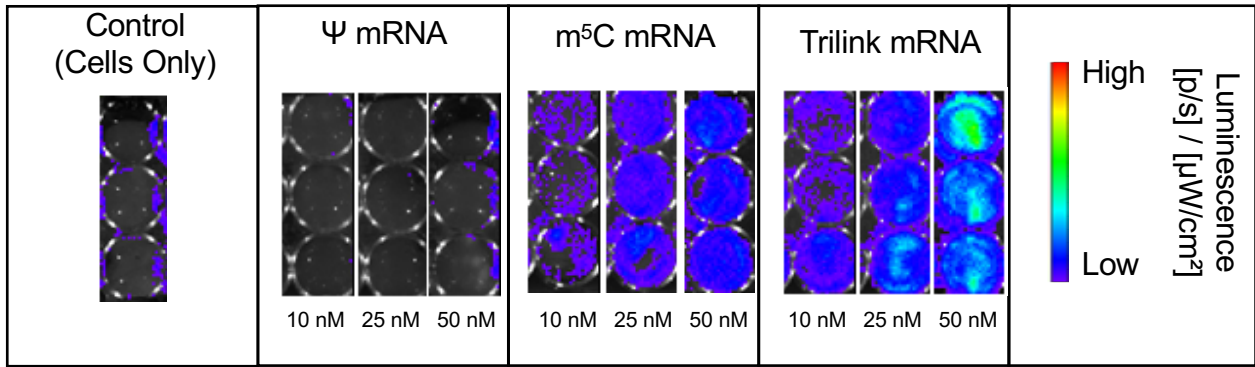
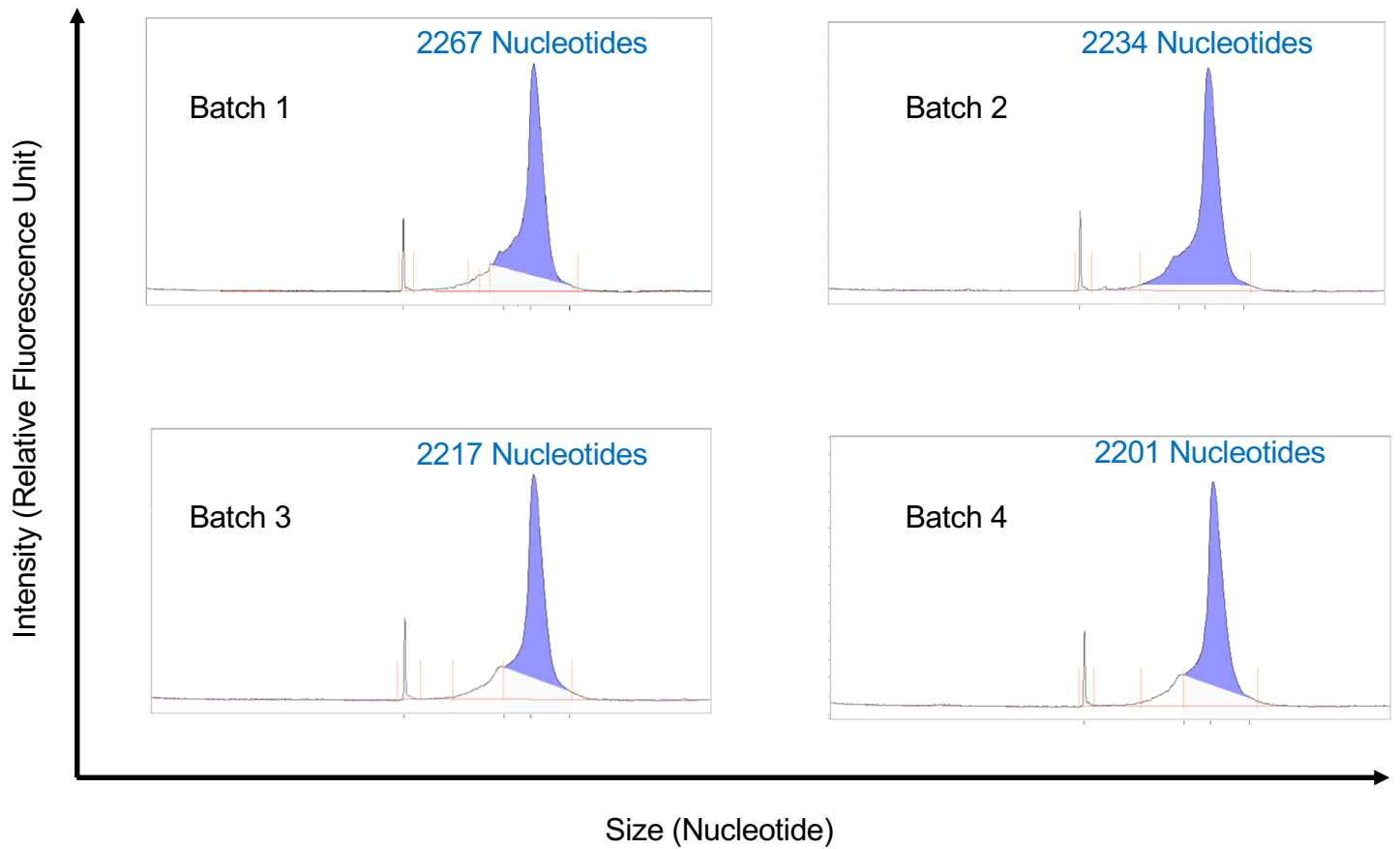


