CLAIMS

1. An antisense nucleic acid molecule targeting a C9orf72 transcript, wherein the antisense nucleic acid molecule is able to reduce the level of sense C9orf72-RNA foci and antisense C9orf72-RNA foci.

2. The antisense nucleic acid molecule of claim 1, wherein the antisense nucleic acid molecule comprises SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

3. The antisense nucleic acid molecule of claim 1 or 2, wherein the antisense nucleic acid molecule consists in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 4, or SEQ ID NO: 6.

4. An antisense nucleic acid molecule targeting a C9orf72 transcript, wherein the antisense nucleic acid molecule comprises or consists in a sequence as shown in SEQ ID NO: 3.

5. An antisense nucleic acid molecule targeting a C9orf72 transcript, wherein the antisense nucleic acid molecule comprises or consists in a sequence as shown in SEQ ID NO: 5.

6. An antisense nucleic acid molecule targeting a C9orf72 transcript, wherein the antisense nucleic acid molecule comprises or consists in a sequence as shown in SEQ ID NO: 21.

7. An antisense nucleic acid molecule targeting a C9orf72 transcript, wherein the antisense nucleic acid molecule comprises or consists in a sequence as shown in SEQ ID NO: 22.

8. The antisense nucleic acid molecule according to any one of claims 1 to 5, wherein said antisense nucleic acid molecule is fused to a small nuclear RNA such as the U7 small nuclear RNA.

9. A nucleic acid construct comprising at least two antisense nucleic acid molecules according to anyone of claims 1 to 8.

10. The nucleic acid construct of claim 9 comprising a first antisense nucleic acid molecule targeting the sense C9orf72 transcript and a second antisense nucleic acid molecule targeting the antisense C9orf72 transcript.

11. The nucleic acid construct of claim 10, wherein the first antisense nucleic acid molecule comprises or consists of the sequence as shown in SEQ ID NO: 6 and the second antisense nucleic acid molecule comprises or consists of the sequence as shown in SEQ ID NO: 3.

12. A vector for delivering the antisense nucleic acid molecule according to any one of claims 1 to 8 or the nucleic acid construct of claims 9-11.

13. The vector according to claim 12, which is a viral vector coding said antisense nucleic acid molecule or said nucleic acid construct.

14. The vector according to claim 13, wherein said viral vector is an AAV vector, in particular an AAV9 or AAV10 vector.

15. The antisense nucleic acid molecule according to any one of claims 1 to 8, the nucleic acid construct of claims 9-11 or the vector according to any one of claims 12 to 14, for use in the treatment of a C9orf72 associated disease, in particular a C9orf72 hexanucleotide repeat expansion associated disease.

16. The antisense nucleic acid molecule according to any one of claims 1 to 8, the nucleic acid construct of claims 9-11 or the vector according to any one of claims 12 to 14, for use according to claim 15, wherein the disease is amyotrophic lateral sclerosis (ALS) or frontotemporal dementia (FTD), in particular amyotrophic lateral sclerosis (ALS).

17. The antisense nucleic acid molecule according to any one of claims 1 to 8, the nucleic acid construct of claims 9-11 or the vector according to any one of claims 12 to 14, wherein said antisense nucleic acid molecule or said vector is for an administration via the intravenous and/or intracerebroventricular routes.

18. Use of the antisense nucleic acid molecule according to any one of claims 1 to 8, the nucleic acid construct of claims 9-11 or the vector according to any one of claims 12 to 14, in the preparation of a medicament for treating a C9orf72 associated disease, in particular a C9orf72 hexanucleotide repeat expansion associated disease.

19. Use according to claim 18, wherein the disease is amyotrophic lateral sclerosis (ALS) or frontotemporal dementia (FTD), in particular amyotrophic lateral sclerosis (ALS).

20. Use according to claim 18 or 19, wherein said antisense nucleic acid molecule or said vector is to be administered via an intravenous and/or intracerebroventricular routes.