What is Claimed Is:

1. A method of increasing the protein content of a muscle cell comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to the muscle cell, wherein the effective amount increases protein in a muscle cell.

2. A method of treating sarcopenia comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to a subject, wherein the effective amount ameliorates the symptoms of sarcopenia.

3. A method of treating cardiomyopathy comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to a subject, wherein the effective amount ameliorates the symptoms of cardiomyopathy.

4. A method of decreasing gene expression in a cardiac muscle cell comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to the cardiac muscle cell, wherein the effective amount decreases expression of Myh7, Ankrd1, Lcn2, pS6K1, and combinations thereof.

5. A method of modulating transcriptional activity in a cardiac muscle cell comprising administering of an effective amount of a composition comprising selenium enriched yeast comprising 2% or less inorganic selenium to the cardiac muscle cell, wherein the effective amount is effective to modulate NFATc2/c3 and/ or Foxo3 transcriptional activity in the cardiac muscle cell.

6. The method of claim 5 wherein NFATc2/c3 transcriptional activity is decreased in the cardiac muscle cell contacted with a selenium enriched yeast comprising 2% or less

inorganic selenium as compared to a cardiac muscle cell not exposed to the composition.

7. The method of claim 5, wherein phosphorylation of NFATc2/c3 is increased in the cardiac muscle cell contacted with a selenium enriched yeast comprising 2% or less inorganic selenium as compared to a cardiac muscle cell not exposed to the composition.

8. The method of any one of claims 5-7, wherein Foxo3 transcriptional activity is increased in the cardiac muscle cell contacted with a selenium enriched yeast comprising 2% or less inorganic selenium as compared to a cardiac muscle cell not exposed to the composition.

9. A method of increasing gene expression in a cardiac muscle cell comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to the cardiac muscle wherein the effective amount increases expression of gene selected from the group consisting of Atm, Gadd45g, Gsk3b, UCP2, and combinations thereof is increased in the cardiac muscle cell contacted with a selenium enriched yeast comprising 2% or less inorganic selenium as compared to a cardiac muscle cell not exposed to the composition.

10. A method of decreasing expression of one or more genes in a skeletal muscle cell comprising administering an effective amount of a composition comprising a selenium enriched yeast comprising 2% or less inorganic selenium to the skeletal muscle cell, wherein the effective amount decreases expression of one or more or all of myostatin, Avcr2b, mTOR, S6K1, Gsk3b, Fxbo32, Trim 63, and Nr2f2 in the cardiac muscle cell contacted with a selenium enriched yeast comprising 2% or less inorganic selenium as compared to a cardiac muscle cell not exposed to the composition.

11. A method of increasing expression of one or more genes in a skeletal muscle cell comprising administering an effective amount of a composition comprising a

selenium enriched yeast comprising 2% or less inorganic selenium to the skeletal muscle cell, wherein the effective amount increases expression of one or more or all Prkaa2, Myf6, Des, and PGC1a, is increased in the skeletal muscle cell contacted with a selenium enriched yeast comprising 2% or less inorganic selenium as compared to a muscle cell not exposed to the composition.

12. A method of increasing mitochondrial function in a cell comprising administering an effective amount of a composition comprising isolated 5' methylselenoadenosine, LVSe-MR or combinations thereof, wherein the effective amount increases mitochondrial function in a cell as compared to a cell not exposed to the composition.

13. A method of increasing pyruvate dehydrogenase complex in a cell comprising administering an effective amount of a composition comprising isolated 5' methylselenoadenosine, wherein the effective amount increases the activity of pyruvate dehydrogenase complex in a cell as compared to a cell not exposed to the composition..

14. A composition comprising an isolated compound selected from the group consisting methyl seleno adenosine, seleno(hydroxyl)-selenophene-(3'-deoxy-adenosine), N-acetylcysteine-selenohomocysteine, allylselenoadenosyl homocysteine, seleno-adenosyl homocysteine, seleno-hydroxy adenosyl homocysteine, selno adenosine, seleno-adenosyl-Se(methyl)-selenoxide, adenosyl-hydroxy selenoxide, ethyl selenoadenosine, seleno-(hydroxy)-selenophene-(3'-desoxy-adenosine), adenosyl-hydroxy selnoxide, selno-adenosyl-Se(methyl)-selenoxide and combinations thereof

15. A composition of claim 14 wherein the isolated compound is methylselenoadenosine.

16. A composition of claims 14 or 15 for use in increasing mitochondrial function in a cell.

What is Claimed Is:

1. A composition for use in a method of increasing the protein content of a muscle cell in a subject comprising an effective amount of a selenium enriched yeast comprising 2% or less inorganic selenium, wherein the effective amount increases the amount of protein in a muscle cell.

2. The composition for use of claim 1, wherein the subject has sarcopenia.

3. The composition for use of claim 1, wherein the effective amount selenium enriched yeast comprising 2% or less inorganic selenium provides between 25 and 800 μg of selenium per subject per day.

4. 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, methyl seleno cysteine, 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.

5. The composition for use of any one of claims 1-4, wherein the composition is a powder, granule or capsule.

6. The composition for use of any one of claims 1-5, wherein the composition is administered orally.

7. The composition for use of any one of claims 1-6, wherein the composition comprises an excipient or a pharmaceutically acceptable carrier.

8. A composition for use in a method of increasing mitochondrial function in a cell in a subject comprising an isolated compound selected from the group consisting of methyl seleno adenosine, seleno(hydroxyl)-selenophene-(3'-dooxy-adenosne),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, methylselenocysteine, and combinations thereof.

9. The composition for use of claim 8, wherein the composition comprises an isolated compound selected from the group consisting of methylselenoadenosine, methylselenocysteine, selenoadenosyl homocysteine, and combinations thereof.

10. The composition for use of claims 4, 8 and 9 for treating a disease or condition associated with mitochondrial dysfunction.

11. The composition for use of claim 10, 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.