



Supplementary Material

Genomic Analysis of Glutathione S-transferases (GST) Family in Common Carp: Identification, Phylogeny and Expression

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Supplementary Fig. S1. Sequence alignment of predicted common carp GST amino acid sequences and zebrafish GST genes.

Supplementary Table SI.- Percent identity matrix between GST genes from common carp and zebrafish.

	Dr_ GSTR	Cc_ GSTR1	Cc_ GSTR2	Cc_ GSTM3c	Dr_ GSTM3c	Dr_ GSTM3a	Dr_ GSTM3b	Cc_ GSTM3d	Cc_ GSTM3a	Cc_ GSTM3b
Dr_GSTR	100.00	85.40	85.84	12.77	16.99	15.53	16.50	14.94	15.05	15.05
Cc_GSTR1	85.40	100.00	96.02	11.70	17.96	16.02	15.53	15.52	15.53	15.53
Cc_GSTR2	85.84	96.02	100.00	11.70	17.96	16.02	15.53	15.52	15.53	15.53
Cc_GSTM3c	12.77	11.70	11.70	100.00	87.00	82.00	81.00	85.29	87.00	86.00
Dr_GSTM3c	16.99	17.96	17.96	87.00	100.00	85.84	83.11	88.24	89.04	87.67
Dr_GSTM3a	15.53	16.02	16.02	82.00	85.84	100.00	94.52	92.51	93.61	90.87
Dr_GSTM3b	16.50	15.53	15.53	81.00	83.11	94.52	100.00	88.77	89.50	86.76
Cc_GSTM3d	14.94	15.52	15.52	85.29	88.24	92.51	88.77	100.00	94.12	92.51
Cc_GSTM3a	15.05	15.53	15.53	87.00	89.04	93.61	89.50	94.12	100.00	96.80
Cc_GSTM3b	15.05	15.53	15.53	86.00	87.67	90.87	86.76	92.51	96.80	100.00
Cc_GSTP	25.24	24.27	23.79	26.60	30.24	28.29	29.27	27.17	26.83	27.80
Dr_GSTP1	25.24	23.79	23.30	26.60	29.27	27.80	28.29	26.59	27.32	27.80
Dr_GSTP2	23.79	23.30	22.82	24.47	30.24	28.78	28.78	28.32	28.29	28.78
Dr_GSTA1	16.67	15.71	15.71	16.00	24.53	23.58	22.64	25.56	23.11	23.11
Dr_GSTA2	17.62	16.67	16.67	15.00	23.11	23.58	22.64	24.44	22.17	22.17
Dr_GSTA3	17.62	16.67	16.67	15.00	22.64	23.58	22.64	25.56	22.17	22.17
Cc_GSTA1	18.10	16.67	16.67	16.00	23.11	21.70	20.75	23.33	20.75	20.75
Cc_GSTA2	17.14	15.71	15.71	16.00	23.11	23.58	22.64	25.00	22.64	22.64
Dr_GSTT2	19.91	18.96	18.48	16.67	16.33	16.33	15.31	16.36	15.82	16.84
Cc_GSTT2a	19.05	18.10	17.62	15.66	15.38	14.87	14.87	15.76	14.87	15.90
Cc_GSTT2b	19.52	18.57	18.10	15.66	15.38	14.87	14.87	15.76	14.87	15.90
Cc_GSTT1a	17.59	18.06	17.59	15.46	19.81	19.32	19.32	17.61	19.32	19.81
Dr_GSTT1a	19.19	19.19	19.19	21.28	21.02	20.38	21.66	18.25	20.38	19.75
Dr_GSTT1b	21.30	21.76	21.30	14.58	16.50	16.50	16.99	14.29	16.50	16.50
Cc_GSTT1b1	20.37	19.44	18.98	15.62	18.45	18.45	18.93	17.14	18.45	18.45
Cc_GSTT1b2	19.91	19.44	18.98	14.58	16.99	16.50	16.99	14.86	16.50	16.50
Cc_GSTZ1	22.06	23.53	23.53	9.41	12.11	12.63	14.21	12.58	12.11	12.11
