CLAIMS

What is claimed is:

1. Use of a composition comprising 5-methyltetrahydrofolate or 5-methyltetrahydrofolic acid in the manufacture of a medicament for treating an individual with a monocarboxylate transporter 8 (MCT8) deficiency (Allan-Herndon-Dudley Syndrome), wherein the medicament is to be administered to the individual.

2. The use of claim 1, wherein vitamin B6 is to be further administered to the individual.

3. The use of claim 2, wherein the vitamin B6 is selected from the group consisting of pyridoxal, pyridoxol, pyridoxine, pyridoxamine, pyridoxamine phosphate, and pyridoxine hydrochloride.

4. The use of claim 2, wherein the vitamin B6 is pyridoxal 5'-phosphate.

5. The use of any one of claims 1-4, wherein vitamin B2 is to be further administered to the individual.

6. The use of claim 5, wherein the vitamin B2 is selected from the group consisting of riboflavin, flavin mononucleotide (FMN), flavin adenine dinucleotide (FAD), and dihydro-flavin adenine dinucleotide ($FADH_2$).

7. The use of any one of claims 1-6, wherein a thyroid hormone analog, thyroid hormone chaperone, thyroid hormone thyromimetic, or thyroid hormone gene therapy is to be further administered to the individual.

8. The use of any one of claims 1-7, wherein the thyroid hormone analog, thyroid hormone chaperone, thyroid hormone thyromimetic, or thyroid hormone gene therapy is selected from the group consisting of diiodothyropropionic acid (DITPA), tetraiodothyroacetic acid (TETRAC), triiodothyroacetic acid (TRIAC or Tiratricol or Teatrois), phenylbutyrate, 4-phenylbutyric acid, sodium

phenylbutyrate, adeno associated virus 9 based gene therapy (AAV9), eprotirome, sobetirome, or Sob-AM2.

9. A composition comprising (a) a thyroid hormone analog, and (b) 5-methyltetrahydrofolate or 5-methyltetrahydrofolic acid.

10. The composition of claim 9, wherein the thyroid hormone analog is diiodothyropropionic acid (DITPA) or triiodothyroacetic acid (TRIAC or Tiratricol or Teatrois).

11. The composition of any one of claims 9-10, further comprising vitamin B6.

12. The composition of claim 11, wherein the vitamin B6 is selected from the group consisting of pyridoxal, pyridoxol, and pyridoxine.

13. The composition of claim 11, wherein the vitamin B6 is pyridoxal 5'-phosphate.

14. The composition of any one of claims 9-13, further comprising vitamin B2.

15. The composition of claim 14, wherein the vitamin B2 is selected from the group consisting of riboflavin, flavin mononucleotide (FMN), flavin adenine dinucleotide (FAD), and dihydro-flavin adenine dinucleotide ($FADH_{2)}$.