

**Table SI.** List of completed clinical studies in breast cancer immunotherapy and their outcomes.

Interventions	Trial ID	Study name	Status	Cancer type/target
Cryosurgery/NK immunotherapy	NCT02844335	Combination of Cryosurgery and NK Immunotherapy for Advanced Breast Cancer	Completed	Recurrent breast cancer
Trastuzumab/NK immunotherapy	NCT02843126	Combination of Trastuzumab and NK Immunotherapy for Recurrent Breast Cancer	Completed	Recurrent breast cancer
GP2peptide + GM-CSF vaccine plus trastuzumab/trastuzumab	NCT03014076	Immunotherapy Vaccine and Herceptin in Breast Cancer	Completed	Breast Cancer
OPT-822/OPT-821 (30 µg/100 µg/PBS/cyclophosphamide	NCT01516307	Trial of Active Immunotherapy With Globo H-KLH (OPT-822) in Metastatic Breast Cancer Subjects	Completed	Metastatic breast cancer
Procedure: Cryosurgery, IRE surgery, surgery/γδ T cells	NCT03183206	Safety and Efficiency of γδ T Cell Against Breast Cancer	Completed	Breast cancer
Cytokine	NCT01256801	Gene Expression Profiling of Breast Cancer Cells Predict the Response of Malignant Pleural Effusion	Completed	Breast neoplasms, neoplasm metastasis, gene expression profiling and immunotherapy
Aldesleukin/therapeutic tumor infiltrating lymphocytes/trastuzumab/paclitaxel	NCT00301730	Cellular Adoptive Immunotherapy in Treating a Patient Who Has Undergone a Donor Stem Cell Transplant for Breast Cancer That Has Spread to the Lung	Completed	Breast cancer and metastatic cancer
QBX258	NCT02494206	Immunotherapy for the Treatment of Breast Cancer Related Upper Extremity Lymphedema (BCRL)	Completed	Breast cancer and upper extremity lymphedema

Herceptin/NeuVax vaccine/GM-CSF	NCT01570036	Combination Immunotherapy With Herceptin and the HER2 Vaccine NeuVax	Completed	Breast cancer
Placebo/interleukin7	NCT01368107	Study Evaluating Impact of IL-7 on CD4 Lymphopenia, Risks of Severe Haematological Toxicity and Tumor Progression in Metastatic Breast Cancer Patients	Completed	Metastatic breast cancer
Tamoxifencitrate/busulfan/thiotepa/melphalan/aldesleukin/sargramostim	NCT00003199	Combination Chemotherapy and Peripheral Blood Stem Cell Transplant Followed By Aldesleukin and Sargramostim in Treating Patients With Inflammatory Stage IIIB or Metastatic Stage IV Breast Cancer	Completed	Estrogen receptor-negative breast, estrogen receptor-positive breast, inflammatory breast, male breast, progesterone receptor-negative breast, progesterone receptor-positive breast, stage IIIB breast and stage IV breast cancer
DC-CIK/ $\gamma\delta$ Cells/Combination	T NCT02418481	Safety and Efficiency of $\gamma\delta$ T Cell Against Breast Cancer (Her-, er-, and pr-)	Completed	Breast cancer
Autologous cells/Interleukin-2	T NCT00001440	Autologous T-Cell Transplantation and the Immunotherapy of Residual Disease in Breast Cancer: Pilot Study of Vaccine-Driven T-Cell Expansion in Patients Treated With Dose-Intensive Chemotherapy	Completed	Breast neoplasm and neoplasm metastasis
KS24.22 cells	NCT01127074	Vaccination of Metastatic Breast Cancer Patients With a CD80-modified Allogeneic Cancer Cell Line (KS2422)	Completed	Metastatic breast cancer
AD5CEA vaccine	NCT01147965	Active Immunotherapy CEA Vaccine in Patients With Malignancies Expressing CEA	Completed	Colon, lung and breast cancer
MV/Other: Standard treatment	NCT02338804	Safety and Efficacy Study of Mix Vaccine in Breast Carcinoma Patient	Completed	Breast neoplasms
Radiation/Imiquimod/Cyclophosphamide	NCT01421017	Toll-like Receptor (TLR) 7 Agonist, Cyclophosphamide, and Radiotherapy for Breast Cancer With Skin Metastases	Completed	Breast, metastatic breast and recurrent breast cancer
hMN14 (labetuzumab)	NCT00041652	Safety Study of hMN14 to Treat Either Colorectal or Breast Cancer	Completed	Colorectal cancer, colon, rectal and

