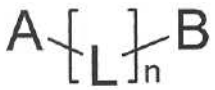
CLAIMS

1. Use of a mitochondrially targeted antioxidant compound in the manufacture of a medicament for aiding in treating or preventing a cell ballooning-associated disease or medical condition, wherein the medicament is to be administered to a subject in need thereof in a therapeutically or prophylactically effective amount.

2. Use of a mitochondrially targeted antioxidant compound in the manufacture of a medicament for altering cellular metabolism and/or storage of fat, wherein the medicament is to be administered to a subject in need thereof, whereby cellular metabolism and/or storage of fat is altered in the subject.

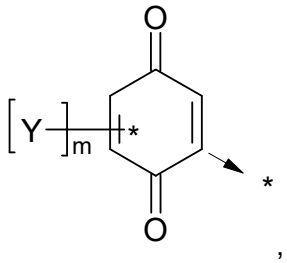
3. Use of a mitochondrially targeted antioxidant compound in the manufacture of a medicament for reducing body weight, or preventing an increase in body weight, of a mammalian subject.

4. The use of any one of claims 1 to 3, wherein the mitochondrially targeted antioxidant is an SkQ compound of Formula II below:



Formula II

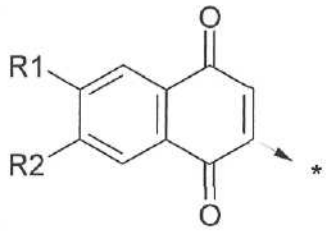
wherein A is hydrogen or an effector moiety, which is an antioxidant optionally having a following structure:



,

and/or reduced forms thereof,

wherein m is from 0 to 3; each Y is independently selected from the group consisting of: lower alkyl (1 to 6 carbons), lower alkoxy (1 to 6 carbons); or two adjacent Y groups, together with carbon atoms to which they are attached, form a following structure:



and/or reduced form thereof,

wherein R1 and R2 may be the same or different and are each independently lower alkyl (1 to 6 carbon atoms) or lower alkoxy (1 to 6 carbon atoms);

L is a linker group, comprising:

a) straight or branched hydrocarbon chain which can be optionally substituted by one or more substituents and optionally contains one or more double or triple bonds;

b) a natural isoprene chain;

n is the number of carbon atoms in the linker, which is an integer from 1 to 40; and

B is a mitochondria targeting group comprising a lipophilic cation;

and a pharmacologically acceptable anion;

and/or solvates, salts, isomers, or prodrugs thereof.

5. The use of any one of claims 1 to 3, wherein the mitochondrially targeted antioxidant is selected from the group consisting of SkQ1, SkQ3, SkQ4, SkQ5, SkQR1, SkQBR1, SkQB1, and SkQBP1.

6. The use of claim 1, wherein the ballooning associated disease or medical condition:
(i) comprises ballooning of hepatocytes in the subject,
(ii) comprises accumulation of cytosolic fat droplets in hepatocytes of the subject, and/or
(iii) is selected from the group consisting of cytostatic drug and radiation injuries; kidney failure with various origin; traumatic, toxic, edematous, neurodegenerative and ischemic brain damage; intestinal infections; toxic cardiac injuries; acute hepatitis; neonatal giant cell hepatitis; autoimmune hepatitis; chronic hepatitis B; chronic cholestasis; increased copper storage; ischemia–reperfusion injury fatty liver, alcoholic steatohepatitis, and non-alcoholic steatohepatitis (NASH).

7. The use of claim 1, wherein the ballooning associated disease or medical condition comprises ballooning of hepatocytes, hepatic steatosis, hepatic inflammation, increase in liver weight, increase in hepatic content of fat, cholesterol, triglycerides, free fatty acids, or collagen, and/or increase in body weight, optionally wherein the medicament to be administered is capable of decreasing said ballooning of hepatocytes, hepatic steatosis, hepatic inflammation,

increase in liver weight, increase in hepatic content of fat, cholesterol, triglycerides, free fatty acids, or collagen, and/or increase in body weight, further optionally wherein hepatic inflammation is capable of being decreased as measured by an inflammation or cell pathology marker, such as a marker selected from the group consisting of CK-18, ALT, TNF-alpha, and IL-6.

8. The use of claim 1, further comprising determining a level of a biomarker and the disease or medical condition is to be diagnosed or prognosed based on said level, optionally wherein said determining comprises performing a liver biopsy or quantifying a blood-born biomarker.

9. The use of claim 1, wherein said medicament to be administered is capable of:
(i) reducing the likelihood of said cell ballooning-associated disease occurring or progressing in the subject;
(ii) reducing ballooning of hepatocytes in the subject; and/or
(iii) reducing hepatic fibrosis in the subject.

10. The use of claim 1, wherein the subject suffers from obesity, diabetes, or alcohol abuse and has, or is at risk of developing, a ballooning associated disease or medical condition.

11. The use of claim 2, wherein triglyceride hydrolysis and/or fatty acid oxidation are increased and/or storage of triglycerides and/or free fatty acids is reduced in the subject.

12. The use of claim 2, wherein the subject has one or more of the following:
(i) hepatocyte ballooning and/or accumulation of cytosolic fat droplets in hepatocytes;
(ii) hepatic steatosis, hepatic inflammation, increase in liver weight, increase in hepatic content of cholesterol, triglycerides, free fatty acids, or collagen, and/or increase in body weight; and
(iii) a ballooning associated disease or medical condition selected from the group consisting of cytostatic drug and radiation injuries; kidney failure with various origin; traumatic, toxic, edematous, neurodegenerative and ischemic brain damage; intestinal infections; toxic cardiac injuries; acute hepatitis; neonatal giant cell hepatitis; autoimmune hepatitis; chronic hepatitis B; chronic cholestasis; increased copper storage; ischemia–reperfusion injury, fatty liver, alcoholic steatohepatitis, and non-alcoholic steatohepatitis (NASH).

13. The use of claim 2, wherein said medicament to be administered is capable of also decreasing said ballooning of hepatocytes, hepatic steatosis, hepatic inflammation, increase in liver weight, increase in hepatic content of cholesterol, triglycerides, or free fatty acids,

and/or increase in body weight.

14. The use of claim 3, wherein the medicament is to be administered orally or by subcutaneous injection.

15. The use of claim 3, whereby the subject’s body weight is decreased by at least 5, 10, 15, or 20%.