Dr_GSTZ1	23.04	24.51	24.51	10.59	14.21	13.16	14.74	14.47	13.68	13.68
Cc_GSTO2	18.84	20.29	20.29	16.48	15.54	15.54	16.58	15.43	14.51	15.03
Dr_GSTO2	18.84	19.32	19.32	17.58	16.06	16.06	17.10	15.43	15.03	15.54
Cc_GSTO1	19.32	20.77	20.77	24.18	18.13	18.13	19.17	16.05	17.62	18.13
Dr_GSTO1	19.32	20.29	20.29	20.88	17.10	17.10	18.13	15.43	16.06	17.62
Cc_GSTK1c	11.11	11.11	11.11	10.26	10.79	10.07	9.35	9.26	9.35	9.35
Dr_GSTK1c	10.84	8.43	8.43	8.16	9.21	10.53	10.53	9.92	9.87	10.53
Dr_GSTK1d	11.66	9.20	9.20	10.87	10.74	11.41	11.41	10.17	10.74	11.41
Dr_GSTK1b	12.28	9.94	9.94	11.32	10.83	10.19	10.83	7.94	9.55	9.55
Cc_GSTK1d	9.29	8.57	8.57	10.91	11.63	11.63	11.63	12.24	10.85	10.85
Cc_GSTK1b	11.83	11.83	11.83	7.84	9.03	10.32	8.39	8.06	9.03	9.03
Cc_GSTK1a	10.40	10.40	10.40	9.09	10.06	10.06	8.81	10.16	9.43	8.81
Dr_GSTK1a	10.40	10.40	10.40	9.09	8.81	8.81	7.55	9.38	8.18	7.55
Dr_MGST1.1	2.70	2.70	2.70	nan	2.56	2.56	2.56	2.56	2.56	2.56
Cc_MGST1.1a	2.70	2.70	2.70	nan	2.56	2.56	2.56	2.56	2.56	2.56
Cc_MGST1.1b	2.70	2.70	2.70	nan	2.56	2.56	2.56	2.56	2.56	2.56
Cc_MGST1.2	5.41	5.41	5.41	nan	5.13	5.13	5.13	5.13	5.13	5.13
Dr_MGST1.2	5.41	5.41	5.41	nan	5.13	5.13	5.13	5.13	5.13	5.13
Cc_MGST2	12.24	12.24	14.29	16.67	9.26	11.11	7.41	11.11	11.11	11.11
Dr_MGST2	22.22	16.67	16.67	nan	11.11	11.11	11.11	11.11	11.11	11.11
Cc_MGST3.1	16.36	14.55	14.55	0.00	5.17	5.17	5.17	3.45	5.17	6.90
Dr_MGST3.1	11.76	13.73	13.73	0.00	5.56	5.56	1.85	3.70	5.56	5.56
Cc_MGST3.2	19.51	17.07	17.07	0.00	6.82	6.82	11.36	9.09	6.82	6.82

Dr_MGST3.2	14.63	12.20	12.20	0.00	6.82	9.09	13.64	11.36	9.09	6.82
	Cc_	Dr_	Dr_	Dr_	Dr_	Dr_	Cc_	Cc_	Dr_	Cc_
	GSTP	GSTP1	GSTP2	GSTA1	GSTA2	GSTA3	GSTA1	GSTA2	GSTT2	GSTT2a
Dr_GSTR	25.24	25.24	23.79	16.67	17.62	17.62	18.10	17.14	19.91	19.05
Cc_GSTR1	24.27	23.79	23.30	15.71	16.67	16.67	16.67	15.71	18.96	18.10
Cc_GSTR2	23.79	23.30	22.82	15.71	16.67	16.67	16.67	15.71	18.48	17.62
Cc_GSTM3c	26.60	26.60	24.47	16.00	15.00	15.00	16.00	16.00	16.67	15.66
Dr_GSTM3c	30.24	29.27	30.24	24.53	23.11	22.64	23.11	23.11	16.33	15.38
Dr_GSTM3a	28.29	27.80	28.78	23.58	23.58	23.58	21.70	23.58	16.33	14.87
Dr_GSTM3b	29.27	28.29	28.78	22.64	22.64	22.64	20.75	22.64	15.31	14.87
Cc_GSTM3d	27.17	26.59	28.32	25.56	24.44	25.56	23.33	25.00	16.36	15.76
Cc_GSTM3a	26.83	27.32	28.29	23.11	22.17	22.17	20.75	22.64	15.82	14.87
Cc_GSTM3b	27.80	27.80	28.78	23.11	22.17	22.17	20.75	22.64	16.84	15.90
