satraplatin, imatinib, nilotinib, dasatinib, and radicicol; an immunomodulatory agent, an antiangiogenic agent, a mitotic inhibitor, a nucleoside analog, a DNA intercalating agent, anti-ageing agents, dipeptides, epigenetic factors and modulators, metformin, rapamycin, valproic acid or salt, wortmannin, polyamine spermidine, HDAC inhibitors sodium butyrate, butyric acid, sirtuin activators, resveratrol, co-enzyme CoQ10, small dicarboxylic acids, aspirin, salicylic, benzoic acid, carnitine analogues, human growth hormone, a topoisomerase analogue, an antibody, a cytokine, a folate antimetabolite, anti-glycolisis agent, inhibitor oligonucleotide to a human oncogenic or proto-oncogenic transcription factor.; or chemotherapeutic agent, an immunomodulatory agent, an antiangiogenic agent, a mitotic inhibitor, a nucleoside analogue, a DNA intercalating agent, a topoisomerase analog, an antibody, a cytokine, or a folate antimetabolite, hexokinase inhibitor, a lactate dehydrogenase inhibitor, a phosphofructokinase 2 or phosphofructo-2-kinase/fructose-2,6-bisphosphatase inhibitor, a pyruvate kinase M2 inhibitor, a transketolase inhibitor, a pyruvate dehydrogenase inhibitor, a pyruvate dehydrogenase kinase inhibitor, a glucose-6-phosphate dehydrogenase inhibitor, a GLUT inhibitor, a proton transport inhibitor, a monocarboxylate transporter inhibitor, a hypoxia-inducible factor 1 alpha inhibitor, an AMP-activated protein kinase inhibitor, a glutamine inhibitor, an asparagine inhibitor, an arginine inhibitor, a fatty acid synthase inhibitor, an ATP-citrate lyase inhibitor, dimethyl malate, and malic enzyme 2 inhibitor, or any combination thereof.

Incorporated, CBA-120). Cells were treated with FBS 5% in quadruplicates or triplicates and were left during all the adjustment procedure prior to the FBS starvation as a positive control and the same number of wells untreated by Bioxomes used as a negative control. Bioxomes were added after washing with HBSS plus Hepes, post- collection of conditioned media that was used as a source of active Bioxomes/exosome released during starvation. Cell counting was performed as percentage of cell count *vs* positive control.

Results:

FBS 5%-supplemented positive control reached full closure of the scratch at 24 hours. Untreated cells under full starvation and scratch stress stopped growing and underwent apoptosis at 24 hours. Viable cells were counted 12 hours after the scratch. Treatment with Bioxomes of HFF at 10sup5 reach 60-75% of the positive control. Bioxomes at the same dose prepared from HFF plus RNA from HFK of Passage 4 results in the same cell number. HFF Bioxomes with HFK RNA at all doses closed the scratch fully at 24 hours at the same rate as the positive control. The scratch trace remained seen in HFF Bioxomes without HFK RNA at 10sup3 HFF Bioxomes with HFF RNA performed similar to the HFF without RNA at high dose.

Example 16: Pilot study to test biodistribution and hepatoprotective effect of Redoxomes in liver fibrosis in vivo model.

To develop Bioxomes and Redoxomes as optional hepatoprotective treatments, Concovalin A (ConA)-induced liver necrosis was selected as a pathological *in-vivo* model. To test the efficacy of Bioxomes and Redoxomes *in-*

histopathological scoring valuated to simplify by two "blinded" pathologists by three grades: 0 basal/healthy; 1 low-to-moderate damage 3 toxic-to-tissue necrotic. Most Redoxome and Bioxome treated animals evaluated at score 2, proving hepatoprotective feasibility for further dose and time dependency in acute and chronic liver pathology models.

Example 17: Robustness and reproducibility of QC and encapsulation efficiency Bioxomes obtained from variety of cells, RNA co-isolated and enriched Bioxomes.

Various cell cultures and starting extraction cell raw material (form 2E3 to E9 cells) were used to prepare Bioxomes from stem, cell lines, and differentiated cells and cultured cells of plant cell origin. Yield of bioxome particles was found to correlate with starting cell number and varied from E6-E12 bioxome particles. Various industrial drying methods were used including, standard rotor evaporation, nitrogen and argon gas evaporation and freeze drying. Similar yield and particle size distribution were obtained by various methods. Cells were grown on adhesive cultures such as all used stem cells, HFF, HFK, HepG2, primaries, tobacco cells, and Jurkat (ATCC; Clone E6-1), that are CD3 expressing T-lymphocytes grown in bioreactors. Relevant cargo was added prior to sonication step or during extrusion as needed, at hydrophilic excipient buffer. To improve encapsulation efficiency, three freeze thaw cycles at least 24 hours apart were performed, resulting in the particle size <500 nm, when prepared from bone marrow stem cells. **Figure 10A** demonstrates less uniform but still under QC specs, particle size data.

