17. The modified eIF4G1 peptide according to claim 16, wherein the variant is selected from the group consisting of N-(α-fluoro-4-methylcinnamoyl)phenylalanine, p-fluoro-phenylalanine, m-fluoro-phenylalanine, and o-fluoro-phenylalanine.

18. The modified eIF4G1 peptide according to any one of claims 1 to 17, wherein the modified eIF4G1 peptide is selected from the group consisting of Tr2_AIB3_A5C (SEQ ID NO: 28), Tr2_me5_1 (SEQ ID NO: 36), eIF4G1_me5 (SEQ ID NO: 39), TAT_eIF4G1_me5 (SEQ ID NO: 42), GT_eIF4G1_me5 (SEQ ID NO: 46), Ac 16 (Ac-G-T-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO:46)-NH2), Ac15 (Ac-T-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO: 48)-NH2), and Ac14 (Ac-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO: 39)-NH2).

19. A pharmaceutical composition comprising a modified eIF4G1 peptide of any one of claims 1 to 18.

20. A nucleic acid molecule encoding for a peptide according to any one of claims 1 to 18.

21. A vector comprising a nucleic acid molecule according to claim 20.

22. A ~~method of inhibiting eIF4E by administering of a pharmaceutically effective amount of a~~ modified eIF4G1 peptide, wherein the peptide has been modified to stabilize the α-helix with at least one α-helix inducer, ~~wherein the peptide has been modified to stabilize the α-helix~~for use in a method.~~.~~

~~23. The method of claim 22, wherein the modified eIF4G1 peptide comprises at least one α-helix inducer.~~

~~24. Method~~ for the treatment of autism and cancer, comprising administering a pharmaceutically effective amount of ~~a~~ the modified eIF4G1 peptide according to any one of claims 1 to 18 or a pharmaceutical composition according to claim 19.

~~25~~23. The ~~method of claim 24~~modified eIF4G1 peptide of claim 22, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, head and neck cancer, esophagus cancer, skin cancer, bladder cancer, colon cancer, cervix cancer and prostate cancer.

CLAIMS

What is claimed is:

1. A modified eIF4G1 peptide, wherein the peptide has been modified to stabilize the α-helix.

2. The modified eIF4G1 peptide of claim 1, wherein the modified eIF4G1 peptide comprises at least one α-helix inducer.

3. The modified eIF4G1 peptide of claim 1 or 2, wherein the peptide comprises a sequence selected from the group consisting of K****RE****FQF (SEQ ID NO: 1), KKRYDRE*LL*FQF (SEQ ID NO: 2), KKR*DRE**LG*QF (SEQ ID NO: 3), and KKRYDRE*LLGFQF (SEQ ID NO: 4).

4. The modified eIF4G1 peptide of any one of claims 1 to 3, wherein the modified eIF4G1 peptide comprises a sequence selected from the group consisting of Linker-KKRYDRE*LL*FQF (SEQ ID NO: 2), YDRE*LL5FQF (SEQ ID NO: 5), KKRYDRE*LL5FQF (SEQ ID NO: 6), YGRKKRRQRRR (SEQ ID NO: 7)-Linker-KKRYDREFLLGFQF (SEQ ID NO: 8), and YGRKKRRQRRR (SEQ ID NO: 7)-Linker-KKRYDRE*LL*FQF (SEQ ID NO: 9).

5. The modified eIF4G1 peptide of any one of claims 1 to 3, wherein the modified eIF4G1 peptide comprises a sequence selected from the group consisting of Linker-KKRYDREFLL*FQF(SEQ ID NO: 10)-NH2, TKKRYDREFLL*FQF(SEQ ID NO: 11)-NH2, KKRYDREFLL*FQF(SEQ ID NO: 10)-NH2, KRYDREFLL*FQF(SEQ ID NO: 12)-NH2, RYDREFLL*FQF(SEQ ID NO: 13)-NH2, YDREFLL*FQF(SEQ ID NO: 14)-NH2, KIIYDREFLLGFQF (SEQ ID NO: 15), and KKRYTREFLLGFQF (SEQ ID NO: 16).

