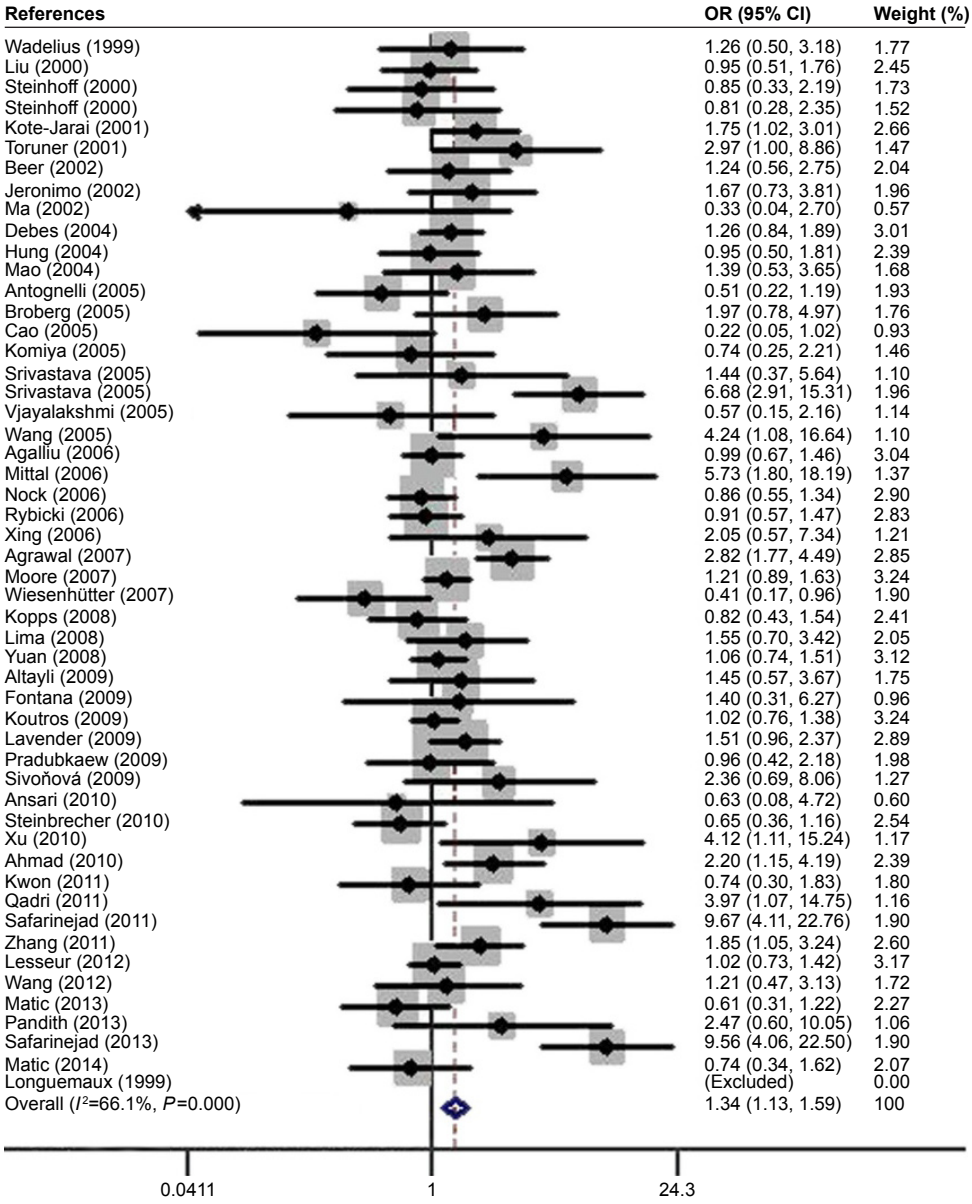

Figure S1 The forest plot of *GSTP1* (rs1695 A>G) polymorphism (GG vs AA) and urinary system cancer susceptibility.
Note: Weights are from random-effects analysis.
Abbreviations: CI, con idence intervals; OR, odds ratio.

