CLAIMS

What is claimed is:

1. Use of a liquid composition for the manufacture of a medicament for the treatment of a cancer that exhibits reduced expression of argininosuccinate synthetase, wherein the liquid composition comprises pegylated arginine deiminase ADI-PEG, where the liquid composition is sterile and at a pH of 6.5 to 7.5, the composition comprising histidine-HCl which is from 0.0035M Histidine-HCl to 0.35M Histidine-HCl.

2. The use according to claim 1, wherein the liquid composition comprises 0.035 M Histidine-HCl at pH 6.8 with 0.13 M sodium chloride.

3. The use according to claim 1 or 2, wherein the cancer is:

(a) pancreatic cancer, small cell lung cancer (SCLC), mesothelioma, or hepatocellular carcinoma;

(b) pancreatic cancer, a sarcoma, or small cell lung cancer, wherein the medicament is to be administered to a patient in combination with an autophagy inhibitor, wherein the autophagy inhibitor is selected from the group consisting of chloroquine, 3-methyladenine, hydroxychloroquine, bafilomycin A1, 5-amino-4-imidazole carboxamide riboside (AICAR), okadaic acid, N6-mercaptopurine riboside, wortmannin, and vinblastine, and optionally wherein the arginine deiminase and the autophagy inhibitor act synergistically;

(c) melanoma, wherein the medicament is to be administered to a patient in combination with cisplatin;

18. The use according to claim 17, wherein the chemotherapeutic agent is selected from the group consisting of cyclophosphamide, gemcitabine, cisplatin, sorafenib, sunitinib and everolimus.

19. A liquid composition for use in treating a cancer that exhibits reduced expression of argininosuccinate synthetase, comprising pegylated arginine deiminase ADI-PEG, where the liquid composition is sterile and at a pH of 6.5 to 7.5, the composition comprising histidine-HCl which is from 0.0035M Histidine-HCl to 0.35M Histidine-HCl.

20. The liquid composition for use according to claim 19, comprising 0.035 M Histidine-HCl at pH 6.8 with 0.13 M sodium chloride.

21. The liquid composition for use according to claim 19 or 20, for use in treating:

(a) pancreatic cancer, small cell lung cancer (SCLC), mesothelioma;

(b) a patient in combination with an autophagy inhibitor, wherein the cancer is pancreatic cancer, a sarcoma, or small cell lung cancer, wherein the autophagy inhibitor is optionally selected from the group consisting of chloroquine, 3-methyladenine,

hydroxychloroquine, bafilomycin A1, 5-amino-4-imidazole carboxamide riboside (AICAR), okadaic acid, N6-mercaptopurine riboside, wortmannin, and vinblastine, and optionally wherein the arginine deiminase and the autophagy inhibitor act synergistically;

(c) melanoma in a patient in combination with cisplatin;

(d) non-small cell lung cancer, head and neck cancer or prostate cancer in a patient in combination with docetaxel;

(e) renal cell carcinoma in a patient in combination with rapamycin; or

(f) a cancer selected from the group consisting of acute myeloid leukemia, relapsed acute myeloid leukemia, breast cancer, ovarian cancer, colorectal cancer, gastric cancer, glioma, glioblastoma multiforme, non-small cell lung cancer (NSCLC), kidney cancer, bladder cancer, uterine cancer, esophageal cancer, brain cancer, head and neck cancers, cervical cancer, testicular cancer, and stomach cancer.

22. The liquid composition for use according to any one of claims 19-21, which is administered from twice a week to once every 2 weeks.

23. The liquid composition for use according to any one of claims 19-21, which is administered weekly.

24. The liquid composition for use according to any one of claims 19-21, which is administered at a dose of between 80 IU/m^2 and 650 IU/m^2.

25. The liquid composition for use according to any one of claims 19-21, which is administered at a dose of 160 IU/m^2.

26. The liquid composition for use according to any one of claims 19-21, which is administered weekly at a dose of 160 IU/m^2.

27. The liquid composition for use according to any one of claims 19-21, which is administered weekly at a dose of 160 IU/m^2 to 640 IU/m^2.

28. The liquid composition for use according to any one of claims 19-27 wherein the reduced expression of argininosuccinate synthetase results from methylation of the argininosuccinate synthetase promoter, or from a DNA mutation or deletion.

29. The liquid composition for use according to claim 28, wherein the cancer is argininosuccinate synthetase negative.

30. The liquid composition for use according to any one of claims 19-29, wherein the treatment inhibits NO synthesis, inhibits angiogenesis, induces apoptosis in tumor cells, or a combination thereof, *in vivo*.

31. The liquid composition for use according to any one of claims 19-29, wherein the treatment results in stable disease or increases progression free survival time in the patient.

32. The liquid composition for use according to any one of claims 19-29, wherein the treatment increases progression free survival time in the patient.

33. The liquid composition for use according to any one of claims 19-32, wherein plasma arginine is depleted for at least one month.

34. The liquid composition for use according to any one of claims 19-32, wherein plasma arginine is depleted for more than 2 months.

35. The liquid composition for use according to any one of claims 19-34, for use in combination with an additional chemotherapeutic agent.

36. The liquid composition for use according to claim 35, wherein the chemotherapeutic agent is selected from the group consisting of cyclophosphamide, gemcitabine, cisplatin, sorafenib, sunitinib and everolimus.