

CLAIMS

WHAT IS CLAIMED IS:

1. A DNA fragment, the DNA fragment comprising a target sequence and a polynucleotide sequence encoding a N-acetylgalactosamine (GalNAc) binding domain (GBD) capable of binding to GalNAc.
2. The DNA fragment of claim 1, wherein the GBD comprises one or more Serines, Threonines, or any combination thereof, and optionally wherein the one or more Serines, Threonines, or any combination thereof are separated by glycines.
3. The DNA fragment of claim 1 or 2, wherein the GBD comprises a sequence as set forth in SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, or SEQ ID NO: 5.
4. The DNA fragment of one of the preceding claims, wherein the DNA fragment further comprises a second polynucleotide sequence encoding specific protease cleavage sequence, flanked by the target sequence and the first polynucleotide sequence, and optionally wherein the specific protease cleavage sequence comprises one or more of T2A, P2A, E2A, F2A, TEV, VLP1 or SUMO specific protease cleavage sequences.
5. The DNA fragment of claim 4, wherein the specific protease cleavage sequence comprises a sequence as set forth in SEQ ID NO: 9 or SEQ ID NO: 10.
6. The DNA fragment of one of the preceding claims, wherein the DNA fragment further comprises a promoter, and optionally wherein the promoter is T3, T7, or SP6.
7. The DNA fragment of claim 6, wherein the promoter comprises a sequence as set forth in SEQ ID NO: 11.
8. The DNA fragment of one of the preceding claims, wherein the DNA fragment is expressed in a pCDNA3.1 plasmid vector.
9. A polynucleotide-puromycin molecule, wherein the polynucleotide-puromycin molecule comprises a transcription product of the DNA fragment of one of claims 1-8, subsequently with a DNA-puromycin linker and a puromycin.
10. The polynucleotide-puromycin molecule of claim 9, wherein the DNA-puromycin linker comprises a sequence as set forth in SEQ ID NO. 8.
11. A polynucleotide-polypeptide molecule, wherein the polynucleotide-polypeptide molecule comprises a transcription product of the DNA fragment of one of claims 1-8

subsequently with a DNA-puromycin linker, a puromycin, and a translation product of the DNA fragment of one of claims 1-8 in a reverse order.

12. A polynucleotide-polypeptide molecule, wherein the polynucleotide-polypeptide molecule comprises a transcription product of the DNA fragment of one of claims 1-8, subsequently with a DNA-puromycin linker, a puromycin, and the GBD.
13. A molecule with N-acetylgalactosamine (GalNAc), the molecule comprising a transcription product of the DNA fragment of one of claims 1-8, subsequently with a DNA-puromycin linker, a puromycin, and the GBD, wherein one or more GalNAcs bind to the GBD.
14. A method of preparing a molecule, the method comprising
 - a. Obtaining the DNA fragment of one of claims 1-8;
 - b. *In vitro* transcribing the DNA fragment of one of claims 1-8, thereby obtaining a transcription product of the DNA fragment of one of claims 1-8;
 - c. Ligating a puromycin to the transcription product from step b, thereby obtaining a polynucleotide-puromycin molecule;
 - d. *In vitro* translating the polynucleotide-puromycin molecule from step c;
 - e. conjugating one or more GalNacs
15. The method of claim 14, wherein the method further comprises cleaving the product obtained in step d prior to step e.
16. The method of claim 14, wherein the conjugating is catalyzed by a N-acetylgalactosamine transferase.
17. A method of delivering a target gene sequence to a target cell, the method comprising applying the molecule with GalNAc of claim 13 to the target cell, and wherein the target cell expresses a ligand of GalNAc.
18. The method of claim 17, wherein the target cell is a liver cell.