Supplemental Table 1 Characteristics of the 51studies included in the Meta-analysis

Author	Years	Ethnicity	Cancer type	Total cases	Total Con.	AA		AG		GG		AA & AG		AG & GG	
						Cases	Con.	Cases	Con.	Cases	Con.	Cases	Con.	Cases	Con.
Agalliu[1]	2006	Caucasian, African	PCa	589	538	260	227	261	251	68	60	521	478	329	311
Agrawal[2]	2007	Asian	PCa	184	569	87	362	57	148	40	59	144	510	97	207
Pandith[3]	2013	Asian	BC	180	210	129	159	45	48	6	3	174	207	51	51
Antognelli[4]	2005	Caucasian	PCa	384	360	172	220	204	120	8	20	376	340	212	140
Rybicki[5]	2006	Caucasian, African	PCa	637	244	239	82	310	129	88	33	549	211	398	162
Lesseur[6]	2012	Caucasian	BC	658	928	294	411	289	414	75	103	583	825	364	517
Liu[7]	2000	Caucasian	RCC	130	491	58	213	56	216	16	62	114	429	72	278
Debes[8]	2004	Caucasian	PCa	425	482	162	184	194	236	69	62	356	420	263	298
Kwon[9]	2011	Asian	PCa	166	327	117	209	42	101	7	17	159	310	49	118
Mittal[10]	2006	Caucasian	PCa	54	105	16	55	28	44	10	6	44	99	38	50
Altayli[11]	2009	Caucasian	BC	135	128	75	62	46	58	14	8	121	120	60	66
Matic[12]	2014	Caucasian	BC	143	114	62	49	65	48	16	17	127	97	81	65
Mao[13]	2004	Unknown	PCa	122	135	56	70	56	56	10	9	112	126	66	65
Wang[14]	2012	Caucasian	RCC	207	236	143	173	55	54	9	9	198	227	64	63
Hung[15]	2004	Caucasian	BC	201	214	103	112	77	78	21	24	180	190	98	102
Vjayalakshmi[16]	2005	Asian	PCa	75	100	49	42	22	52	4	6	71	94	26	58
Jeronimo[17]	2002	Caucasian	PCa	105	141	45	61	44	67	16	13	89	128	60	80
Yuan[18]	2008	Caucasian	BC	657	684	301	284	274	327	82	73	575	611	356	400
Broberg[19]	2005	Caucasian	BC	61	155	24	71	27	69	10	15	51	140	37	84
Komiya[20]	2005	Asian	PCa	187	291	143	212	39	69	5	10	182	281	44	79
Kopps[21]	2008	Caucasian	BC	143	196	66	82	56	82	21	32	122	164	77	114
Kote-Jarai[22]	2001	Caucasian	PCa	273	273	117	140	115	105	41	28	232	245	156	133
Koutros[23]	2009	Unknown	PCa	1086	1098	489	531	500	464	97	103	989	995	597	567
Nock[24]	2006	Caucasian	PCa	439	479	175	207	222	214	42	58	397	421	264	272
Moore[25]	2007	Caucasian	RCC	910	1232	425	577	390	548	95	107	815	1125	485	655
Lima[26]	2008	Unknown	PCa	125	100	65	55	38	33	22	12	103	88	60	45