Cc_GSTP	100.00	85.10	81.25	27.67	28.64	26.70	29.13	28.16	18.37	17.95
Dr_GSTP1	85.10	100.00	87.02	28.64	30.58	28.64	29.61	28.64	18.88	19.49
Dr_GSTP2	81.25	87.02	100.00	28.16	30.10	28.16	28.64	29.13	19.90	20.00
Dr_GSTA1	27.67	28.64	28.16	100.00	91.48	91.03	78.48	80.27	16.50	17.59
Dr_GSTA2	28.64	30.58	30.10	91.48	100.00	93.27	76.68	80.27	16.00	16.58
Dr_GSTA3	26.70	28.64	28.16	91.03	93.27	100.00	79.37	82.51	16.00	16.58
Cc_GSTA1	29.13	29.61	28.64	78.48	76.68	79.37	100.00	88.79	17.50	17.59
Cc_GSTA2	28.16	28.64	29.13	80.27	80.27	82.51	88.79	100.00	16.50	17.59
Dr_GSTT2	18.37	18.88	19.90	16.50	16.00	16.00	17.50	16.50	100.00	85.02
Cc_GSTT2a	17.95	19.49	20.00	17.59	16.58	16.58	17.59	17.59	85.02	100.00
Cc_GSTT2b	17.95	19.49	20.00	17.09	16.08	16.08	17.09	17.09	85.90	99.12
Cc_GSTT1a	19.00	19.00	19.50	14.49	15.89	14.95	14.95	14.49	43.75	43.95
Dr_GSTT1a	19.87	20.51	21.15	16.35	17.61	16.98	17.61	16.98	48.31	46.89
Dr_GSTT1b	19.00	19.00	19.50	14.55	15.96	15.02	14.55	14.55	43.30	41.70
Cc_GSTT1b1	19.50	19.50	20.50	14.08	15.49	14.55	15.02	15.02	39.73	38.57
Cc_GSTT1b2	20.00	19.50	20.50	15.02	16.43	15.49	15.96	15.96	39.73	39.01
Cc_GSTZ1	14.89	14.89	16.49	21.47	20.94	20.94	21.47	21.99	20.60	22.22
Dr_GSTZ1	14.89	14.89	15.43	21.47	21.47	21.47	20.42	21.47	21.61	22.22
Cc_GSTO2	15.38	16.41	17.44	16.75	16.75	17.77	15.74	16.24	18.96	17.62
Dr_GSTO2	15.38	16.41	16.41	17.77	17.77	18.78	16.75	17.77	18.96	18.10
Cc_GSTO1	16.41	16.41	16.92	17.77	17.77	18.78	17.77	18.27	18.96	18.10
Dr_GSTO1	18.46	17.95	18.46	18.27	18.27	19.29	18.27	18.78	19.91	19.52
Cc_GSTK1c	9.63	11.85	13.33	12.95	12.23	12.23	15.11	13.67	17.42	16.23
Dr_GSTK1c	8.11	8.78	7.43	14.47	15.79	15.13	17.11	15.79	13.69	14.37
Dr_GSTK1d	8.97	9.66	8.28	13.42	14.09	14.09	16.11	14.77	13.94	14.63
Dr_GSTK1b	7.84	8.50	7.84	10.83	10.19	10.19	12.74	11.46	13.87	13.37
Cc_GSTK1d	10.48	11.29	11.29	11.02	10.24	10.24	13.39	12.60	17.02	16.43
Cc_GSTK1b	7.95	8.61	7.95	12.26	11.61	11.61	13.55	11.61	16.37	15.29
Cc_GSTK1a	6.45	7.10	9.03	11.95	11.32	11.32	12.58	11.95	16.00	16.09
Dr_GSTK1a	7.74	8.39	8.39	11.95	11.32	11.32	13.84	11.95	16.57	14.94
Dr_MGST1.1	2.78	2.78	2.78	5.41	5.41	5.41	5.41	5.41	5.13	7.69
Cc_MGST1.1a	0.00	0.00	0.00	5.41	5.41	5.41	5.41	5.41	5.13	7.69
Cc_MGST1.1b	2.78	2.78	2.78	5.41	5.41	5.41	5.41	5.41	2.56	5.13
Cc_MGST1.2	2.78	2.78	2.78	10.81	13.51	13.51	13.51	13.51	5.13	7.69
Dr_MGST1.2	5.56	5.56	5.56	8.11	10.81	10.81	10.81	10.81	5.13	7.69
