VEGF (vascular endothelial growth factor), which affect cancer cell metastasis, invasion, and angiogenesis in cells are decreased; and the levels of growth, metastasis (migration), and tube formation of the cancer cells are decreased. See WO2016/108446.

[0004] Further, the anticancer activity of calcium lactate was measured using animal models, which showed that administration of calcium lactate suppressed growth of cancer cells in animal models. See WO2016/108446.

[0005] Administration of calcium lactate in combination with conventional radiation showed that an equivalent anticancer effect can be obtained with a decreased amount of radiation as compared with the conventional amount of radiation. See WO2016/108446. Also, administration to relevant cancer cell lines of calcium lactate in combination with various kinds of well-known anticancer drugs showed that a higher anticancer effect can be obtained with a decreased concentration of the anticancer drugs as compared with administration of the well-known anticancer drugs alone. See WO2016/108446.

[0006] Novel pharmaceutical and nutrient compositions and foods containing calcium lactate are needed for treatment of cancer or reducing the risk of cancer.

SUMMARY

[0006a] In one aspect of the present disclosure, there is provided a use of a pharmaceutical composition comprising

~~(i) calcium lactate as an active agent,~~
~~(ii) a pharmaceutically acceptable polysaccharide, and~~
~~(iii) an additional polymer and/or lipid~~
~~in the manufacture of a medicament for treating cancer.~~

a therapeutically effective amount of calcium lactate as an active agent and a pharmaceutically acceptable polysaccharide, and a mixture of pharmaceutically acceptable polymer, and pharmaceutically acceptable lipid,

in the manufacture of a medicament treating cancer,

wherein the polysaccharide is a cellulose derivative, pectin, hyaluronic acid, starch, guar gum, chitosan, gelatin, collagen, alginate, alginic acid or combinations thereof,

wherein the polymer a poloxamer series, polyvinylpyrrolidone, polyethylene glycol (PEG), polyglycolic lactic acid (PLGA) series, or combinations thereof,

wherein the lipid is a mono- or tri-fatty acid glycerin ester or polyethylene glycol complexes thereof, polyethylene glycol esters of vegetable oils, fatty acid propylene glycol esters, sesame oil, soybean oil, castor oil, corn oil, palm oil, peanut oil, cacao oil, cottonseed oil, sunflower seed oil, safflower oil, almond oil, olive oil, hydrogenated oil, oleic, acid, linolenic acid, linoleic acid, palmitic acid, palmitoleic acid, arachadonic acid, myristic acid, capric acid, caprylic acid, lauric acid, stearic acid, ethyl oleate, isopropyl palmitate, octyldodecyl myristate, cetyl palmitate, lauryl alcohol, oleyl alcohol, cetyl alcohol, stearyl alcohol, or combinations thereof,

wherein a weight ratio of the calcium lactate: the polysaccharide: mixture of the lipid and the polymer are 1 :0.2:5 to 1 :5:30, and

wherein the composition is injectable composition.

[0007] The present disclosure is directed to pharmaceutical compositions comprising a therapeutically effective amount of calcium lactate as an active agent for treating cancer and a pharmaceutically acceptable polysaccharide, polymer, lipid, or combinations thereof. In some embodiments, the composition comprises the calcium lactate and the polysaccharide. In some embodiments, the weight ratio of the calcium lactate and the polysaccharide is 1:<0.2 to 1:5, 1:<0.2, or 1:0.2 to 1:5.

WHAT IS CLAIMED IS:

1. Use of a pharmaceutical composition comprising a therapeutically effective amount of

~~(i)~~ calcium lactate as an active agent~~,~~ and

~~(ii)~~ a pharmaceutically acceptable polysaccharide, and a mixture of pharmaceutically acceptable