**Fig. S1**

**(A)**

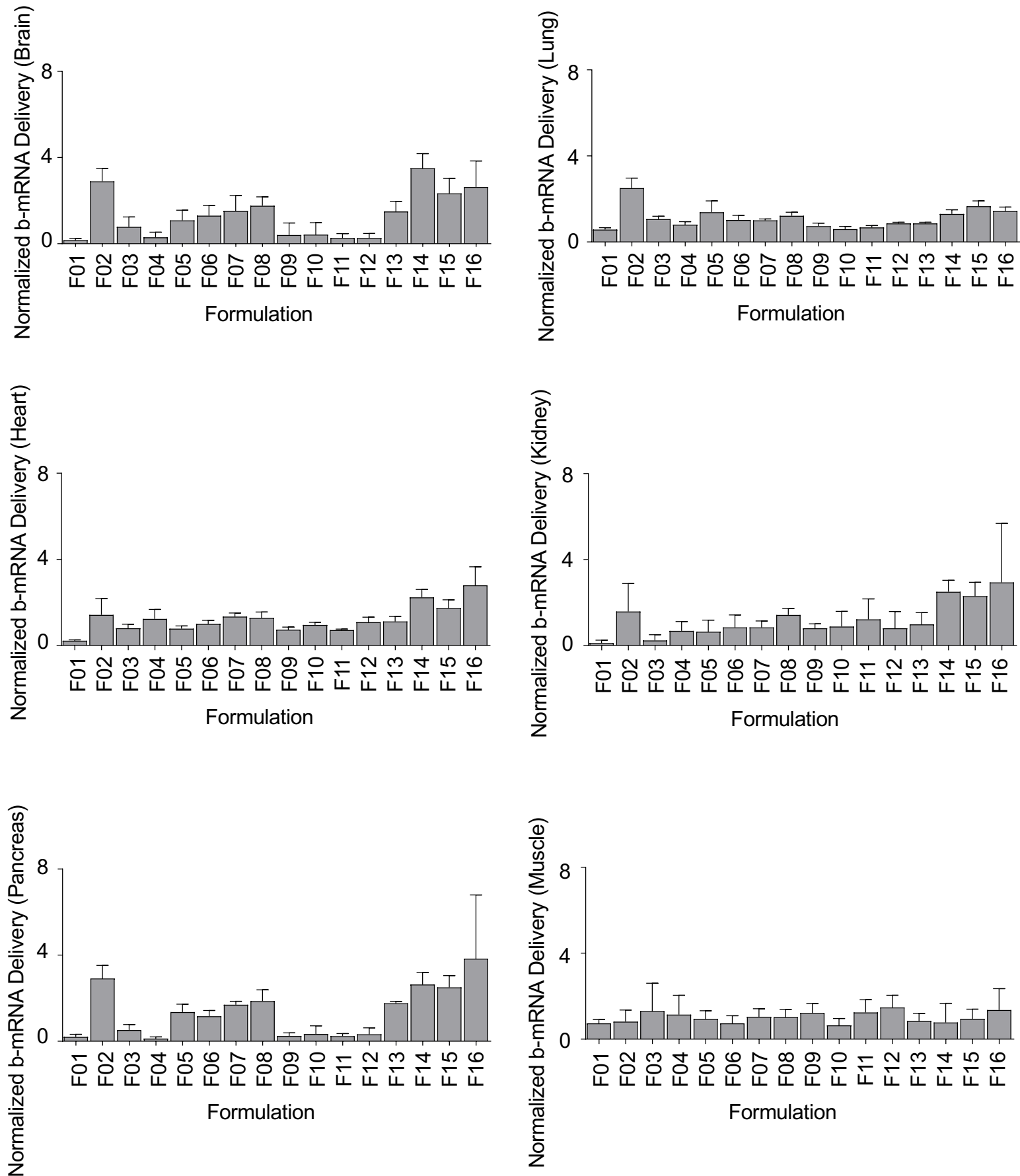


**(B)**



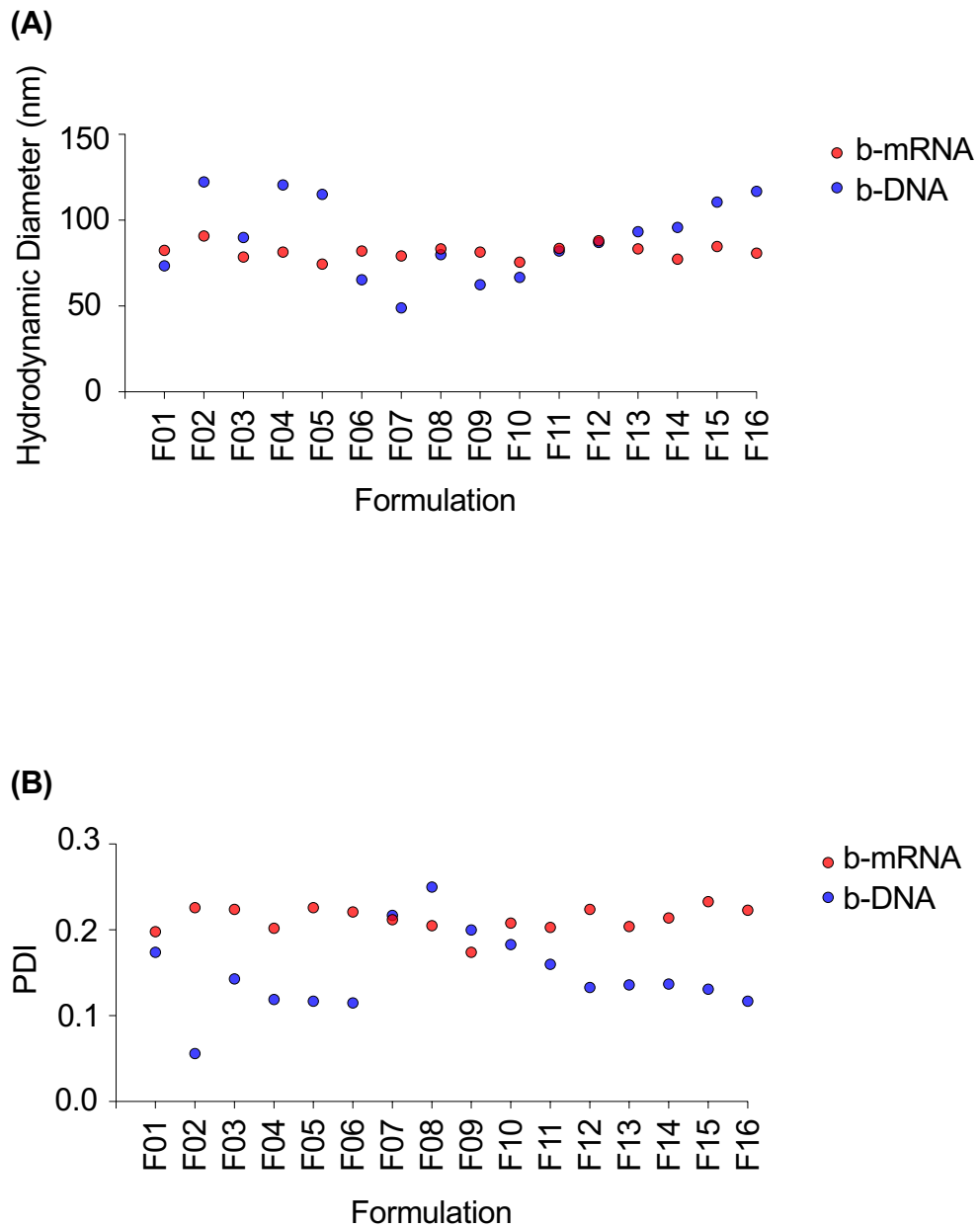
**Fig. S1. Barcoded mRNA (b-mRNA) optimization and quality control.** (A) bEnd.3 cells were treated with LNPs encapsulating different b-mRNA (modified with either pseudouridine ( $\psi$ ) or 5-methylcytosine (m<sup>5</sup>C)) or commercially available Trilink-mRNA at different concentration. Luciferase activity was assessed at 48 hours after treatment. (B) Representative Bioanalyzer trace of b-mRNA from different batches.