6. The modified eIF4G1 peptide of any one of claims 1 to 5, wherein the modified peptide comprises a protection group.

7. The modified eIF4G1 peptide of claim 6, wherein the protection group is an acyl or acetyl group.

8. The modified eIF4G1 peptide of any one of claims 1 to 7, wherein the modified peptide comprises capping groups at the N-terminus and/or the C-terminus.

9. The modified eIF4G1 peptide of any one of claims 1 to 8, wherein the peptide comprises at least one non-natural amino acid.

10. The modified eIF4G1 peptide of any one of claims 1 to 9, wherein one or more phenylalanine residues (F) are methylated at C_α.

11. The modified eIF4G1 peptide of claim 10, wherein one or more phenylalanine residues (F) in the peptide sequence KKRYDREFLLGFQF (SEQ ID NO: 8) is methylated at C_α.

12. The modified eIF4G1 peptide of any one of claims 1 to 9, wherein one or more glycine residues (G) is replaced by a cycloalkane derivative.

13. The modified eIF4G1 peptide of claim 12, wherein the cycloalkane derivative is selected from the group consisting of 1-aminocyclopentanoic acid, 1-aminocyclohexanoic acid, β-cyclohexylalanine, an α-(1-carboxycyclopentyl)glycine, 1-aminocyclopropanoic acid, 1-amino cyclobutanoic acid and aminomethylcyclohexanoic acid.

14. The modified eIF4G1 peptide of any one of claims 1 to 13, wherein the modified eIF4G1 peptide comprises an N-terminus which is modified.

15. The modified eIF4G1 peptide of any one of claims 1 to 14, wherein the modified eIF4G1 peptide comprises a C-terminus which is modified.

16. The modified eIF4G1 peptide of any one of claims 1 to 15, wherein the modified eIF4G1 peptide comprises one or more phenylalanine variants.

17. The modified eIF4G1 peptide according to claim 16, wherein the variant is selected from the group consisting of N-(α-fluoro-4-methylcinnamoyl)phenylalanine, p-fluoro-phenylalanine, m-fluoro-phenylalanine, and o-fluoro-phenylalanine.

18. The modified eIF4G1 peptide according to any one of claims 1 to 17, wherein the modified eIF4G1 peptide is selected from the group consisting of Tr2_AIB3_A5C (SEQ ID NO: 28), Tr2_me5_1 (SEQ ID NO: 36), eIF4G1_me5 (SEQ ID NO: 39), TAT_eIF4G1_me5 (SEQ ID NO: 42), GT_eIF4G1_me5 (SEQ ID NO: 46), Ac 16 (Ac-G-T-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO:46)-NH2), Ac15 (Ac-T-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO: 48)-NH2), and Ac14 (Ac-K-K-R-Y-D-R-E-*-L-L-5-F-Q-F(SEQ ID NO: 39)-NH2).

19. A pharmaceutical composition comprising a modified eIF4G1 peptide of any one of claims 1 to 18.

20. A nucleic acid molecule encoding for a peptide according to any one of claims 1 to 18.

21. A vector comprising a nucleic acid molecule according to claim 20.

22. A modified eIF4G1 peptide, wherein the peptide has been modified to stabilize the α-helix with at least one α-helix inducer, for use in a method for the treatment of autism and cancer, comprising administering a pharmaceutically effective amount of the modified eIF4G1 peptide according to any one of claims 1 to 18 or a pharmaceutical composition according to claim 19.

23. The modified eIF4G1 peptide of claim 22, wherein the cancer is selected from the group consisting of breast cancer, lung cancer, head and neck cancer, esophagus cancer, skin cancer, bladder cancer, colon cancer, cervix cancer and prostate cancer.