Longuemaux[27]	1999	Caucasian	RCC	173	211	121	146	52	65	0	0	173	211	52	65
Fontana[28]	2009	Caucasian	BC	51	45	20	28	27	13	4	4	47	41	31	17
Ma[29]	2002	Asian	BC	61	179	33	110	27	59	1	10	60	169	28	69
Matic[30]	2013	Caucasian	BC	201	122	84	49	95	52	22	21	179	101	117	73
Lavender[31]	2009	African	PCa	190	572	55	186	85	274	50	112	140	460	135	386
Pradubkaew[32]	2009	Unknown	BC	139	278	94	153	35	108	10	17	129	261	45	125
Qadri[33]	2011	Asian	PCa	50	78	26	59	17	15	7	4	43	74	24	19
Zhang[34]	2011	Asian	BC	200	200	83	92	72	81	45	27	155	173	117	108
Safarinejad[35]	2011	Asian	PCa	168	236	54	174	90	54	24	8	144	228	114	62
Safarinejad[36]	2013	Caucasian	BC	166	332	54	172	88	152	24	8	142	324	112	160
Ansari[37]	2010	Asian	PCa	65	65	40	25	23	38	2	2	63	63	25	40
Srivastava[38]	2005	Asian	PCa	127	144	46	83	77	56	4	5	123	139	81	61
Sivoňová[39]	2009	Caucasian	PCa	129	228	56	110	67	113	6	5	123	223	73	118
Srivastava[40]	2005	Caucasian	BC	106	370	33	191	58	166	15	13	91	357	73	179
Steinbrecher[41]	2010	Caucasian	PCa	238	492	125	216	95	228	18	48	220	444	113	276
Steinhoff[42]	2000	Caucasian	BC	135	127	67	70	59	46	9	11	126	116	68	57
Steinhoff[42]	2000	Caucasian	PCa	91	127	47	70	38	46	6	11	85	116	44	57
Ahmad[43]	2011	Asian	RCC	196	250	71	126	99	103	26	21	170	229	125	124
Beer[44]	2002	Caucasian	PCa	173	223	109	146	51	63	13	14	160	209	64	77
Toruner[45]	2001	Caucasian	BC	121	121	67	83	42	33	12	5	109	116	54	38
Wadelius[46]	1999	Caucasian	PCa	143	120	75	71	56	40	12	9	131	111	68	49
Cao[47]	2005	Caucasian	BC	145	170	77	93	66	66	2	11	143	159	68	77
Wiesenhütter[48]	2007	Caucasian	RCC	99	325	49	134	43	144	7	47	92	278	50	191
Xing[49]	2006	Asian	BC	108	112	59	69	42	39	7	4	101	108	49	43
Xu[50]	2010	Asian	PCa	103	103	68	70	23	30	12	3	91	100	35	33
Wang[51]	2005	Asian	PCa	108	90	41	58	58	29	9	3	99	87	67	32

PCa, prostate cancer; BC, bladder cancer; RCC, renal cell carcinoma.

References

1. Agalliu I, Langeberg WJ, Lampe JW, Salinas CA, Stanford JL. Glutathione S-transferase M1, T1, and P1 polymorphisms and prostate cancer risk in middle-aged men. *Prostate.* 2006;66(2):146-156.
2. Agrawal S, Tripathi G, Khan F, Sharma R, Baburaj VP. Relationship between GSTs gene polymorphism and susceptibility to end stage renal disease among North Indians. *Ren Fail.* 2007;29(8):947-953.
3. Pandith AA, Lateef A, Shahnawaz S, et al. GSTP1 gene Ile105Val polymorphism causes an elevated risk for bladder carcinogenesis in smokers. *Asian Pac J Cancer Prev.* 2013;14(11):6375-6378.
4. Antognelli C, Mearini L, Talesa VN, Giannantoni A, Mearini E. Association of CYP17, GSTP1, and PON1 polymorphisms with the risk of prostate cancer. *Prostate.* 2005;63(3):240-251.
5. Rybicki BA, Neslund-Dudas C, Nock NL, et al. Prostate cancer risk from occupational exposure to polycyclic aromatic hydrocarbons interacting with the GSTP1 Ile105Val polymorphism. *Cancer Detect Prev.* 2006;30(5):412-422.
6. Lesseur C, Gilbert-Diamond D, Andrew AS, et al. A case-control study of polymorphisms in xenobiotic and arsenic metabolism genes and arsenic-related bladder cancer in New Hampshire. *Toxicol Lett.* 2012;210(1):100-106.
7. Liu K, Zhang L, Chen J, Hu Z, Cai G, Hong Q. Association of MeCP2 (rs2075596, rs2239464) genetic polymorphisms with systemic lupus erythematosus: a meta-analysis. *Lupus.* 2013;22(9):908-918.