**Fig. S2**



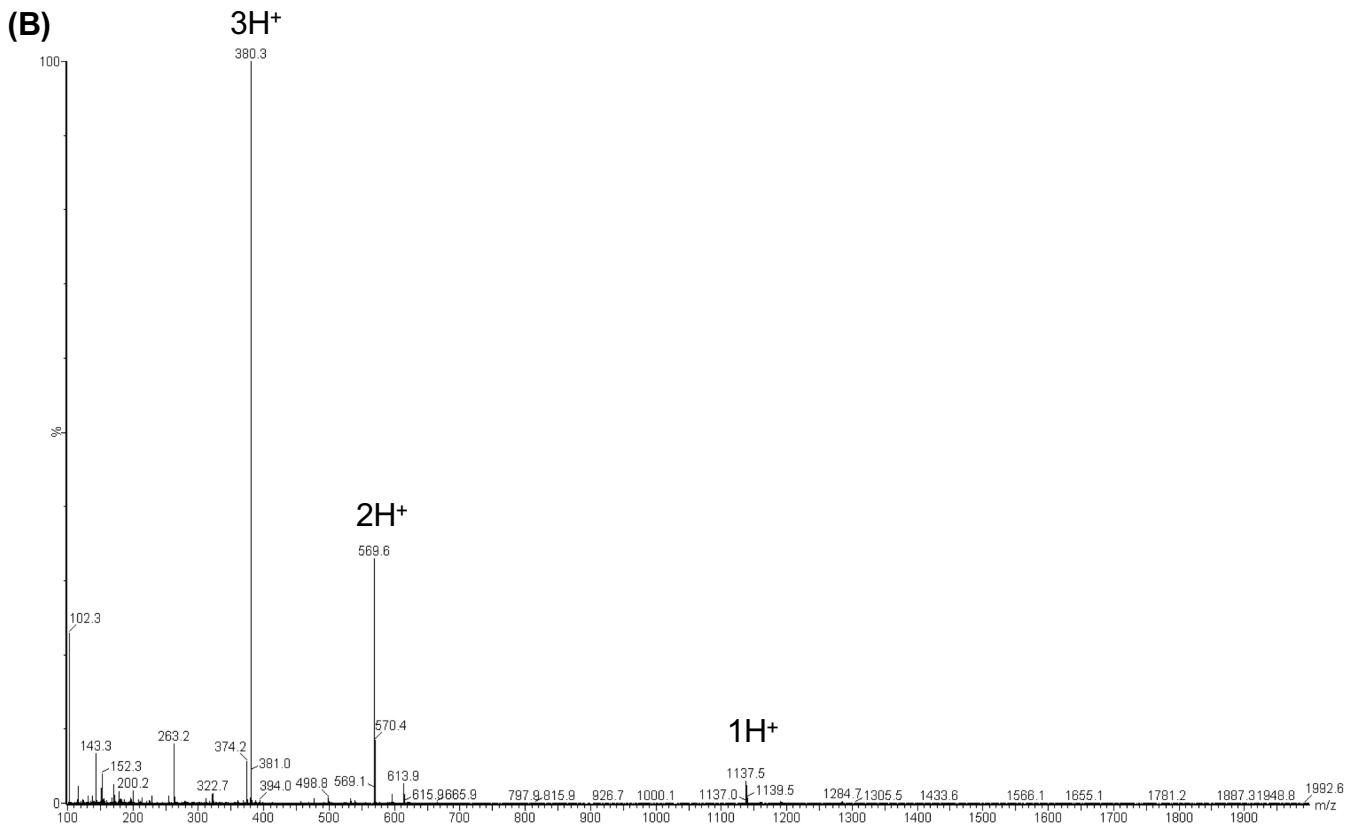
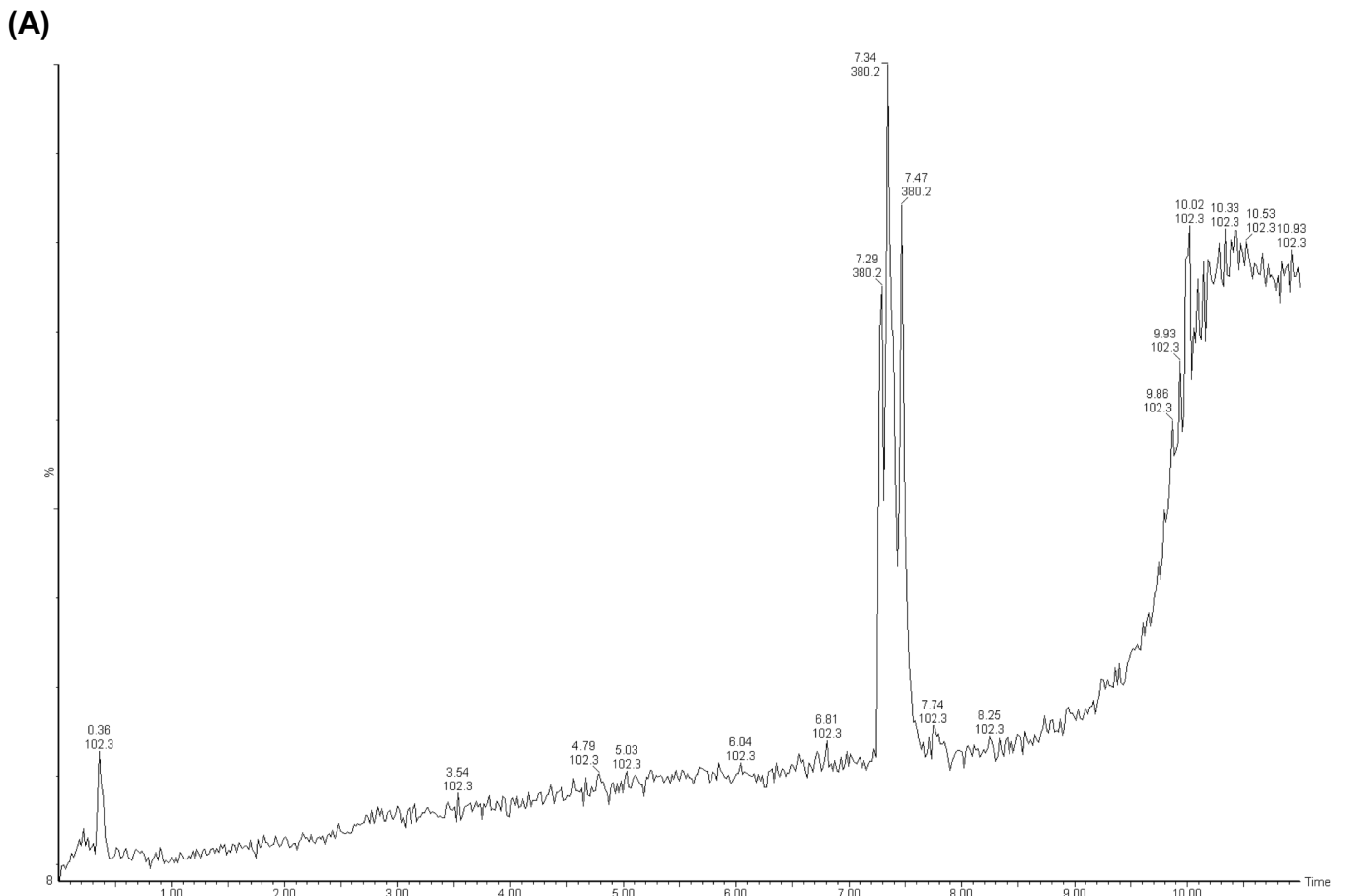
**Fig. S2. F2, F14, F15, and F16 are more efficient than other LNP formulations to deliver barcoded mRNA (b-mRNA) to the brain, lung, heart, kidney, pancreas, and muscle.** 16 b-mRNA LNP formulations were pooled and injected into C57BL/6 mice intravenously (0.25  $\mu\text{g}$  of each b-mRNA was included in a single injection). 4 hours post injection, b-mRNA delivery to the lung, kidney, heart, pancreas, brain, and muscle were quantified. N = 4 mice per group. Data were plotted as mean  $\pm$  SD.

