Claims:

1. Isolated artery-derived, ex vivo differentiated brown adipose-like cells.

2. The brown adipose-like cells of claim 1 further characterized by expression of at least one adipocyte marker selected from fatty acid binding protein 4 (aP2), peroxisome proliferator activated receptor α (PPARα) peroxisome proliferator activated receptor γ (PPARγ), adiponectin (ADN), uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

3. The brown adipose-like cells of claim 2, wherein the adipocyte marker is a brown adipocyte marker selected from uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

4. The brown adipose-like cells of claim 2, wherein the adipogenic marker is expressed in the brown adipose-like cell at higher levels as compared to untreated artery-derived cells.

5. The brown adipose-like cells of claim 1 further characterized by thermogenic potential is stimulated by exposure to at least one of catecholamine and cyclic AMP.

6. The brown adipose-like cells of claim 1, wherein the artery-derived cells are differentiated from internal mammary artery cells.

7. A pharmaceutical composition comprising the brown adipose-like cells of claim 2 and a pharmaceutically acceptable carrier.

8. A method of making brown adipose-like cells comprising:

culturing a population of artery-derived cells in adipogenic induction medium for a period of time and under conditions sufficient to increase expression of an adipocyte marker at a higher level as compared to untreated artery-derived cells.

9. The method of claim 8, wherein the adipocyte marker is selected from fatty acid binding protein 4 (aP2), peroxisome proliferator activated receptor α (PPARα) peroxisome proliferator activated receptor γ (PPARγ), adiponectin (ADN), uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

10. The method of claim 8 further comprising isolating the brown adipose-like cells.

11. The method of claim 8, wherein the artery-derived cells are internal mammary artery cells.

12. The method of claim 11, wherein the artery-derived cells are positive for HLA-1 and negative for CD10, CD31, CD34, CD45, CD133, CD141, and KDR/Flk-1.

13. The method of claim 12, wherein the artery-derived cells are additionally positive for CD29, CD44, CD73, CD166, and additionally negative for CD15, CD23, CD24, CD62p, CD80, CD86, CD104, CD117, CD138, CD146, VE-Cadherin, and HLA-2.

14. The method of claim 8, wherein the adipogenic induction medium comprises a compound selected from bone morphogenetic proteins (BMP), peroxisome proliferator-activated receptor gamma (PPARγ), Retinoid X receptor-alpha (RxRα), insulin and T3, a thiazolidinedione (TZD), vitamin A, retinoic acid, insulin, glucocorticoid or agonist thereof, Wingless-type (Wnt), Insulin-like Growth Factor-1 (IGF-1), Epidermal growth factor (EGF), Fibroblast growth factor (FGF), Transforming growth factor (TGF)-α, TGF-β, Tumor necrosis factor alpha (TNFα), Macrophage colony stimulating factor (MCSF), Vascular endothelial growth factor (VEGF) and Platelet-derived growth factor (PDGF).

15. A method of treating a subject comprising:

obtaining a population of artery-derived brown adipose-like cells; and

administering the brown adipose-like cells into a target region in the subject.

16. The method of claim 15, wherein the subject has a metabolic disorder selected from obesity, diabetes or hyperlipidemia.

17. The method of claim 15, wherein the subject is obese and is in need of treatment.

18. The method of claim 15, wherein the artery-derived brown adipose-like cells are autologous to the subject.

19. The method of claim 15, wherein the artery-derived brown adipose-like cells are allogeneic or xenogeneic to the subject.

20. The method of claim 15, wherein the method comprises preparing the brown adipose-like cells as an injectable composition.

Claims:

1. Isolated artery-derived, ex vivo differentiated brown adipose-like cells.

2. The brown adipose-like cells of claim 1 further characterized by expression of at least one adipocyte marker selected from fatty acid binding protein 4 (aP2), peroxisome proliferator activated receptor α (PPARα) peroxisome proliferator activated receptor γ (PPARγ), adiponectin (ADN), uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

3. The brown adipose-like cells of claim 2, wherein the adipocyte marker is a brown adipocyte marker selected from uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

4. The brown adipose-like cells of claim 2, wherein the adipogenic marker is expressed in the brown adipose-like cell at higher levels as compared to untreated artery-derived cells.

