

Table S1. Selective clinical trials of viral antigens-based cancer vaccines.

Type of Intervention	Target Markers	Disease	Phase	Trial ID	Patients Number	Clinical Benefit (Patients Number)	Serious Adverse Events (Patients Numbers)	Other Intervention	OS (Months)	PFS (Months)	Specific T Cells re-Sponse (Positive/Test Number)	Ref.	Publish Year
Peptide	HPV 16 E6/E7	CC	II	NA	6	NA	No Grade ≥ 3 events	None	13	NA	6/6	[1]	2008
Listeria Monocytogenes	HPV 16 E7	CC	I	NA	15	SD (7) PR (1)	Grade 3 (6)	None	11.6	NA	1/3	[2]	2009
DNA Vaccine	HPV 16/18 E6/E7	HNSCC	I/IIa	NCT02163057	22	NA	No Grade ≥ 3 events	None	15.9	12-month DFS rate (89.4%)	8/21	[3]	2018
Dendritic Cell	LMP2	NPC	I	NA	16	PR (2)	No Grade ≥ 3 events	None	NA	NA	9/16	[4]	2002
Dendritic Cell	LMP1, LMP2	NPC	II	NA	16	SD (2) PR (1)	Grade 3 (1)	None	6	1.92	0/8	[5]	2012
Virus	EBNA1, LMP2	NPC	I	NCT01256853	18	NA	Grade 3 (1)	None	NA	NA	15/18	[6]	2013
Virus	EBNA1, LMP2	NPC	Ia	NCT01147991	16	NA	No Grade ≥ 3 events	None	NA	NA	8/14	[7]	2014
Peptide	HCV Core	HCC	II	UMIN000003520 UMIN000005634	42	NA	Total events: Grade 3 (14), Grade 5 (1)	Sorafenib	6.1	NA	19/36	[8]	2015

OS: overall survival; PFS: progression-free survival; HPV: Human papillomavirus; LMP: latent membrane proteins; EBNA1: Epstein-Barr virus nuclear antigen 1; HCV: hepatitis C virus; CC: Cervical cancer; HNSCC: Head and neck squamous cell cancer; NPC: Nasopharyngeal carcinoma; HCC: hepatocellular carcinoma; CR: complete response; PR: partial response; SD: stable disease; NA: not applicable.

Table S2. Selective clinical trials of CGAs-based cancer vaccines.

Type of intervention	Target	Disease	Phase	Patients number	Clinical benefit	Serious adverse events	Other intervention	OS (months)	PFS (Months)	Specific T cells response	Trial ID	Ref.
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					(patients number)	(patients numbers)				(positive/test number)		
Recombi- nant Pro- tein	MAGE-A3	Melanoma	II	18	SD (6) PR (1) CR (3)	Grade 3 (1)	High-dose interleukin- 2 (HDIL-2)	NA	3.6	NA	NCT0126 6603	[9]
DC	MAGE-A3, MAGE-A2, WT1, gp100, tyrosinase	Melanoma	I/II	9	SD (4) PR (1)	Grade 3 (9) Grade 4 (1)	Carboplatin Paclitaxel	12	2.3	5/9	UMIN00 0006629	[10]
Recombi- nant Pro- tein	MAGE-A3	BC	I	24	NA	NA	Bacillus- Calmette- Guerin	NA	NA	12/23	NCT0149 8172	[11]
Recombi- nant Pro- tein	MAGE-A3	NSCLC	I	67	NA	Grade 3/4 (24) Grade 5 (1)	Adjuvant Chemother- apy	NA	NA	CD4+:15/40 CD8+:4/40	NCT0045 5572	[12]
DC	MAGE-A1, MAGE-A3, NY-ESO-1	Neuroblas- toma and sar- coma	I	10	SD (1) CR (1)	Grade 3 (1) Grade 4 (4)	Decitabine	NA	NA	6/9	NCT0124 1162	[13]
Recombi- nant Pro- tein	MAGE-A3	NSCLC	II	122	NA	Grade 3 (13) Grade 4 (2)	None	57	45	NA	NCT0029 0355	[14]
Recombi- nant Pro- tein	MAGE-A3	Melanoma	II	72	SD (10) PR (2) CR (3)	Grade 3 (3)	None	AS15 arm: 33 AS02 B arm: 19	AS15 arm: 11.6 AS02B arm: 7.1	AS15 arm: 18/26 AS02B arm: 6/29	NCT0008 6866	[15]
Recombi- nant Pro- tein	NY-ESO-1	STs	I	26	SD (8)	Grade 3 (6)	None	NA	NA	2/8	UMIN00 0005246 UMIN00 0008006	[16]

DC	NY-ESO-1, MAGE-C2, MUC1	PC	Ila	21	SD (12) PR (1)	No Grade ≥3 events	None	NA	9.5	12/21	NCT0269 2976	[17]
Recombi- nant Pro- tein	NY-ESO-1	Melanoma	I/II	35	NA	Grade 3 (1)	Montanide	NA	NA	CD4+:18/21 CD8+:4/21	NYU#09 -0007 MSSM#1 3-1391	[18]
Lentivirus Vector	NY-ESO-1	STs	I	39	SD (20) PR (2)	No Grade ≥3 events	None	31.1	4.6	17/33	NCT0212 2861	[19]
Recombi- nant Pro- tein	NY-ESO-1	STs	I	13	SD (3)	Grade 3 (1)	None	NA	NA	CD4+:6/11 CD8+:4/11	NCT0201 5416	[20]
mRNA	NY-ESO-1, MAGE-C1, MAGE-C2, survivin, 5T4, MUC-1	NSCLC	Ib	26	SD (12) PR (1)	Grade ≥3 (4)	Pemetrexed EGFR-TKI	13.95	2.87	10/25	NCT0191 5524	[21]
Peptide	NY-ESO-1 gp100 MART-1	Melanoma	I	33	NA	Grade 3-5 (9)	Nivolumab	NA	47.1	NA	NA	[22]
Recombi- nant Pro- tein	NY-ESO-1	OC	I	12	SD (5) PR (1)	Grade 3 (2)	decitabine	NA	NA	7/11	NCT0088 7796	[23]
Recombi- nant Pro- tein	PRAME	NSCLC	I	60	NA	No Grade ≥3 events	None	NA	NA	CD4+:26/35 CD8+:2/32	NCT0115 9964	[24]
Peptide	PRAME, PSMA	STs	I	26	SD (10)	No Grade ≥3 events	None	NA	NA	15/24	NA	[25]

OS: overall survival; PFS: progression-free survival; MAGE-A3: melanoma-associated antigen A3; WT1: wilms' tumor protein; gp100: glycoprotein 100; MUC1: mucin 1; NY-ESO-1: New York esophageal squamous cell carcinoma-1; PRAME: preferentially expressed antigen in melanoma; PSMA: prostate-specific membrane antigen; BC: bladder cancer; NSCLC: non-small cell lung cancer; STs: solid tumors; PC: prostate cancer; OC: ovarian cancer; CR: complete response; PR: partial response; SD: stable disease; EGFR-TKI: epidermal growth factor receptor -tyrosine kinase inhibitor; NA: not applicable.

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