**Fig. S3**



**Fig. S3. Encapsulation of barcoded DNA (b-DNA) versus b-mRNA in LNPs alters LNP physical properties.** Hydrodynamic diameter and PDI of LNPs encapsulating b-mRNA or b-DNA were analyzed by dynamic light scattering and were shown in (A) and (B) respectively.

**Fig. S4**



**Fig. S4. Ionizable lipid chemical characterization. High-performance liquid chromatography (HPLC) photo diode array detection and mass spectrometry analysis were shown in (A) and (B) respectively.**

# Table 1

**Table. S1** Library of primer sequences

Primers	Sequence
Miseq primer 1	CAAGCAGAAGACGGCATAACGAGATCCTGGTAGGTGACTGGAGTTCAGACGTGTG
Miseq primer 2	CAAGCAGAAGACGGCATAACGAGATTAAGCATGGTACTGGAGTTCAGACGTGTG
Miseq primer 3	CAAGCAGAAGACGGCATAACGAGATAGATGTGCGTGACTGGAGTTCAGACGTGTG
Miseq primer 4	CAAGCAGAAGACGGCATAACGAGATGTCGAGCAGTGACTGGAGTTCAGACGTGTG
Miseq primer 5	CAAGCAGAAGACGGCATAACGAGATGAATTGCTGTGACTGGAGTTCAGACGTGTG
Miseq primer 6	CAAGCAGAAGACGGCATAACGAGATAAGCAACTGTGACTGGAGTTCAGACGTGTG
Miseq primer 7	CAAGCAGAAGACGGCATAACGAGATCTAACTGGGTGACTGGAGTTCAGACGTGTG
Miseq primer 8	CAAGCAGAAGACGGCATAACGAGATAGGCTCAAGTGACTGGAGTTCAGACGTGTG
Miseq primer 9	CAAGCAGAAGACGGCATAACGAGATCAGTTGGTGTGACTGGAGTTCAGACGTGTG
Miseq primer 10	CAAGCAGAAGACGGCATAACGAGATTCTGGACCGTGACTGGAGTTCAGACGTGTG
Miseq primer 11	CAAGCAGAAGACGGCATAACGAGATTGTTATACGTGACTGGAGTTCAGACGTGTG
Miseq primer 12	CAAGCAGAAGACGGCATAACGAGATTCAGCGAAGTGACTGGAGTTCAGACGTGTG
Miseq primer 13	CAAGCAGAAGACGGCATAACGAGATGTCAAGTTGTGACTGGAGTTCAGACGTGTG
Miseq primer 14	CAAGCAGAAGACGGCATAACGAGATAGGATGTGGTACTGGAGTTCAGACGTGTG
Miseq primer 15	CAAGCAGAAGACGGCATAACGAGATCATTCCGAGTGACTGGAGTTCAGACGTGTG
Miseq primer 16	CAAGCAGAAGACGGCATAACGAGATACATCCTTGTGACTGGAGTTCAGACGTGTG
Miseq primer 17	CAAGCAGAAGACGGCATAACGAGATTCGTGTGCGTGACTGGAGTTCAGACGTGTG
Miseq primer 18	CAAGCAGAAGACGGCATAACGAGATTCGCCAGAGTGACTGGAGTTCAGACGTGTG
Miseq primer 19	CAAGCAGAAGACGGCATAACGAGATTCGCTATGGTACTGGAGTTCAGACGTGTG
Miseq primer 20	CAAGCAGAAGACGGCATAACGAGATGGCTCCTGGTACTGGAGTTCAGACGTGTG
Miseq primer 21	CAAGCAGAAGACGGCATAACGAGATATCCGACAGTGACTGGAGTTCAGACGTGTG
Miseq primer 22	CAAGCAGAAGACGGCATAACGAGATAACATAATGTGACTGGAGTTCAGACGTGTG
Miseq primer 23	CAAGCAGAAGACGGCATAACGAGATATGGTAGGGTGACTGGAGTTCAGACGTGTG
Miseq primer 24	CAAGCAGAAGACGGCATAACGAGATGCTAAGTAGTGACTGGAGTTCAGACGTGTG
Miseq primer 25	CAAGCAGAAGACGGCATAACGAGATACTTCTTCGTGACTGGAGTTCAGACGTGTG
Miseq primer 26	CAAGCAGAAGACGGCATAACGAGATTAGATCCTGTGACTGGAGTTCAGACGTGTG
Miseq primer 27	CAAGCAGAAGACGGCATAACGAGATTTACTGTCTGACTGGAGTTCAGACGTGTG
Miseq primer 28	CAAGCAGAAGACGGCATAACGAGATGGCATAGGGTGACTGGAGTTCAGACGTGTG
Miseq primer 29	CAAGCAGAAGACGGCATAACGAGATCAAGGCCAGTGACTGGAGTTCAGACGTGTG
Miseq primer 30	CAAGCAGAAGACGGCATAACGAGATGACGCTATGTGACTGGAGTTCAGACGTGTG
Miseq primer 31	CAAGCAGAAGACGGCATAACGAGATAAGGGCGACGTGACTGGAGTTCAGACGTGTG
Miseq primer 32	CAAGCAGAAGACGGCATAACGAGATCCTAGAAATGTGACTGGAGTTCAGACGTGTG
Miseq primer 33	CAAGCAGAAGACGGCATAACGAGATTGGTAACGGTGACTGGAGTTCAGACGTGTG
Miseq primer 34	CAAGCAGAAGACGGCATAACGAGATCATCAGACGTGACTGGAGTTCAGACGTGTG
Miseq primer 35	CAAGCAGAAGACGGCATAACGAGATGTGCGTAAGTGACTGGAGTTCAGACGTGTG
Miseq primer 36	CAAGCAGAAGACGGCATAACGAGATCTATTCAAGTGACTGGAGTTCAGACGTGTG
Miseq primer 37	CAAGCAGAAGACGGCATAACGAGATAGTGTCTTGTGACTGGAGTTCAGACGTGTG
Miseq primer 38	CAAGCAGAAGACGGCATAACGAGATCCTTGCTGGTACTGGAGTTCAGACGTGTG
Miseq primer 39	CAAGCAGAAGACGGCATAACGAGATTTGCTGGAGTGACTGGAGTTCAGACGTGTG
Miseq primer 40	CAAGCAGAAGACGGCATAACGAGATAGCTCTGGGTACTGGAGTTCAGACGTGTG
Miseq primer 41	CAAGCAGAAGACGGCATAACGAGATACCAAGGAGTGACTGGAGTTCAGACGTGTG
Miseq primer 42	CAAGCAGAAGACGGCATAACGAGATGATAACCTGTGACTGGAGTTCAGACGTGTG
Miseq primer 43	CAAGCAGAAGACGGCATAACGAGATTAGATGACGTGACTGGAGTTCAGACGTGTG
Miseq primer 44	CAAGCAGAAGACGGCATAACGAGATTGCCAAGGGTGACTGGAGTTCAGACGTGTG
Miseq primer 45	CAAGCAGAAGACGGCATAACGAGATGACCGAGAGTGACTGGAGTTCAGACGTGTG
Miseq primer 46	CAAGCAGAAGACGGCATAACGAGATCAGACAATGTGACTGGAGTTCAGACGTGTG
Miseq primer 47	CAAGCAGAAGACGGCATAACGAGATCTAGGTTCTGACTGGAGTTCAGACGTGTG
Miseq primer 48	CAAGCAGAAGACGGCATAACGAGATGTTTCATTAGTGACTGGAGTTCAGACGTGTG