8. Debes JD, Yokomizo A, McDonnell SK, et al. Gluthatione-S-transferase P1 polymorphism I105V in familial and sporadic prostate cancer. *Cancer Genet Cytogenet.* 2004;155(1):82-86.

9. Kwon DD, Lee JW, Han DY, et al. Relationship between the Glutathione-S-Transferase P1, M1, and T1 Genotypes and Prostate Cancer Risk in Korean Subjects. *Korean J Urol.* 2011;52(4):247-252.

10. Mittal RD MD, Mandhani A, et al. Evaluating polymorphic status of glutathione-S-transferase genes in blood and tissue samples of prostate cancer patients. *Asian Pacific J Cancer Prev.* 2006;7(3):444-446.

11. Altayli E, Gunes S, Yilmaz AF, Goktas S, Bek Y. CYP1A2, CYP2D6, GSTM1, GSTP1, and GSTT1 gene polymorphisms in patients with bladder cancer in a Turkish population. *Int Urol Nephrol.* 2009;41(2):259-266.

12. Matic MG, Coric VM, Savic-Radojevic AR, et al. Does occupational exposure to solvents and pesticides in association with glutathione S-transferase A1, M1, P1, and T1 polymorphisms increase the risk of bladder cancer? The Belgrade case-control study. *PLoS One.* 2014;9(6):e99448.

13. Mao GE, Morris G, Lu QY, et al. Glutathione S-transferase P1 Ile105Val polymorphism, cigarette smoking and prostate cancer. *Cancer Detect Prev.* 2004;28(5):368-374.

14. Wang G, Hou J, Ma L, et al. Risk factor for clear cell renal cell carcinoma in Chinese population: a case-control study. *Cancer Epidemiol.* 2012;36(2):177-182.

15. Hung RJ, Boffetta P, Brennan P, et al. GST, NAT, SULT1A1, CYP1B1 genetic polymorphisms, interactions with environmental exposures and bladder cancer risk in a high-risk population. *Int J Cancer.* 2004;110(4):598-604.

16. Vijayalakshmi K VV, Krishnan M, et al. Polymorphisms at GSTM1 and GSTP1 gene loci and risk of prostate cancer in a South Indian population. *Asian Pacific J Cancer Prev.* 2005;6(3):309-314.

17. Jeronimo C VG, Henrique R, et al. I105V Polymorphism and promoter methylation of the GSTP1 Gene in Prostate Adenocarcinoma. *Cancer Epidemio Biomarkers Prev.* 2002;11(5):445-450.

18. Yuan JM, Chan KK, Coetzee GA, et al. Genetic determinants in the metabolism of bladder carcinogens in relation to risk of bladder cancer. *Carcinogenesis.* 2008;29(7):1386-1393.

19. Broberg K, Bjork J, Paulsson K, Hoglund M, Albin M. Constitutional short telomeres are strong genetic susceptibility markers for bladder cancer. *Carcinogenesis.* 2005;26(7):1263-1271.

20. Komiya Y, Tsukino H, Nakao H, Kuroda Y, Imai H, Katoh T. Human glutathione S-transferase A1, T1, M1, and P1 polymorphisms and susceptibility to prostate cancer in the Japanese population. *J Cancer Res Clin Oncol.* 2005;131(4):238-242.

21. Kopps S, Angeli-Greaves M, Blaszkewicz M, et al. Glutathione S-transferase P1 ILE105Val polymorphism in occupationally exposed bladder cancer cases. *J Toxicol Environ Health A.* 2008;71(13-14):898-901.