Cc_MGST2	2.04	6.12	8.16	18.00	20.00	20.00	22.00	22.00	7.84	7.84
Dr_MGST2	10.53	10.53	10.53	25.00	25.00	25.00	25.00	25.00	5.00	5.00
Cc_MGST3.1	5.77	11.54	11.54	12.96	12.96	12.96	11.11	11.11	1.75	3.51
Dr_MGST3.1	2.08	4.17	6.25	10.00	10.00	10.00	10.00	10.00	1.89	1.89
Cc_MGST3.2	13.16	10.53	5.26	10.00	12.50	12.50	15.00	12.50	11.63	11.63

Dr_MGST3.2	10.53	7.89	2.63	5.00	5.00	5.00	7.50	5.00	13.95	11.63
	Cc_	Cc_GST-	Dr_	Dr_	Cc_	Cc_	Cc_	Dr_	Cc_	Dr_
	GSTT2b	T1a	GSTT1a	GSTT1b	GSTT1b1	GSTT1b2	GSTZ1	GSTZ1	GSTO2	GSTO2
Dr_GSTR	19.52	17.59	19.19	21.30	20.37	19.91	22.06	23.04	18.84	18.84
Cc_GSTR1	18.57	18.06	19.19	21.76	19.44	19.44	23.53	24.51	20.29	19.32
Cc_GSTR2	18.10	17.59	19.19	21.30	18.98	18.98	23.53	24.51	20.29	19.32
Cc_GSTM3c	15.66	15.46	21.28	14.58	15.62	14.58	9.41	10.59	16.48	17.58
Dr_GSTM3c	15.38	19.81	21.02	16.50	18.45	16.99	12.11	14.21	15.54	16.06
Dr_GSTM3a	14.87	19.32	20.38	16.50	18.45	16.50	12.63	13.16	15.54	16.06
Dr_GSTM3b	14.87	19.32	21.66	16.99	18.93	16.99	14.21	14.74	16.58	17.10
Cc_GSTM3d	15.76	17.61	18.25	14.29	17.14	14.86	12.58	14.47	15.43	15.43
Cc_GSTM3a	14.87	19.32	20.38	16.50	18.45	16.50	12.11	13.68	14.51	15.03
Cc_GSTM3b	15.90	19.81	19.75	16.50	18.45	16.50	12.11	13.68	15.03	15.54
Cc_GSTP	17.95	19.00	19.87	19.00	19.50	20.00	14.89	14.89	15.38	15.38
Dr_GSTP1	19.49	19.00	20.51	19.00	19.50	19.50	14.89	14.89	16.41	16.41
Dr_GSTP2	20.00	19.50	21.15	19.50	20.50	20.50	16.49	15.43	17.44	16.41
Dr_GSTA1	17.09	14.49	16.35	14.55	14.08	15.02	21.47	21.47	16.75	17.77
Dr_GSTA2	16.08	15.89	17.61	15.96	15.49	16.43	20.94	21.47	16.75	17.77
Dr_GSTA3	16.08	14.95	16.98	15.02	14.55	15.49	20.94	21.47	17.77	18.78
Cc_GSTA1	17.09	14.95	17.61	14.55	15.02	15.96	21.47	20.42	15.74	16.75
Cc_GSTA2	17.09	14.49	16.98	14.55	15.02	15.96	21.99	21.47	16.24	17.77
Dr_GSTT2	85.90	43.75	48.31	43.30	39.73	39.73	20.60	21.61	18.96	18.96
Cc_GSTT2a	99.12	43.95	46.89	41.70	38.57	39.01	22.22	22.22	17.62	18.10
Cc_GSTT2b	100.00	43.95	46.89	41.70	38.57	39.01	22.73	22.73	18.10	18.57
Cc_GSTT1a	43.95	100.00	86.52	59.75	60.17	60.58	21.57	19.61	16.04	16.51
Dr_GSTT1a	46.89	86.52	100.00	65.17	64.04	65.17	27.27	24.85	16.15	16.77
Dr_GSTT1b	41.70	59.75	65.17	100.00	76.45	77.27	21.57	22.06	16.98	17.92
Cc_GSTT1b1	38.57	60.17	64.04	76.45	100.00	91.74	21.57	20.59	15.09	16.04
Cc_GSTT1b2	39.01	60.58	65.17	77.27	91.74	100.00	21.08	21.57	16.04	16.98
Cc_GSTZ1	22.73	21.57	27.27	21.57	21.57	21.08	100.00	88.89	25.47	24.06
