

CLAIMS

What is claimed is:

1. A method of treating an individual with a monocarboxylate transporter 8 (MCT8) deficiency (Allan-Herndon-Dudley Syndrome), comprising: administering to the individual a composition comprising 5-methyltetrahydrofolate or 5-methyltetrahydrofolic acid.
2. The method of claim 1, further comprising the administration of vitamin B6.
3. The method 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 method of claim 2, wherein the vitamin B6 is pyridoxal 5'-phosphate.
5. The method of any one of claims 1-4, further comprising the administration of vitamin B2.
6. The method 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 (FADH₂).
7. The method of any one of claims 1-6, further comprising the administration of a thyroid hormone analog, thyroid hormone chaperone, thyroid hormone thyromimetic, or thyroid hormone gene therapy.
8. The method of any one of claims 1-7, further comprising the administration of a thyroid hormone analog, thyroid hormone chaperone, thyroid hormone thyromimetic, or thyroid hormone gene therapy, 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 Teatros).
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 (FADH₂).