What is Claimed Is:

1. A composition for use in a method of increasing mitochondrial function in a cell in a subject comprising administering an effective amount of a composition comprising isolated 5' methylselenoadenosine, leucyl-valyl-selenomethionyl-arginine (LVSe-MR), selenoadenosyl homocysteine, or combinations thereof to the subject, wherein the effective amount increases mitochondrial function in a cell as compared to a cell not exposed to the composition, wherein the administering of an effective amount of the composition is administering a dose between 25 and 800 µg of selenium to the subject per day.

2. The composition for use of claim 1, wherein the composition is a powder, granule or capsule.

3. The composition for use of any one of claims 1-2, wherein the composition is administered orally.

4. The composition for use of any one of claims 1-3, wherein the composition comprises an excipient or a pharmaceutically acceptable carrier.

5. A composition for use in a method of increasing mitochondrial function in a cell in a subject comprising administering an effective amount of an isolated compound selected from the group consisting of methyl seleno adenosine, seleno(hydroxyl)-selenophene-(3'-dooxy-adenosine), N-acetylcysteine-selenohomocysteine, allylselenoadenosyl homocysteine, seleno-adenosyl homocysteine,
seleno-hydroxy adenosyl homocysteine, seleno adenosine, seleno-adenosyl-Se(methyl)selenoxide, adenosyl-hydroxy selenoxide, ethyl selenoadenosine, seleno-(hydroxy) selenophene-(3'-desoxy-adenosine), adenosyl-hydroxy selenoxide, seleno-adenosyl-Se(methyl)-selenoxide, leucyl-valyl-selenomethionyl-arginine (LVSe-MR), and combinations thereof, wherein the administering of an effective amount of the isolated compound is administering a dose between 25 and 800 µg of selenium to the subject per day.

6. The composition for use of claim 5, wherein the composition comprises an isolated compound selected from the group consisting of methylselenoadenosine, leucyl-valyl-

selenomethionyl-arginine (LVSe-MR), selenoadenosyl homocysteine, and combinations thereof.

7. The composition for use of claims 1, 5 and 6 for treating a disease or condition associated with mitochondrial dysfunction.

8. The composition for use of claim 7, wherein the disease or condition is selected from the group consisting of cancer, cardiovascular disease and cardiac failure, type 2 diabetes, Alzheimer's and Parkinson's disease, fatty liver disease, cataracts, osteoporosis, muscle wasting, sleep disorders, psoriasis, arthritis, and colitis.

9. The composition of any preceding claim containing the isolated compound in a concentration ranging from 500 ppb to 1 ppm.

10. The composition of any preceding claim, wherein the administering of an effective amount of the composition or isolated compound is administering a dose of between 200 and 500 µg of selenium to the subject per day.