Dr_GSTZ1	22.73	19.61	24.85	22.06	20.59	21.57	88.89	100.00	26.44	25.00
Cc_GSTO2	18.10	16.04	16.15	16.98	15.09	16.04	25.47	26.44	100.00	87.50
Dr_GSTO2	18.57	16.51	16.77	17.92	16.04	16.98	24.06	25.00	87.50	100.00
Cc_GSTO1	18.57	16.98	19.25	19.81	18.40	19.34	24.06	24.04	72.92	76.25
Dr_GSTO1	20.00	17.92	18.63	19.81	17.45	18.87	24.06	24.04	73.33	73.75
Cc_GSTK1c	16.23	13.91	17.88	15.89	15.89	16.56	13.33	12.67	10.74	11.41
Dr_GSTK1c	14.37	12.80	15.43	12.80	13.41	14.02	14.11	14.11	10.49	11.73
Dr_GSTK1d	14.63	11.18	14.29	12.42	13.04	13.66	13.75	13.75	10.69	11.95
Dr_GSTK1b	13.37	13.02	14.72	12.43	14.79	15.38	12.79	11.24	11.17	12.29
Cc_GSTK1d	16.43	14.89	18.80	14.89	14.89	15.60	12.23	11.51	11.19	13.43
Cc_GSTK1b	15.29	12.57	15.34	13.77	16.17	16.17	15.06	14.46	11.52	12.73
Cc_GSTK1a	16.09	11.70	15.34	13.45	14.04	14.62	13.53	12.94	11.24	11.83
Dr_GSTK1a	14.94	12.28	14.11	10.53	12.87	13.45	11.76	11.18	11.83	12.43
Dr_MGST1.1	7.69	11.43	11.43	8.57	8.57	8.57	9.30	10.26	14.81	14.81
Cc_MGST1.1a	7.69	11.43	11.43	8.57	8.57	8.57	13.95	12.82	12.96	12.96
Cc_MGST1.1b	5.13	8.57	8.57	5.71	5.71	5.71	11.63	10.26	14.81	14.81
Cc_MGST1.2	7.69	14.29	14.29	11.43	11.43	11.43	9.30	10.26	14.81	14.81
Dr_MGST1.2	7.69	11.43	11.43	8.57	8.57	8.57	9.30	10.26	16.67	16.67
Cc_MGST2	7.84	4.26	2.56	6.38	6.38	6.38	3.64	3.92	10.77	10.77
Dr_MGST2	5.00	12.50	12.50	18.75	18.75	18.75	9.09	11.11	8.82	8.82
Cc_MGST3.1	3.51	1.89	2.08	1.89	1.89	1.89	9.84	10.53	5.71	5.71
Dr_MGST3.1	1.89	2.04	2.08	4.08	2.04	2.04	8.77	9.43	7.58	7.58
Cc_MGST3.2	11.63	10.26	10.26	10.26	10.26	10.26	10.64	11.63	12.50	12.50

Dr_MGST3.2	11.63	10.26	10.26	12.82	12.82	12.82	6.38	9.30	14.29	12.50
	Cc_ GSTO1	Dr_ GSTO1	Cc_ GSTK1c	Dr_ GSTK1c	Dr_ GSTK1d	Dr_ GSTK1b	Cc_ GSTK1d	Cc_ GSTK1b	Cc_ GSTK1a	Dr_ GSTK1a
Dr_GSTR	19.32	19.32	11.11	10.84	11.66	12.28	9.29	11.83	10.40	10.40
Cc_GSTR1	20.77	20.29	11.11	8.43	9.20	9.94	8.57	11.83	10.40	10.40
Cc_GSTR2	20.77	20.29	11.11	8.43	9.20	9.94	8.57	11.83	10.40	10.40
Cc_GSTM3c	24.18	20.88	10.26	8.16	10.87	11.32	10.91	7.84	9.09	9.09
Dr_GSTM3c	18.13	17.10	10.79	9.21	10.74	10.83	11.63	9.03	10.06	8.81
Dr_GSTM3a	18.13	17.10	10.07	10.53	11.41	10.19	11.63	10.32	10.06	8.81
Dr_GSTM3b	19.17	18.13	9.35	10.53	11.41	10.83	11.63	8.39	8.81	7.55
Cc_GSTM3d	16.05	15.43	9.26	9.92	10.17	7.94	12.24	8.06	10.16	9.38
Cc_GSTM3a	17.62	16.06	9.35	9.87	10.74	9.55	10.85	9.03	9.43	8.18
Cc_GSTM3b	18.13	17.62	9.35	10.53	11.41	9.55	10.85	9.03	8.81	7.55
