

WHAT IS CLAIMED IS:

1. A method of enhancing production, infection, growth, spread, or titer of an interferon-sensitive virus in an immortalized cell, a cancer cell or a tumor cell, the method comprising:
administering a Fumaric and Maleic Acid Ester (FMAE)-containing compound, or derivative thereof, to the immortalized, cancer or tumor cell before, concurrently with, or after infection of the immortalized, cancer or tumor cell with the interferon-sensitive virus.
2. The method according to claim 1, wherein the interferon-sensitive virus is a non-interferon-sensitive virus genetically rendered interferon-sensitive, an attenuated interferon-sensitive virus, an interferon-sensitive oncolytic virus, or a non-replicating interferon-sensitive virus.
3. The method according to claim 2, wherein an oncolytic activity, a cell death activity, and/or cytotoxic activity of the interferon-sensitive oncolytic virus in the cancer cell or the tumor cell is enhanced or increased.
4. The method according to claim 2, wherein an immunotherapeutic activity of the interferon-sensitive oncolytic virus in the cancer cell or the tumor cell is enhanced, increased or potentiated, including up-regulation of virus encoded transgenes and/or cytokines.
5. The method according to claim 1, wherein the FMAE-containing compound is or comprises the structure of: Dimethylfumarate (DMF), diethylfumarate (DEF), dimethyl maleate (DMM), diethyl maleate (DEM), monoethyl maleate, monomethyl maleate, monoethyl fumarate, or monomethyl fumarate (MMF), or a pharmaceutically acceptable salt, solvate, hydrate, prodrug, reduced, or oxidized form thereof.
6. The method according to claim 1, wherein the interferon-sensitive virus is a reovirus, newcastle disease virus, polio virus, mumps virus, measles virus, influenza virus, Maraba virus (such as MG-1), Rabies virus, Rotavirus, Hepatitis A virus, Rubella virus, Dengue virus, Chikungunya virus, Respiratory Syncytial Virus, LCMV, lentivirus, replicating retrovirus, adenovirus, herpes simplex virus or rhabdovirus, or a variant or derivative thereof.

7. The method according to claim 2, wherein the interferon-sensitive oncolytic virus comprises a rhabdovirus which is vesicular stomatitis virus or a derivative or variant thereof.
8. The method according to claim 1, wherein the interferon-sensitive virus comprises a virus selected under specific growth conditions, subjected to one or more selection pressures, genetically modified using a recombinant technique, or any combination thereof.
9. The method according to claim 1, wherein the cell is mammalian.
10. The method according to claim 9, wherein the cell is human.
11. The method according to claim 1, wherein the immortalized cell, the cancer cell or the tumor cell comprises 293-T cells, BHK21 cells, or MDCK cells, Vero cells, HEK-293 cells, EB-66 cells, EB-bX cells, PER-.C6 cells, AGE1.CR cells, Age1.CS cells, Age1.HN cells, Age1.RO cells, QOR2/2E11 cells, UMNSAH-DF1 cells, CHO cells, hybridoma cells, sf9 cells, or R4 cells. 293-T cells, BHK21 cells, or MDCK cells lymphoblastic leukemia, myeloid leukemia, adrenocortical carcinoma, AIDS-related cancer, AIDS-related lymphoma, anal cancer, appendix cancer, astrocytoma, atypical teratoid/rhabdoid tumor, basal cell carcinoma, bile duct cancer, bladder cancer, bone cancer, osteosarcoma, malignant fibrous histiocytoma, brain stem glioma, brain tumor, cerebellar astrocytoma, cerebral astrocytoma/malignant glioma, craniopharyngioma, ependymblastoma, medulloblastoma, pineal parenchymal tumors of intermediate differentiation, supratentorial primitive neuroectodermal tumors and pineoblastoma, visual pathway and hypothalamic glioma, spinal cord tumors, breast cancer, bronchial tumors, Burkitt lymphoma, carcinoid tumor, central nervous system lymphoma, cervical cancer, chordoma, chronic lymphocytic leukemia, chronic myelogenous leukemia, chronic myeloproliferative disorders, colon cancer, cutaneous T-Cell lymphoma, embryonal tumors, endometrial cancer, ependymblastoma, ependymoma, esophageal cancer, extracranial germ cell tumor, extragonadal germ cell tumor, extrahepatic bile duct cancer, eye cancer, intraocular melanoma, retinoblastoma, gallbladder cancer, gastric (stomach) cancer, gastrointestinal carcinoid tumor, gastrointestinal stromal tumor (GIST), gastrointestinal stromal cell tumor, germ cell tumors, extracranial, extragonadal, ovarian, gestational trophoblastic tumor, glioma, hairy cell leukemia, head and neck