				colorectal neoplasms, colorectal carcinoma and breast neoplasms
SV-BR-1-GM/Cyclophosphamide/Interferon- $\alpha$ -2b	NCT03066947	SV-BR-1-GM in Metastatic or Locally Recurrent Breast Cancer	Completed	Breast cancer and breast neoplasm
Hypofractionated Stereotactic Body Radiation Therapy/Radiation: Hypofractionated Stereotactic Body Radiation Therapy	NCT00167414	Study for Using Radiosurgery on Limited Metastases of Breast Cancer	Completed	Breast and metastatic cancer
HER-2/neu intracellular domain protein/therapeutic autologous dendritic cells	NCT00005956	Biological Therapy in Treating Patients With Advanced Cancer	Completed	Breast, gastric and ovarian cancer
9 Peptides from Her-2/neu, CEA & CTA	NCT00892567	Evaluating the T Cell Response to a Peptide-based Vaccine in Patients With Breast Cancer	Completed	Breast neoplasms
Capecitabine/Cixutumumab/Lapatinib Ditosylate/Other: Quality-of-Life Assessment	NCT00684983	Capecitabine and Lapatinib Ditosylate With or Without Cixutumumab in Treating Patients With Previously Treated HER2-Positive Stage IIIB-IV Breast Cancer	Completed	HER2 <sup>+</sup> breast carcinoma, recurrent breast carcinoma, stage IIIB breast cancer AJCC v7, Stage IIIC breast cancer AJCC v7 and stage IV breast cancer AJCC v6 and v7
Denileukinfittox/reco	NCT00128622	Denileukin Diftitox Followed by Vaccine Therapy in Treating Patients	Completed	Breast, colorectal, lung, pancreatic and

mbinant fowlpox-CEA (6D)/TRICOM vaccine/therapeutic autologous dendritic cells		With Metastatic Cancer		unspecified adult solid tumors; protocol specific
<sup>212</sup> Pb-TCMC-Trastuzumab/trastuzumab	NCT01384253	Safety Study of <sup>212</sup> Pb-TCMC-Trastuzumab Radio Immunotherapy	Completed	Breast, peritoneal, ovarian, pancreatic and stomach neoplasms
Dendritic cells	NCT03450044	Immunogenicity and Safety of DCs in Breast Cancer	Completed	Breast cancer female
Aldesleukin/mutant p53 peptide pulsed dendritic cell vaccine/ras peptide cancer vaccine/sargramostim/therapeutic autologous lymphocytes/therapeutic tumor infiltrating lymphocytes	NCT00019084	Vaccine Therapy and Biological Therapy in Treating Patients With Advanced Cancer	Completed	Breast, cervical, colorectal, lung, ovarian and pancreatic cancer
Allogeneic tumor cell vaccine/autologous tumor cell vaccine/recombinant interferon $\alpha$ /recombinant	NCT00002475	Cyclophosphamide Plus Vaccine Therapy in Treating Patients With Advanced Cancer	Completed	Breast, colorectal, kidney, pancreatic and lung cancer and malignant mesothelioma

interferon γ/sargramostim/cyclophosphamide				
INO-1400/INO-9012/INO-1401	NCT02960594	hTERT Immunotherapy Alone or in Combination With IL-12 DNA Followed by Electroporation in Adults With Solid Tumors at High Risk of Relapse	Completed	Breast, lung, pancreatic, head and neck, ovarian, colorectal, gastric and esophageal cancer and hepatocellular carcinoma
Anti-NYESO-1mTCRPBL/Cyclophosphamide/Fludarabine/Aldesleukin	NCT01967823	T Cell Receptor Immunotherapy Targeting NY-ESO-1 for Patients With NY-ESO-1 Expressing Cancer	Completed	Melanoma, meningioma, breast, non-small cell lung and hepatocellular cancer
Bavituximab	NCT00669591	A Safety and Efficacy Study of Bavituximab Plus Docetaxel in Patients With Advanced Breast Cancer	Completed	Breast cancer
TRICOM-CEA (6D)	NCT00027534	Vaccine Therapy in Treating Patients With Advanced or Metastatic Cancer	Completed	Breast, colorectal, gallbladder, gastric, head and neck, liver, ovarian, pancreatic and testicular germ cell tumor
Peripheral blood lymphocyte therapy	NCT00003887	Lymphocyte Infusion in Treating Patients With Relapsed Cancer After Bone Marrow or Peripheral Stem Cell Transplantation	Completed	Breast, chronic myeloproliferative disorders, gestational trophoblastic tumor, kidney, leukemia, lymphoma, multiple myeloma and plasma cell neoplasm, myelodysplastic syndromes, neuroblastoma, ovarian, sarcoma and testicular germ cell tumor
CEARNA-pulsed DC cancer vaccine	NCT00004604	Biological Therapy in Treating Patients With Metastatic Cancer	Completed	Breast, colorectal, extrahepatic bile duct, gallbladder, gastric, head and neck, liver, lung, metastatic, ovarian, pancreatic and