Cc_GSTP	16.41	18.46	9.63	8.11	8.97	7.84	10.48	7.95	6.45	7.74
Dr_GSTP1	16.41	17.95	11.85	8.78	9.66	8.50	11.29	8.61	7.10	8.39
Dr_GSTP2	16.92	18.46	13.33	7.43	8.28	7.84	11.29	7.95	9.03	8.39
Dr_GSTA1	17.77	18.27	12.95	14.47	13.42	10.83	11.02	12.26	11.95	11.95
Dr_GSTA2	17.77	18.27	12.23	15.79	14.09	10.19	10.24	11.61	11.32	11.32
Dr_GSTA3	18.78	19.29	12.23	15.13	14.09	10.19	10.24	11.61	11.32	11.32
Cc_GSTA1	17.77	18.27	15.11	17.11	16.11	12.74	13.39	13.55	12.58	13.84
Cc_GSTA2	18.27	18.78	13.67	15.79	14.77	11.46	12.60	11.61	11.95	11.95
Dr_GSTT2	18.96	19.91	17.42	13.69	13.94	13.87	17.02	16.37	16.00	16.57
Cc_GSTT2a	18.10	19.52	16.23	14.37	14.63	13.37	16.43	15.29	16.09	14.94
Cc_GSTT2b	18.57	20.00	16.23	14.37	14.63	13.37	16.43	15.29	16.09	14.94
Cc_GSTT1a	16.98	17.92	13.91	12.80	11.18	13.02	14.89	12.57	11.70	12.28
Dr_GSTT1a	19.25	18.63	17.88	15.43	14.29	14.72	18.80	15.34	15.34	14.11
Dr_GSTT1b	19.81	19.81	15.89	12.80	12.42	12.43	14.89	13.77	13.45	10.53
Cc_GSTT1b1	18.40	17.45	15.89	13.41	13.04	14.79	14.89	16.17	14.04	12.87
Cc_GSTT1b2	19.34	18.87	16.56	14.02	13.66	15.38	15.60	16.17	14.62	13.45
Cc_GSTZ1	24.06	24.06	13.33	14.11	13.75	12.79	12.23	15.06	13.53	11.76
Dr_GSTZ1	24.04	24.04	12.67	14.11	13.75	11.24	11.51	14.46	12.94	11.18
Cc_GSTO2	72.92	73.33	10.74	10.49	10.69	11.17	11.19	11.52	11.24	11.83
Dr_GSTO2	76.25	73.75	11.41	11.73	11.95	12.29	13.43	12.73	11.83	12.43
Cc_GSTO1	100.00	85.83	13.42	13.58	13.84	15.64	14.93	14.55	13.61	12.43
Dr_GSTO1	85.83	100.00	11.41	12.35	12.58	13.97	13.43	12.73	11.83	11.83
Cc_GSTK1c	13.42	11.41	100.00	56.50	54.50	59.30	76.97	59.30	71.57	62.75
Dr_GSTK1c	13.58	12.35	56.50	100.00	87.04	63.13	75.31	62.67	67.58	63.47
Dr_GSTK1d	13.84	12.58	54.50	87.04	100.00	60.75	67.92	59.81	62.50	59.72
Dr_GSTK1b	15.64	13.97	59.30	63.13	60.75	100.00	67.68	71.82	72.52	67.57
Cc_GSTK1d	14.93	13.43	76.97	75.31	67.92	67.68	100.00	66.67	75.00	67.26
Cc_GSTK1b	14.55	12.73	59.30	62.67	59.81	71.82	66.67	100.00	75.91	68.64
Cc_GSTK1a	13.61	11.83	71.57	67.58	62.50	72.52	75.00	75.91	100.00	76.42
Dr_GSTK1a	12.43	11.83	62.75	63.47	59.72	67.57	67.26	68.64	76.42	100.00
Dr_MGST1.1	12.96	16.67	14.52	24.64	23.19	19.32	13.33	17.39	13.04	17.39
Cc_MGST1.1a	14.81	16.67	12.90	26.09	24.64	19.05	13.33	18.84	14.49	18.84
Cc_MGST1.1b	12.96	16.67	12.90	24.64	23.19	19.10	13.33	17.39	13.04	17.39
Cc_MGST1.2	12.96	16.67	14.52	24.64	23.19	17.05	13.33	17.39	13.04	15.94
Dr_MGST1.2	14.81	18.52	14.52	26.09	24.64	18.39	13.33	18.84	14.49	17.39