22. Kote-Jarai Z, Easton D, Edwards SM, et al. Relationship between glutathione S-transferase M1, P1 and T1 polymorphisms and early

onset prostate cancer. *Pharmacogenetics.* 2001;11(4):325-330.

23. Koutros S, Berndt SI, Sinha R, et al. Xenobiotic metabolizing gene variants, dietary heterocyclic amine intake, and risk of prostate cancer. *Cancer Res.* 2009;69(5):1877-1884.

24. Nock NL, Liu X, Cicek MS, et al. Polymorphisms in polycyclic aromatic hydrocarbon metabolism and conjugation genes, interactions with smoking and prostate cancer risk. *Cancer Epidemio Biomarkers Prev.* 2006;15(4):756-761.

25. Moore LE, Brennan P, Karami S, et al. Glutathione S-transferase polymorphisms, cruciferous vegetable intake and cancer risk in the Central and Eastern European Kidney Cancer Study. *Carcinogenesis.* 2007;28(9):1960-1964.

26. Lima MM, Oliveira MN, Granja F, et al. Lack of association of GSTT1, GSTM1, GSTO1, GSTP1 and CYP1A1 polymorphisms for susceptibility and outcome in Brazilian prostate cancer patients. *Folia Biol.* 2008;54(3):102-108.

27. Longuemaux S, Deloménie C, Gallou C, et al. Candidate genetic modifiers of individual susceptibility to renal cell carcinoma_ a study of polymorphic human xenobiotic-metabolizing enzymes. *Cancer Res.* 1999;59(12):2903-2908.

28. Fontana L, Delort L, Jomard L, et al. Genetic polymorphisms in CYP1A1, CYP1B1, COMT, GSTP1 and NAT2 genes and association with bladder cancer risk in a French cohor. *Anticancer Res.* 2009;29(5):1631-5.

29. Ma QW, Ling GF, Chen JG, et al. Polymorphism of Glutathione S-transferase T1, M1 and P1 Genes. *Biomed Environ Sci.* 2002;15(3):253-260.

30. Matic M, Pekmezovic T, Djukic T, et al. GSTA1, GSTM1, GSTP1, and GSTT1 polymorphisms and susceptibility to smoking-related bladder cancer: a case-control study. *Urol Oncol.* 2013;31(7):1184-1192.

31. Lavender NA, Benford ML, VanCleave TT, et al. Examination of polymorphic glutathione S-transferase (GST) genes, tobacco smoking and prostate cancer risk among men of African descent: a case-control study. *BMC cancer.* 2009;9:397.

32. Pradubkaew K, Pramyothin P, Limwongse C, et al. Glutathione S-transferase polymorphisms and risk of bladder cancer in Thais. *Thai J Pharm Sci.* 2009;33(2-3):67-73.

33. Qadri Q, Sameer AS, Shah ZA, et al. Genetic polymorphism of the glutathione-S-transferase P1 gene (GSTP1) and susceptibility to prostate cancer in the Kashmiri population. *Genet Mol Res.* 2011;10(4):3038-3045.

34. Zhang R, Xu G, Chen W, Zhang W. Genetic polymorphisms of glutathione S-transferase P1 and bladder cancer susceptibility in a Chinese population. *Genet Test Mol Biomarkers.* 2011;15(1-2):85-88.

35. Safarinejad MR, Shafiei N, Safarinejad SH. Glutathione S-transferase gene polymorphisms (GSTM1, GSTT1, GSTP1) and prostate cancer: a case-control study in Tehran, Iran. *Prostate Cancer Prostatic Dis.* 2011;14(2):105-113.

36. Safarinejad MR, Safarinejad S, Shafiei N, Safarinejad S. Association of genetic polymorphism of glutathione S-transferase (GSTM1, GSTT1, GSTP1) with bladder cancer susceptibility. *Urol Oncol.* 2013;31(7):1193-1203.