Claims:

1. An artificial bioxome particle comprising a cell membrane component and designed to undergo fusion with a target cell, wherein said membrane component is derived from a pre-defined cellular or extracellular source and obtained by lipid extraction with a mild solvent system; and, wherein said bioxome particle is engineered to carry a cargo comprising at least one predetermined active molecule; and, wherein said cargo can be released into the target cell after the fusion of the bioxome particle with the target cell.

2. The bioxome particle of claim 1, wherein the cargo comprises a plurality of active molecules.

3. The bioxome particle of any one of claims 1 or 2, wherein the source is selected from the group consisting of fibroblasts, mesenchymal stem cells, stem cells, cells of the immune system, dendritic cells, ectoderm, keratinocytes, cells of GI, cells of oral cavity, nasal mucosal cells, neuronal cells, retinal cells, endothelial cells, cardiospheres, cardiomyocytes, pericytes, blood cells, melanocytes, parenchymal cells, liver reserve cells, neural stem cells, pancreatic stem cells, embryonic stem cells, bone marrow, skin tissue, liver tissue, pancreatic tissue, biological fluids, excrement or surgery extracted tissues, milk, saliva, mucus, blood plasma, urine, feces, sebum, postnatal umbilical cord, placenta, amniotic sac, kidney tissue, neurological tissue, adrenal gland tissue, mucosal epithelium, smooth muscle tissue, a bacterial cell, a bacterial culture, a

whole microorganism, conditional medium, amniotic fluid, lipoaspirate, liposuction byproducts, and a plant tissue.

4. The bioxome particle of any one of claims 1 to 3, wherein the active molecule is selected from the group consisting of nucleic acid, peptide, amino acid, polypeptide, nucleoside, growth factor, organic molecule, polyphenol, steroid, lipophilic poor soluble drug, inorganic molecule, anti-oxidant, hormone, antibody, vitamin, cytokine, enzyme, heat shock protein, or a combination thereof.

5. The bioxome particle of claim 4, wherein the active molecule is selected from cannabinoid, cannabinoid acid, endocannabinoid, rapamycin and CoQ10.

6. The bioxome particle of any one of claims 1 to 5, wherein the active molecule has a therapeutic effect.

7. The bioxome of any one of claims 1 to 6 which is a redoxome, wherein the cargo comprises at least one redox active free-radicals scavenging compound.

8. The redoxome of claim 7, capable of blocking LPO chain reaction, such as lipid radical/ peroxide trap, such as vitamin E, terpenoids, polyphenols, flavonoid, phenolic acids, cannabinoids, retinoids, vitamin D, lipoic acid, sterols.

9. The redoxome of claim 7, comprising an iron chelator selected from the group consisting of desferrioxamine (DFX), ethylenediaminetetraacetic acid (EDTA), rutin,

disodium EDTA, tetrasodium EDTA, calcium disodium EDTA, diethylenetriaminepentaacetic acid (DTPA) or a salt thereof, hydroxyethlethylenediaminetriacetic acid (HEDTA) or a salt thereof, nitrilotriacetic acid (NTA), acetyl trihexyl citrate, aminotrimethylene phosphonic acid, beta-alanine diacetic acid, bismuth citrate, citric acid, cyclohexanediamine tetraacetic acid, diammonium citrate, dibutyl oxalate, diethyl oxalate, diisobutyl oxalate, diisopropyl oxalate, dilithium oxalate, dimethyl oxalate, dipotassium EDTA, dipotassium oxalate, dipropyl oxalate, disodium EDTA-copper, disodium pyrophosphate, etidronic acid, HEDTA, methyl cyclodextrin, oxalic acid, pentapotassium, triphosphate, pentasodium aminotrimethylene phosphonate, pentasodium pentetate, pentasodium triphosphate, pentetic acid, dicarboxyic acid, phytic acid, potassium citrate, sodium citrate, sodium dihydroxyethylglycinate, sodium gluceptate, sodium gluconate, sodium hexametaphosphate, sodium metaphosphate, sodium metasilicate, sodium oxalate, sodium trimetaphosphate, tea-EDTA, tetrahydroxypropyl ethylenediamine, tetrapotassium etidronate, tetrapotassium pyrophosphate, tetrasodium etidronate, tetrasodium pyrophosphate, tripotassium EDTA, trisodium EDTA, trisodium hedta, trisodium NTA, trisodium phosphate, malic acid, fumaric acid, maltol, succimer, penicillamine, dimercaprol, deferipron, a natural protein based iron chelator, melatonin, siderphore, zinc or copper cation, or salt or complex, desferrioxamine mesylate, detoxamin, deferoxamine, deferiprone, deferasirox, glutathione, metalloprotein, ferrochel (bis-glycinate chelate), ceruloplasmin,