Cc_MGST2	10.77	12.31	10.17	14.08	14.71	12.63	3.85	10.96	12.99	11.69
Dr_MGST2	8.82	8.82	5.71	7.32	7.32	8.20	nan	4.88	4.88	4.88
Cc_MGST3.1	5.71	8.57	14.06	17.28	16.67	14.42	23.33	10.84	11.90	8.33
Dr_MGST3.1	7.58	9.09	14.06	13.75	12.82	13.00	15.38	11.25	12.50	10.00
Cc_MGST3.2	10.71	12.50	19.05	17.14	18.57	16.67	31.25	12.86	10.00	15.71

Dr_MGST3.2	12.50	12.50	14.29	14.29	15.71	15.56	25.00	11.43	11.43	11.43	
	Dr_ MGST1.1	Cc_ MGST1.1a	Cc_ MGST1.1b	Cc_ MGST1.2	Dr_ MGST1.2	Cc_ MGST2	Dr_ MGST2	Cc_ MGST3.1	Dr_ MGST3.1	Cc_ MGST3.2	Dr_ MGST3.2
Dr_GSTR	2.70	2.70	2.70	5.41	5.41	12.24	22.22	16.36	11.76	19.51	14.63
Cc_GSTR1	2.70	2.70	2.70	5.41	5.41	12.24	16.67	14.55	13.73	17.07	12.20
Cc_GSTR2	2.70	2.70	2.70	5.41	5.41	14.29	16.67	14.55	13.73	17.07	12.20
Cc_GSTM3c	nan	nan	nan	nan	nan	16.67	nan	0.00	0.00	0.00	0.00
Dr_GSTM3c	2.56	2.56	2.56	5.13	5.13	9.26	11.11	5.17	5.56	6.82	6.82
Dr_GSTM3a	2.56	2.56	2.56	5.13	5.13	11.11	11.11	5.17	5.56	6.82	9.09
Dr_GSTM3b	2.56	2.56	2.56	5.13	5.13	7.41	11.11	5.17	1.85	11.36	13.64
Cc_GSTM3d	2.56	2.56	2.56	5.13	5.13	11.11	11.11	3.45	3.70	9.09	11.36
Cc_GSTM3a	2.56	2.56	2.56	5.13	5.13	11.11	11.11	5.17	5.56	6.82	9.09
Cc_GSTM3b	2.56	2.56	2.56	5.13	5.13	11.11	11.11	6.90	5.56	6.82	6.82
Cc_GSTP	2.78	0.00	2.78	2.78	5.56	2.04	10.53	5.77	2.08	13.16	10.53
Dr_GSTP1	2.78	0.00	2.78	2.78	5.56	6.12	10.53	11.54	4.17	10.53	7.89
Dr_GSTP2	2.78	0.00	2.78	2.78	5.56	8.16	10.53	11.54	6.25	5.26	2.63
Dr_GSTA1	5.41	5.41	5.41	10.81	8.11	18.00	25.00	12.96	10.00	10.00	5.00
Dr_GSTA2	5.41	5.41	5.41	13.51	10.81	20.00	25.00	12.96	10.00	12.50	5.00
Dr_GSTA3	5.41	5.41	5.41	13.51	10.81	20.00	25.00	12.96	10.00	12.50	5.00
Cc_GSTA1	5.41	5.41	5.41	13.51	10.81	22.00	25.00	11.11	10.00	15.00	7.50
Cc_GSTA2	5.41	5.41	5.41	13.51	10.81	22.00	25.00	11.11	10.00	12.50	5.00
Dr_GSTT2	5.13	5.13	2.56	5.13	5.13	7.84	5.00	1.75	1.89	11.63	13.95
Cc_GSTT2a	7.69	7.69	5.13	7.69	7.69	7.84	5.00	3.51	1.89	11.63	11.63
Cc_GSTT2b	7.69	7.69	5.13	7.69	7.69	7.84	5.00	3.51	1.89	11.63	11.63
Cc_GSTT1a	11.43	11.43	8.57	14.29	11.43	4.26	12.50	1.89	2.04	10.26	10.26
Dr_GSTT1a	11.43	11.43	8.57	14.29	11.43	2.56	12.50	2.08	2.08	10.26	10.26
Dr_GSTT1b	8.57	8.57	5.71	11.43	8.57	6.38	18.75	1.89	4.08	10.26	12.82
Cc_GSTT1b1	8.57	8.57	5.71	11.43	8.57	6.38	18.75	1.89	2.04	10.26	12.82
Cc_GSTT1b2	8.57	8.57	5.71	11.43	8.57	6.38	18.75	1.89	2.04	10.26	12.82
Cc_GSTZ1	9.30	13.95	11.63	9.30	9.30	3.64	9.09	9.84	8.77	10.64	6.38