37. Ansari SB, Vasudevan R, Bakhshi A, et al. Analysis of glutathione S-transferase (M1, T1 and P1) gene polyorphisms in Iranian prostate

cancer subjects. *Afr J Biotechnol.* 2010;9(43):7230-7235.

38. Srivastava DS, Mandhani A, Mittal B, Mittal RD. Genetic polymorphism of glutathione S-transferase genes (GSTM1, GSTT1 and GSTP1) and susceptibility to prostate cancer in Northern India. *BJU Int.* 2005;95(1):170-173.

39. Sivonova M, Waczulikova I, Dobrota D, et al. Polymorphisms of glutathione-S-transferase M1, T1, P1 and the risk of prostate cancer: a case-control study. *J Exp Clin Cancer Res.* 2009;28:32.

40. Srivastava DS, Mishra DK, Mandhani A, Mittal B, Kumar A, Mittal RD. Association of genetic polymorphism of glutathione S-transferase M1, T1, P1 and susceptibility to bladder cancer. *Eur Urol.* 2005;48(2):339-344.

41. Steinbrecher A, Rohrmann S, Timofeeva M, Risch A, Jansen E, Linseisen J. Dietary glucosinolate intake, polymorphisms in selected biotransformation enzymes, and risk of prostate cancer. *Cancer Epidemio Biomarkers Prev.* 2010;19(1):135-143.

42. Steinhoff C, Franke KH, Golka K, et al. Glutathione transferase isozyme genotypes in patients with prostate and bladder carcinoma. *Arch Toxicol.* 2000;74(9):521-526.

43. Ahmad ST, Arjumand W, Seth A, Kumar Saini A, Sultana S. Impact of glutathione transferase M1, T1, and P1 gene polymorphisms in the genetic susceptibility of North Indian population to renal cell carcinoma. *DNA Cell Biol.* 2012;31(4):636-643.

44. Beer TM, Evans AJ, Hough KM, Lowe BA, McWilliams JE, Henner WD. Polymorphisms of GSTP1 and related genes and prostate cancer risk. *Prostate Cancer Prostatic Dis.* 2002;5(1):22-27.

45. Toruner GA, Akyerli C, Ucar A, et al. Polymorphisms of glutathione S-transferase genes(GSTM1, GSTP1 and GSTT1) and bladder cancer susceptibility in the Turkish population. *Arch Toxicol.* 2001;75(8):459-464.

46. Wadelius M, Autrup JL, Stubbins MJ, et al. Polymorphisms in NAT2, CYP2D6, CYP2C19 and GSTP1 and their association with prostate cancer. *Pharmacogenetics.* 1999;9(3):333-340.

47. Cao W, Cai L, Rao JY, et al. Tobacco smoking, GSTP1 polymorphism, and bladder carcinoma. *Cancer.* 2005;104(11):2400-2408.

48. Wiesenhutter B, Selinski S, Golka K, Bruning T, Bolt HM. Re-assessment of the influence of polymorphisms of phase-II metabolic enzymes on renal cell cancer risk of trichloroethylene-exposed workers. Int Arch Occup Environ Health. 2007;81(2):247-251.

49. Xing DL. Association study of polymorphisms in the human drug metabolism enzyme gene and bladder cancer risk. *Zhengzhou University: thesis.* 2006.

50. Xu XX, Cao W, Hou JG, et al. Relatioship of GSTP1, RASSF1A polymorphisms and enviromental agent with susceptibility to prostate cancer: a case-control study. *Acad J Sec Mil Med Univ.* 2010;31(1):12-17.

51. Wang YL. Relationship between glutathione S-transferase TM1,T1 and P1 polymorphisms and prostate cancer risk in Chinese populaiton. *Chinese Third Milltary Medical University: thesis*, 2005.