188. A virus comprising the nucleic acid comprising a recombinant vaccinia virus genome of any one of claims 1-187.

189. A packaging cell line comprising the nucleic acid of any one of claims 1-187.

190. A packaging cell line comprising the virus of claim 188.

191. A pharmaceutical composition comprising the virus of claim 188 and a

physiologically acceptable carrier.

192. A kit comprising the nucleic acid of any one of claims 1-187 and a package insert instructing a user of the kit to express the nucleic acid in a host cell.

193. A kit comprising the virus of claim 188 and a package insert instructing a user of the kit to express the virus in a host cell.

194. A kit comprising the virus of claim 188 and a package insert instructing a user to administer a therapeutically effective amount of the virus to a mammalian patient having cancer, thereby treating the cancer.

195. The kit of claim 194, wherein the mammalian patient is a human patient.

196. Use of a therapeutically effective amount of the virus of claim 188 in the manufacture of a medicament for treating cancer in a mammalian patient.

197. Use of a therapeutically effective amount of the pharmaceutical composition of claim 191 in the manufacture of a medicament for treating cancer in a mammalian patient.

198. The use of claim 196 or 197, wherein the mammalian patient is a human patient.

199. The use of any one of claims 196-198, wherein the cancer is selected from the group consisting of leukemia, lymphoma, liver cancer, bone cancer, lung cancer, brain cancer, bladder cancer, gastrointestinal cancer, breast cancer, cardiac cancer, cervical cancer, uterine cancer, head and neck cancer, gallbladder cancer, laryngeal cancer, lip and oral cavity cancer, ocular cancer, melanoma, pancreatic cancer, prostate cancer, colorectal cancer, testicular cancer, and throat cancer.

200. The use of claim 199, wherein the medicament further comprises administering to the mammalian patient an anti-PDl antibody or an anti-PD-Ll antibody.