
			Weighted median	3.621573	0.33499660, 3.915202E+01	0.28934250
			Inverse variance weighted	5.156913	0.91531739, 2.905413E+01	0.06293032
			Simple mode	2.012344	0.03132584, 1.292712E+02	0.74682493
			Weighted mode	1.302574	0.02710217, 6.260384E+01	0.89547049
Bladder cancer	Isoleucine	7	MR-Egger	469.92909049	3.378760E−16, 6.535929E+20	0.7844282
			Weighted median	0.17263359	1.180394E−04, 2.524781E+02	0.6478860
			Inverse variance weighted	0.62129476	1.995025E−03, 1.934849E+02	0.8709225
			Simple mode	0.05472649	6.430422E−07, 4.657531E+03	0.6365631
			Weighted mode	0.06381232	6.538788E−07, 6.227472E+03	0.6590887
Kidney cancer	Isoleucine		MR-Egger	0.9955125	0.9828620, 1.0083259	0.49897443
			Weighted median	0.9949279	0.9851044, 1.0048493	0.31517095
			Inverse variance weighted	0.9924968	0.9854490, 0.9995949	0.03831826
			Simple mode	0.9846519	0.9631857, 1.0065965	0.18423305
			Weighted mode	1.0033179	0.9875373, 1.0193506	0.68651013

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Table S12 The valine-related genetic variants used for the MR analyses

Exposure	SNP	Chr	Pos	Beta	Se	Pval	Sample size	Effect allele	Other allele	Eaf	R^2	F
Valine	rs1260326	2	27730940	−0.051522	0.00410407	3.80E−36	115052	C	T	0.603979	1.37E−03	157.5971494
Valine	rs72538440	2	65225088	0.0645082	0.00409456	6.40E−56	115052	GC	G	0.424048	2.15E−03	248.2034529
Valine	rs13389219	2	165528876	−0.0353512	0.0041127	8.30E−18	115052	T	C	0.392543	6.42E−04	73.88337217
Valine	rs2943652	2	227108446	0.0246206	0.00418772	4.10E−09	115052	T	C	0.644806	3.00E−04	34.56483141
Valine	rs34894639	3	135798658	−0.0276111	0.0048032	9.00E−09	115052	T	C	0.231573	2.87E−04	33.04444994
Valine	rs10018448	4	89225171	0.105058	0.00403086	9.51E−150	115052	G	A	0.535311	5.87E−03	679.2900905
Valine	rs12648408	4	89244131	−0.0510331	0.00928048	3.80E−08	115052	A	G	0.050797	2.63E−04	30.2381678
Valine	rs7656569	4	89166761	0.0715921	0.00516398	1.10E−43	115052	A	C	0.192297	1.67E−03	192.200074
Valine	rs6941263	6	109162094	−0.028383	0.00516214	3.80E−08	115052	A	T	0.187838	2.63E−04	30.23078938
Valine	rs17096421	10	88820592	0.0628534	0.00882799	1.10E−12	115052	T	A	0.056398	4.40E−04	50.69047212
Valine	rs2638315	12	56865056	0.0430756	0.00518824	1.00E−16	115052	C	G	0.182452	5.99E−04	68.93106777
Valine	rs36181536	12	122528263	−0.0311053	0.0042924	4.30E−13	115052	C	T	0.673511	4.56E−04	52.51227898
Valine	rs2274815	14	102718052	0.0276771	0.00497988	2.70E−08	115052	A	G	0.205058	2.68E−04	30.88843187
Valine	rs12325419	16	70368909	−0.0891001	0.00628395	1.20E−45	115052	A	G	0.115339	1.74E−03	201.0404241
Valine	rs117643180	17	7185779	−0.173468	0.0127268	2.70E−42	115052	A	C	0.025857	1.61E−03	185.7773461
Valine	rs62080209	17	79636653	−0.0317028	0.00537209	3.60E−09	115052	G	A	0.168696	3.03E−04	34.82580247
Valine	rs35230038	19	49300431	−0.0965787	0.00980718	7.00E−23	115052	A	G	0.045406	8.42E−04	96.97658091
Valine	rs117048185	19	49309776	0.191237	0.0154247	2.70E−35	115052	C	G	0.017262	1.33E−03	153.7102548
Valine	rs837616	19	49365588	−0.0245943	0.00442889	2.80E−08	115052	G	A	0.291521	2.68E−04	30.83696267
Valine	rs2238732	22	18915347	−0.0620455	0.0100133	5.80E−10	115052	T	C	0.042267	3.34E−04	38.39357667

Table S13 Two-sample MR estimates for the effect of urologic cancers on valine

Exposure	Outcome	No. of SNP	Method	OR	95% CI	P value
Prostate cancer	Valine	15	MR-Egger	34.948644	0.004230648, 288704.65039	0.45374798
			Weighted median	6.290405	0.661999283, 59.77226	0.10939538
			Inverse variance weighted	4.214190	0.760484275, 23.35275	0.09964345
			Simple mode	17.471282	0.197572078, 1544.98395	0.23148074
			Weighted mode	17.471282	0.249250560, 1224.65398	0.20825028
Bladder cancer	Valine	7	MR-Egger	4301.485301	1.003735E−20, 1.843392E+27	0.7752659
			Weighted median	76.743639	1.991868E−02, 2.956816E+05	0.2580425
			Inverse variance weighted	4.074804	4.229639E−03, 3.925638E+03	0.6885919
			Simple mode	24.306650	9.097432E−05, 6.494286E+06	0.6329014
			Weighted mode	45.019582	4.095176E−04, 4.949147E+06	0.5421258
Kidney cancer	Valine	21	MR-Egger	0.9984155	0.9799508, 1.017228	0.8695261
			Weighted median	1.0045456	0.9946809, 1.014508	0.3677209
			Inverse variance weighted	0.9968090	0.9865677, 1.007157	0.5441246
			Simple mode	0.9910360	0.9753016, 1.007024	0.2832279
			Weighted mode	1.0038224	0.9908762, 1.016938	0.5710061

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