~~(iii) an additional~~ polymer, and~~/or~~ pharmaceutically acceptable lipid,

in the manufacture of a medicament ~~for~~ treating cancer,

wherein the polysaccharide is a cellulose derivative, pectin, hyaluronic acid, starch, guar gum, chitosan, gelatin, collagen, alginate, alginic acid or combinations thereof,

wherein the polymer a poloxamer series, polyvinylpyrrolidone, polyethylene glycol (PEG), polyglycolic lactic acid (PLGA) series, or combinations thereof,

wherein the lipid is a mono- or tri-fatty acid glycerin ester or polyethylene glycol complexes thereof, polyethylene glycol esters of vegetable oils, fatty acid propylene glycol esters, sesame oil, soybean oil, castor oil, corn oil, palm oil, peanut oil, cacao oil, cottonseed oil, sunflower seed oil, safflower oil, almond oil, olive oil, hydrogenated oil, oleic, acid, linolenic acid, linoleic acid, palmitic acid, palmitoleic acid, arachadonic acid, myristic acid, capric acid, caprylic acid, lauric acid, stearic acid, ethyl oleate, isopropyl palmitate, octyldodecyl myristate, cetyl palmitate, lauryl alcohol, oleyl alcohol, cetyl alcohol, stearyl alcohol, or combinations thereof,

wherein a weight ratio of the calcium lactate: the polysaccharide: mixture of the lipid and the polymer are 1 :0.2:5 to 1 :5:30, and

wherein the composition is injectable composition.

~~2. The use of claim 1, wherein the cancer is lung cancer, breast cancer, colorectal cancer, stomach cancer, brain cancer, pancreatic cancer, thyroid cancer, skin cancer, bone cancer, lymphoma, uterine cancer, cervical cancer, kidney cancer, or melanoma.~~

~~3. The use of claim 1 or 2, wherein a second anticancer agent is to be administered.~~

~~4. The use of any one of claims 1-3, wherein radiation is to be further administered, preferably wherein the radiation is provided in an amount of 2 Gy to 10 Gy per day.~~

~~5. The use of any one of claims 1-4, wherein the weight ratio of the calcium lactate and the polysaccharide is 1:<0.2 to 1:5.~~

~~6. The use of any one of claims 1-5, comprising the polymer and the lipid, wherein the weight ratio of the polymer and lipid is 1:0.1 to 1:50.~~

~~7. The use of any one of claims 1-6, wherein the weight ratio of the calcium lactate and the polymer and/or the lipid is at least 1:5.~~

~~8. The use of any one of claims 1-7, wherein the additional polymer is a poloxamer series, polyvinylpyrrolidone, polyethylene glycol (PEG), polyglycolic lactic acid (PLGA) series, gelatin, collagen, or combinations thereof .~~

~~9. The use of any one of claims 1-8, wherein the additional lipid is a mono- or tri-fatty acid glycerin ester or polyethylene glycol complexes thereof, polyethylene glycol esters of vegetable oils, fatty acid propylene glycol esters, sesame oil, soybean oil, castor oil, corn oil, palm oil, peanut oil, cacao oil, cottonseed oil, sunflower seed oil, safflower oil, almond oil, olive oil, hydrogenated oil, oleic acid, linolenic acid, linoleic acid, palmitic acid, palmitoleic acid, arachidonic acid, myristic acid, capric acid, caprylic acid, lauric acid, stearic acid, ethyl oleate, isopropyl palmitate, octyldodecyl myristate, cetyl palmitate, lauryl alcohol, oleyl alcohol, cetyl alcohol, stearyl alcohol, or combinations thereof.~~

~~10. The use of any one of claims 1-9, wherein the pharmaceutical composition is an injectable composition.~~

~~11. The use of any one of claims 1-10, wherein the pharmaceutically acceptable polysaccharide is a cellulose derivative, pectin, hyaluronic acid, starch, guar gum, chitosan, alginate, alginic acid or combinations thereof.~~

~~12~~2. The use of ~~any one of claims 1-11~~claim 1, wherein the ~~pharmaceutical composition has~~calcium lactate is coated with a pharmaceutically acceptable enteric coating,
wherein the enteric coating comprises hydroxypropyl methyl cellulose phthalate (HPMCP), cellulose acetate phthalate (CAP), polyvinyl acetate phthalate (PVAP), shellac, polymer of methacrylic acid and an ester thereof, or combinations thereof,
wherein the composition is enteric coated at range of 5 % to 12% using the enteric coating.

~~13. The use of any one of claims 1-12, wherein the pharmaceutical composition is formulated as a hydrogel.~~

~~14. The use of claim 13, wherein the pharmaceutical composition is a solution comprising corn oil and a poloxamer as additional lipid and additional polymer, and wherein the ratio calcium lactate : polysaccharide : corn oil+poloxamer is within a range from 1:0.2:5 to 1:5:30.~~