# Table 2

**Table S2.** Library of IVT templates

Barcode	Sequence
b-mRNA 1	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAGTACCCTCCC GCCCGACTCTAGAATTA
b-mRNA 2	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GGCAATTGTCCC GCCCGACTCTAGAATTA
b-mRNA 3	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AGGTGCGTTACCG CCCGACTCTAGAATTA
b-mRNA 4	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGACGATCATCCG CCCGACTCTAGAATTA
b-mRNA 5	GCCCAGTCATAGCCGAATAG NNNNNNNNNN ATGGGAGACACCG CCCCGACTCTAGAATTA
b-mRNA 6	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CTGTTTCTCCC GCCCGACTCTAGAATTA
b-mRNA 7	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGTTTGTACGCC GCCCGACTCTAGAATTA
b-mRNA 8	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CCCACAAATCCC GCCCGACTCTAGAATTA
b-mRNA 9	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAGGCTGCAACCG CCCGACTCTAGAATTA
b-mRNA 10	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GTCAGCATTCCC GCCCGACTCTAGAATTA
b-mRNA 11	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CCTCATGGATCCG CCCCGACTCTAGAATTA
b-mRNA 12	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CATCGTGGAACCG CCCGACTCTAGAATTA
b-mRNA 13	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AATTCCCAGCCC GCCCGACTCTAGAATTA
b-mRNA 14	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGTCGTTTTGCC GCCCGACTCTAGAATTA
b-mRNA 15	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAAGGCGAGACCG CCCGACTCTAGAATTA
b-mRNA 16	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CTCTGATCTGCC GCCCGACTCTAGAATTA
b-mRNA 17	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AGAACGTGTCCC GCCCGACTCTAGAATTA
b-mRNA 18	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AGACCTTAGCCC GCCCGACTCTAGAATTA
b-mRNA 19	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AGTTCGAACACCG CCCGACTCTAGAATTA
b-mRNA 20	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TGCTTTGGGCCGCC CGGACTCTAGAATTA
b-mRNA 21	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TTCTACCTGCC GCCCGACTCTAGAATTA
b-mRNA 22	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGCGATAATGCC GCCCGACTCTAGAATTA
b-mRNA 23	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TCAGTCTCTGCC GCCCGACTCTAGAATTA
b-mRNA 24	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GTGCATGTCACCG CCCGACTCTAGAATTA
b-mRNA 25	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GGAACCAACACCG CCCGACTCTAGAATTA
b-mRNA 26	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GTTCAGAGAGCC GCCCGACTCTAGAATTA
b-mRNA 27	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TTGGCTAGTGCC GCCCGACTCTAGAATTA
b-mRNA 28	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GGCAAAGTCACCG CCCGACTCTAGAATTA
b-mRNA 29	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CTTGCTGAACCG CCCGACTCTAGAATTA
b-mRNA 30	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GTATGCCTGTCC GCCCGACTCTAGAATTA
b-mRNA 31	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TTAGGAGTCGCC GCCCGACTCTAGAATTA
b-mRNA 32	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AGATAGCGTGCC GCCCGACTCTAGAATTA
b-mRNA 33	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAGCGGACTTCC GCCCGACTCTAGAATTA
b-mRNA 34	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGGTCTAGATCCG CCCGACTCTAGAATTA
b-mRNA 35	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAGGGGATTCCG CCCGACTCTAGAATTA
b-mRNA 36	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CAGATGCGAACCG CCCGACTCTAGAATTA
b-mRNA 37	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GGAACCTCAACCG CCCGACTCTAGAATTA
b-mRNA 38	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GATTGGCCAACCG CCCGACTCTAGAATTA
b-mRNA 39	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TGTCGCCTTTCC GCCCGACTCTAGAATTA
b-mRNA 40	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CAGCGACATTCCG CCCGACTCTAGAATTA
b-mRNA 41	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CCATACGTTGCC GCCCGACTCTAGAATTA
b-mRNA 42	GCCCAGTCATAGCCGAATAG NNNNNNNNNN GGTTAGGTAGCC GCCCGACTCTAGAATTA
b-mRNA 43	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TACACCGTGACCG CCCGACTCTAGAATTA
b-mRNA 44	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TACTTCTGGGCCGCC CGGACTCTAGAATTA
b-mRNA 45	GCCCAGTCATAGCCGAATAG NNNNNNNNNN AAGCGCTTGTCC GCCCGACTCTAGAATTA
b-mRNA 46	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CGTTAATCCC GCCCGACTCTAGAATTA
b-mRNA 47	GCCCAGTCATAGCCGAATAG NNNNNNNNNN TATCACGAGGCC GCCCGACTCTAGAATTA
b-mRNA 48	GCCCAGTCATAGCCGAATAG NNNNNNNNNN CCGAATAGTCCC GCCCGACTCTAGAATTA
Luc T7 F2	TAATAGGACTCACTATAggg CATTCCGGTACTGTTGG
Luc Seq US1	AGACGTGTGCTCTTCCGATCT GGACGAGGTGCCTAAAGGAC
NeoR Seq US2	ACACGACGCTCTTCCGATCT GCCCAGTCATAGCCGAATAG