Dr_GSTZ1	10.26	12.82	10.26	10.26	10.26	3.92	11.11	10.53	9.43	11.63	9.30
Cc_GSTO2	14.81	12.96	14.81	14.81	16.67	10.77	8.82	5.71	7.58	12.50	14.29
Dr_GSTO2	14.81	12.96	14.81	14.81	16.67	10.77	8.82	5.71	7.58	12.50	12.50
Cc_GSTO1	12.96	14.81	12.96	12.96	14.81	10.77	8.82	5.71	7.58	10.71	12.50
Dr_GSTO1	16.67	16.67	16.67	16.67	18.52	12.31	8.82	8.57	9.09	12.50	12.50
Cc_GSTK1c	14.52	12.90	12.90	14.52	14.52	10.17	5.71	14.06	14.06	19.05	14.29
Dr_GSTK1c	24.64	26.09	24.64	24.64	26.09	14.08	7.32	17.28	13.75	17.14	14.29
Dr_GSTK1d	23.19	24.64	23.19	23.19	24.64	14.71	7.32	16.67	12.82	18.57	15.71
Dr_GSTK1b	19.32	19.05	19.10	17.05	18.39	12.63	8.20	14.42	13.00	16.67	15.56
Cc_GSTK1d	13.33	13.33	13.33	13.33	13.33	3.85	nan	23.33	15.38	31.25	25.00
Cc_GSTK1b	17.39	18.84	17.39	17.39	18.84	10.96	4.88	10.84	11.25	12.86	11.43
Cc_GSTK1a	13.04	14.49	13.04	13.04	14.49	12.99	4.88	11.90	12.50	10.00	11.43
Dr_GSTK1a	17.39	18.84	17.39	15.94	17.39	11.69	4.88	8.33	10.00	15.71	11.43
Dr_MGST1.1	100.00	88.41	92.76	72.85	70.20	19.51	25.49	18.94	19.70	23.85	21.54
Cc_MGST1.1a	88.41	100.00	93.48	73.19	68.12	20.34	25.77	19.69	19.69	22.40	20.00
Cc_MGST1.1b	92.76	93.48	100.00	74.34	70.20	19.35	25.24	21.05	19.55	24.43	22.14
Cc_MGST1.2	72.85	73.19	74.34	100.00	88.31	17.07	20.59	19.70	18.94	23.48	21.97
Dr_MGST1.2	70.20	68.12	70.20	88.31	100.00	19.67	22.77	21.37	19.85	23.66	22.90
Cc_MGST2	19.51	20.34	19.35	17.07	19.67	100.00	80.95	32.33	31.01	25.60	27.20
Dr_MGST2	25.49	25.77	25.24	20.59	22.77	80.95	100.00	33.00	30.00	23.76	24.75
Cc_MGST3.1	18.94	19.69	21.05	19.70	21.37	32.33	33.00	100.00	82.00	44.53	41.61
Dr_MGST3.1	19.70	19.69	19.55	18.94	19.85	31.01	30.00	82.00	100.00	42.34	42.34

Cc_MGST3.2	23.85	22.40	24.43	23.48	23.66	25.60	23.76	44.53	42.34	100.00	81.43
Dr_MGST3.2	21.54	20.00	22.14	21.97	22.90	27.20	24.75	41.61	42.34	81.43	100.00

Supplementary Table SII.- Comparative analysis of GST genes of common carp with other species.

Species / Gene name	<i>Cyprinus carpio</i>	<i>Danio rerio</i>	<i>Takifugu rubripes</i>	<i>Oryzias latipes</i>	<i>Gasterosteus aculeatus</i>	<i>Xenopus tropicalis</i>	<i>Gallus gallus</i>	<i>Homo sapiens</i>
Total number	27	24	11	14	11	15	13	21
MGST1	3	2	0	1	1	1	1	1
MGST2	1	1	0	0	0	1	1	1
MGST3	2	2	2	2	2	2	1	1
GSTK	4	4	1	1	1	2	1	1
GSTM	4	3	2	2	1	1	0	5
GSTA	2	3	1	1	1	0	5	5
GSTT	5	3	2	2	1	2	2	3
GSTP	1	2	0	0	0	2	0	1
GSTO	2	2	1	2	1	3	1	2
GSTZ	1	1	1	1	1	1	1	1
GSTR	2	1	1	2	2	0	0	0