				testicular germ cell tumor
Imiquimod	NCT00899574	Imiquimod for Breast Cancer Patients With Chest Wall Recurrence or Skin Metastases	Completed	Breast cancer and breast neoplasms
HER-2 Pulsed Dendritic cell Vaccine	NCT02061332	DC Vaccine for Patients With Ductal Carcinoma In Situ	Completed	Breast cancer and DCIS
AVX701	NCT00529984	A Phase I/II Study With CEA(6D) VRP Vaccine in Patients With Advanced or Metastatic CEA-Expressing Malignancies	Completed	Colorectal, breast, lung, pancreatic and colon cancer
Docetaxel/PANVAC-V/PANVAC-F/Sargramostim	NCT00179309	Docetaxel Alone or in Combination With Vaccine to Treat Breast Cancer	Completed	Breast cancer
OCPM Immunotherapeutic Vaccine	NCT00674791	Study of Cancer Peptides Vaccine Plus GM-CSF as Adjuvant Treatment for High Risk (TXN2-3M0) or Metastatic Breast Cancer With No Evidence of Disease	Completed	Breast cancer
Aldesleukin/recombinant interferon $\alpha$ /sargramostim	NCT00003408	Biological Therapy Following Chemotherapy and Peripheral Stem Cell Transplantation in Treating Patients With Cancer	Completed	Breast cancer, chronic myeloproliferative disorders, gestational trophoblastic tumor, kidney cancer, leukemia lymphoma, multiple myeloma and plasma cell neoplasm, myelodysplastic syndromes, neuroblastoma, ovarian cancer, sarcoma and testicular germ cell tumor
MVA-brachyury-TRICOM	NCT02179515	Safety and Tolerability of a Modified Vaccinia Ankara (MVA)-Based Vaccine Modified to Express Brachyury and T-cell Costimulatory Molecules (MVA-Brachyury-TRICOM)	Completed	Lung, breast and prostate tumors (others) and ovarian cancer
CPG7909/Herceptin <sup>®</sup>	NCT00031278	Safety And Efficacy Study Of The Combination Of CpG 7909 And Herceptin In Patients With Metastatic Breast Cancer	Completed	Carcinoma, metastatic breast

MEDI6469	NCT01862900	Stereotactic Body Radiation and Monoclonal Antibody to OX40 (MEDI6469) in Breast Cancer Patients With Metastatic Lesions	Completed	Metastatic breast cancer with lung or liver metastases
IDC-G305	NCT02015416	A Phase 1 Trial of NY-ESO-1 With GLA-SE in Patients With Unresectable or Metastatic Cancer	Completed	Melanoma, ovarian cancer, sarcoma, non-small cell lung and breast cancer
Ibrutinib/Durvalumab	NCT02403271	A Multi-Center Study of Ibrutinib in Combination With MEDI4736 in Subjects With Relapsed or Refractory Solid Tumors	Completed	Non-small cell lung, breast and pancreatic cancer
DEC-205/NY-ESO-1 Fusion Protein CDX-1401/Sirolimus	NCT01522820	Vaccine Therapy With or Without Sirolimus in Treating Patients With NY-ESO-1 Expressing Solid Tumors	Completed	Various stages of breast and other cancer types
AlloStim/Procedure: Cryoablation	NCT01065441	Experimental Therapeutic Cancer Vaccine Created In-situ in Patients With Stage II-Stage IV Cancer	Completed	Solid tumors stage II, Stage III and stage IV, breast, colorectal, prostate, melanoma, ovarian, sarcoma and non-small cell lung cancer
DPX-0907 consists of 7 tumor-specific HLA-A2-restricted peptides, a universal T Helper peptide, a polynucleotide adjuvant, aliposome and Montanide ISA51VG	NCT01095848	A Phase I Safety Study of a Cancer Vaccine to Treat HLA-A2 Positive Advanced Stage Ovarian, Breast and Prostate Cancer	Completed	Ovarian, breast and prostatic neoplasms
GI-6207 [Recombinant Saccharomyces Cerevisia/(Yeast CEA	NCT00924092	An Open Label Phase I Study to Eval the Safety and Tolerability of a Vaccine (GI-6207) Consisting of Whole, Heat-killed Recombinant Saccharomyces Cerevisiae (Yeast) Genetically Modified to Express CEA	Completed	Prostate, breast, lung, colorectal and head and neck cancer

Vaccine)] GI-6207 [Recombinant Sarrcharomyces Cerevusua-CEA (610D)]		Protein in Adults With Metastatic CEA-expressing		
PANVAC-V/PANVAC- F/Sargramostim (GM- CSF, Leukine)	NCT00088413	PANVAC-V and PANVAC-F Vaccines Plus Sargramostim to Treat Advanced Cancer	Completed	Adenocarcinoma, colorectal, ovarian and breast cancer
Exemestane/Cyclophos- phamide	NCT01963481	Exemestane and Cyclophosphamide for Metastatic Breast Cancer	Completed	Metastatic breast cancer