# Table 3

**Table S3.** Library of b-DNA sequences

Barcode	Sequences
b-DNA 1	A*G*A*CGTGTGCTCTCCGATCT GAGGGTACTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 2	A*G*A*CGTGTGCTCTCCGATCT GACAATTGCC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 3	A*G*A*CGTGTGCTCTCCGATCT TAACGCACCT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 4	A*G*A*CGTGTGCTCTCCGATCT ATGATCGTCG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 5	A*G*A*CGTGTGCTCTCCGATCT TGTCTCCAT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 6	A*G*A*CGTGTGCTCTCCGATCT GGAGAAACAG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 7	A*G*A*CGTGTGCTCTCCGATCT CGTACAAACG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 8	A*G*A*CGTGTGCTCTCCGATCT GATTTGTGGG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 9	A*G*A*CGTGTGCTCTCCGATCT TTGCAGCCTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 10	A*G*A*CGTGTGCTCTCCGATCT GAATGCTGAC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 11	A*G*A*CGTGTGCTCTCCGATCT ATCCATGAGG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 12	A*G*A*CGTGTGCTCTCCGATCT TTCCACGATG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 13	A*G*A*CGTGTGCTCTCCGATCT GCTGGGAATT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 14	A*G*A*CGTGTGCTCTCCGATCT CAAAACGACG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 15	A*G*A*CGTGTGCTCTCCGATCT TCTCGCCTTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 16	A*G*A*CGTGTGCTCTCCGATCT CAGATCAGAG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 17	A*G*A*CGTGTGCTCTCCGATCT GACACGTTCT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 18	A*G*A*CGTGTGCTCTCCGATCT GCTAAGTCT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 19	A*G*A*CGTGTGCTCTCCGATCT TGTTGACCT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 20	A*G*A*CGTGTGCTCTCCGATCT CCCAAAGACA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 21	A*G*A*CGTGTGCTCTCCGATCT CAGGTAGGAA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 22	A*G*A*CGTGTGCTCTCCGATCT CATTATCGCG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 23	A*G*A*CGTGTGCTCTCCGATCT CAGAGACTGA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 24	A*G*A*CGTGTGCTCTCCGATCT TGACATGCAC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 25	A*G*A*CGTGTGCTCTCCGATCT TGTTGTTCC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 26	A*G*A*CGTGTGCTCTCCGATCT CTCTCTGAAC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 27	A*G*A*CGTGTGCTCTCCGATCT CACTAGCAA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 28	A*G*A*CGTGTGCTCTCCGATCT TGACTTTGCC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 29	A*G*A*CGTGTGCTCTCCGATCT TTCAGCGAAG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 30	A*G*A*CGTGTGCTCTCCGATCT ACAGGCATAC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 31	A*G*A*CGTGTGCTCTCCGATCT CGACTCCTAA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 32	A*G*A*CGTGTGCTCTCCGATCT CAGCCTATCT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 33	A*G*A*CGTGTGCTCTCCGATCT AAGTCCGCTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 34	A*G*A*CGTGTGCTCTCCGATCT ATCTAGACCG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 35	A*G*A*CGTGTGCTCTCCGATCT AATCCCCCTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 36	A*G*A*CGTGTGCTCTCCGATCT TTCGCATCTG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 37	A*G*A*CGTGTGCTCTCCGATCT TTGGAGTTCC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 38	A*G*A*CGTGTGCTCTCCGATCT TTGGCCAATC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 39	A*G*A*CGTGTGCTCTCCGATCT AAAGGCCACA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 40	A*G*A*CGTGTGCTCTCCGATCT AATGTCGCTG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 41	A*G*A*CGTGTGCTCTCCGATCT CAACGTATGG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 42	A*G*A*CGTGTGCTCTCCGATCT CTACCTAACC NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 43	A*G*A*CGTGTGCTCTCCGATCT TCACGGTGA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 44	A*G*A*CGTGTGCTCTCCGATCT CCCAGAAGTA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 45	A*G*A*CGTGTGCTCTCCGATCT ACAAGCGCTT NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 46	A*G*A*CGTGTGCTCTCCGATCT GGATTAACCG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 47	A*G*A*CGTGTGCTCTCCGATCT CCTCGTGATA NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T
b-DNA 48	A*G*A*CGTGTGCTCTCCGATCT GACTATTCGG NNNNNNNNNN AGATCGGAAGAGCGTCG*T*G*T