CLAIMS

1. A modified adeno-associated virus (AAV), comprising a nucleotide sequence encoding a 7-mer peptide inserted in its capsid, wherein the 7-mer peptide confers reduced tropism towards the liver.

2. The modified AAV of claim 1, wherein the modified AAV has decreased liver tropism.

3. The modified AAV of claim 2, wherein the 7-mer peptide is selected from the group consisting of YRVFVVV (SEQ ID NO: 346), FFRCPLG (SEQ ID NO: 365), FIECLLL (SEQ ID NO: 121), and WVFLVDS (SEQ ID NO: 342).

4. The modified AAV of claim 1, wherein the modified AAV is liver de-targeting.

5. The modified AAV of claim 4, wherein the 7-mer peptide is selected from the group consisting of WLTWLLG (SEQ ID NO: 376), MMWVGFS (SEQ ID NO: 393), GVCSCSG (SEQ ID NO: 397), ALRAKEC (SEQ ID NO: 392), LSRSKGY (SEQ ID NO: 378), and YYARREG (SEQ ID NO: 389).

6. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype DJ (AAV-DJ) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 399, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1767th and 1768th nucleotides of SEQ ID NO: 399.

7. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype 2 (AAV2) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 401, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1764th and 1765th nucleotides of SEQ ID NO: 401.

8. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype 5 (AAV5) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 402, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1722th and 1723th nucleotides of SEQ ID NO: 402.

9. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype 6 (AAV6) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 403, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1770th and 1771th nucleotides of SEQ ID NO: 403.

10. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype 6 (AAV6) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 403, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1764th and 1765th nucleotides of SEQ ID NO: 403.

11. The modified AAV of any one of claims 1-5, wherein the adeno-associated virus is serotype 9 (AAV9) comprising a capsid comprising the nucleotide sequence as set forth in SEQ ID NO: 404, and wherein the nucleotide sequence encoding the 7-mer peptide is inserted between the 1764th and 1765th nucleotides of SEQ ID NO: 404.

12. A composition comprising the modified AAV of any one of the preceding claims, and a pharmaceutically acceptable excipient.

13. A nucleic acid encoding the modified AAV of any one of the preceding claims.