5. The brown adipose-like cells of claim 1 further characterized by thermogenic potential is stimulated by exposure to at least one of catecholamine and cyclic AMP.

6. The brown adipose-like cells of claim 1, wherein the artery-derived cells are differentiated from internal mammary artery cells.

7. A pharmaceutical composition comprising the brown adipose-like cells of claim 2 and a pharmaceutically acceptable carrier.

8. A method of making brown adipose-like cells comprising:

culturing a population of artery-derived cells in adipogenic induction medium for a period of time and under conditions sufficient to increase expression of an adipocyte marker at a higher level as compared to untreated artery-derived cells.

9. The method of claim 8, wherein the adipocyte marker is selected from fatty acid binding protein 4 (aP2), peroxisome proliferator activated receptor α (PPARα) peroxisome proliferator activated receptor γ (PPARγ), adiponectin (ADN), uncoupling protein 1 (UCP-1), PR domain containing protein 16 (PRDM16), PPAR coactivator-1α (PGC-1α), CCAAT/enhancer binding protein β (C/EBPβ), cell death-inducing DFFA-like effector A (CIDE-A), and elongation of very long chain fatty acids like protein 3 (ELOVL3).

10. The method of claim 8 further comprising isolating the brown adipose-like cells.

11. The method of claim 8, wherein the artery-derived cells are internal mammary artery cells.

12. The method of claim 11, wherein the artery-derived cells are positive for HLA-1 and negative for CD10, CD31, CD34, CD45, CD133, CD141, and KDR/Flk-1.

13. The method of claim 12, wherein the artery-derived cells are additionally positive for CD29, CD44, CD73, CD166, and additionally negative for CD15, CD23, CD24, CD62p, CD80, CD86, CD104, CD117, CD138, CD146, VE-Cadherin, and HLA-2.

14. The method of claim 8, wherein the adipogenic induction medium comprises a compound selected from bone morphogenetic proteins (BMP), peroxisome proliferator-activated receptor gamma (PPARγ), Retinoid X receptor-alpha (RxRα), insulin and T3, a thiazolidinedione (TZD), vitamin A, retinoic acid, insulin, glucocorticoid or agonist thereof, Wingless-type (Wnt), Insulin-like Growth Factor-1 (IGF-1), Epidermal growth factor (EGF), Fibroblast growth factor (FGF), Transforming growth factor (TGF)-α, TGF-β, Tumor necrosis factor alpha (TNFα), Macrophage colony stimulating factor (MCSF), Vascular endothelial growth factor (VEGF) and Platelet-derived growth factor (PDGF).

15. A population of artery-derived brown adipose-like cells for use as a medicament.

16. A population of artery-derived brown adipose-like cells for use in the treatment of a metabolic disorder selected from obesity, diabetes or hyperlipidemia.

17. The population of cells of claim 16 for use in the treatment of obesity.

18. The population of cells of claim 15 or 16, wherein the artery-derived brown adipose-like cells are autologous to a subject.

19. The population of cells of claim 15 or 16, wherein the artery-derived brown adipose-like cells are allogeneic or xenogeneic to a subject.

20. The population of cells of claim 15 or 16, wherein the brown adipose-like cells are prepared as an injectable composition.

21. The use of a population of artery-derived brown adipose-like cells in the manufacture of a medicament for the therapeutic and/or prophylactic treatment of a metabolic disorder selected from obesity, diabetes or hyperlipidemia.

22. The use of claim 21, wherein the metabolic disorder is obesity.

23. The use of claim 21, wherein the artery-derived brown adipose-like cells are autologous to a subject.

24. The use of claim 21, wherein the artery-derived brown adipose-like cells are allogeneic or xenogeneic to a subject.

25. The use of claim 21, wherein the brown adipose-like cells are prepared as an injectable composition.