penicillamine, cuprizone, trientine, ferrulic acid, zinc acetate, and lipocalin 2 or a combination thereof.

10. The bioxome particle of any one of claims 1 to 9 which is a long circulating, slow release bioxome, a selective targeting bioxome, an immunogenic bioxome; or any combination thereof.

11. A composition comprising the bioxome particle of any one of claims 1 to 10 and at least one carrier.

12. The composition of claim 11, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

13. The composition of claim 11, wherein the composition is a cosmeceutical composition and the carrier is a cosmeceutically acceptable carrier.

14. The composition of claim 11, wherein the composition is an edible composition, and the carrier is food grade carrier.

15. A process for the manufacture of a sample comprising a plurality of bioxome particles, wherein the bioxome particles are engineered to carry a cargo comprising at least one active molecule and designed to undergo fusion with a target cell to release the cargo; and wherein said bioxome particles comprise a cell membrane component

derived from a pre-defined cellular or extracellular source; the process comprising:

a. Performing total cell lipid extraction from the selected cellular or extracellular source in a mild solvent system to obtain a lipid extract;
b. Drying the lipid extract; and
c. Inducing self-assembly of bioxome particles by performing at least one step of ultra-sonication and/or extrusion;

wherein the resulting bioxome particles in the sample are characterized by an average particle size of about 0.03µm to 5µm.

16. The process of claim 15, wherein the average particle size is 0.05µm to 3µm.

17. The process of any one of claims 15 or 16, wherein the sample comprising the bioxome particle has the pH of 3.5 to 5.5.

18. The process of any one of claims 15 to 17, wherein the mild solvent system comprises a mixture of polar and non-polar solvents.

19. The process of any one of claims 15 to 18, wherein the solvent system further comprises a stabilizer.

20. The process of any one of claims 15 to 19, wherein the solvent system further comprises an antioxidant, a

surfactant, vitamin E, squalene, cholesterol, or a combination thereof.

21. The process of any one of claims 15 to 20, further comprising the step of co-precipitation of a nucleic acid.

22. The process of any one of claims 15 to 21, wherein the cellular or extracellular source for total lipid extraction is selected from the group consisting of fibroblasts, mesenchymal stem cells, stem cells, cells of the immune system, dendritic cells, ectoderm, keratinocytes, cells of GI, cells of oral cavity, nasal mucosal cells, neuronal cells, retinal cells, endothelial cells, cardiospheres, cardiomyocytes, pericytes, blood cells, melanocytes, parenchymal cells, liver reserve cells, neural stem cells, pancreatic stem cells, embryonic stem cells, bone marrow, skin tissue, liver tissue, pancreatic tissue, postnatal umbilical cord, placenta, amniotic sac, kidney tissue, neurological tissue, adrenal gland tissue, mucosal epithelium, smooth muscle tissue, a bacterial cell, a bacterial culture, a whole microorganism, conditional medium, amniotic fluid, lipoaspirate, liposuction byproducts, and a plant tissue.

23. The process of any one of claims 15 to 22, wherein the lipid extraction is performed from cell-conditioned media, lyophilized conditioned cell media, cell pellet,

frozen cells, dry cells, washed cell bulk, non-adhesive cell suspension, and adhesive cell layer.

24. A sample comprising a plurality of bioxome particles, prepared according to the process of any one of claims 15 to 23.

25. The pharmaceutical composition of claim 12 for use for treating or preventing a pathology in a subject in need of such treatment.

26. The bioxome particle of any one of claims 1 to 10 for use as a vehicle for delivery of active molecules to the target site.

27. The bioxome particle of any one of claims 1 to 10 for use as a medicament.