cancer, hepatocellular (Liver) cancer, histiocytosis, Langerhans cell cancer, Hodgkin lymphoma, hypopharyngeal cancer, islet cell tumors, Kaposi sarcoma, kidney cancer, laryngeal cancer, lymphocytic leukemia, hairy cell leukemia, lip and oral cavity cancer, liver cancer, non-small cell lung cancer, small cell lung cancer, Hodgkin lymphoma, non-Hodgkin lymphoma, malignant fibrous histiocytoma of bone and osteosarcoma, medulloblastoma, medulloepithelioma, melanoma, intraocular melanoma, Merkel cell carcinoma, mesothelioma, metastatic squamous neck cancer, mouth cancer, multiple endocrine neoplasia syndrome, multiple myeloma/plasma cell neoplasm, nasal cavity and paranasal sinus cancer, nasopharyngeal cancer, neuroblastoma, oral cancer, oropharyngeal cancer, ovarian cancer, pancreatic cancer, parathyroid cancer, penile cancer, pharyngeal cancer, pheochromocytoma, pineal parenchymal tumors, pineoblastoma and supratentorial primitive neuroectodermal tumors, pituitary tumor, plasma cell neoplasm/multiple myeloma, pleuropulmonary blastoma, primary central nervous system lymphoma, prostate cancer, rectal cancer, renal cell (kidney) cancer, renal pelvis and ureter cancer, transitional cell cancer, respiratory tract carcinoma, retinoblastoma, rhabdomyosarcoma, salivary gland cancer, uterine sarcoma, skin cancer, Merkel cell skin carcinoma, small intestine cancer, soft tissue sarcoma, squamous cell carcinoma, squamous neck cancer, stomach (Gastric) cancer, supratentorial primitive neuroectodermal tumors, T-Cell lymphoma, testicular cancer, throat cancer, thymoma and thymic carcinoma, thyroid cancer, trophoblastic tumor, urethral cancer, uterine cancer, endometrial cancer, uterine sarcoma, vaginal cancer, vulvar cancer, or Wilms tumor.

12. A method for treating a tumor or cancer in a subject in need thereof, the method comprising:

administering a Fumaric and Maleic Acid Ester (FMAE)-containing compound, or derivative thereof, to the subject before, after, or concurrently with administering an interferon-sensitive virus to the subject.

13. A composition comprising at least one Fumaric and Maleic Acid Ester (FMAE)-containing compound, or derivative thereof, and a pharmaceutically acceptable carrier or excipient, wherein the composition is for use in viral enhancement.

14. A composition comprising an interferon-sensitive virus and at least one Fumaric and

Maleic Acid Ester (FMAE)-containing compound, or derivative thereof.

15. A method for producing an interferon-sensitive virus comprising:
culturing an immortalized cell, a cancer cell or a tumor cell with the interferon-sensitive virus or a component thereof in an appropriate medium in the presence of at least one Fumaric and Maleic Acid Ester (FMAE)-containing compound or derivative thereof; and
producing the interferon-sensitive virus from the immortalized cell, the cancer or the tumor cell.

16. The method according to claim 15, wherein the interferon-sensitive virus is an attenuated virus, a genetically modified virus, a non-replicating virus, or an oncolytic virus.

17. The method according to claim 16, wherein the interferon-sensitive virus is used to prepare a cancer vaccine, wherein the virus is the vaccine or the vaccine comprises the cell infected with the virus.

18. The method a claim 16, wherein the produced virus is an interferon-sensitive virus-based cancer gene therapy vector.