FIG. 1

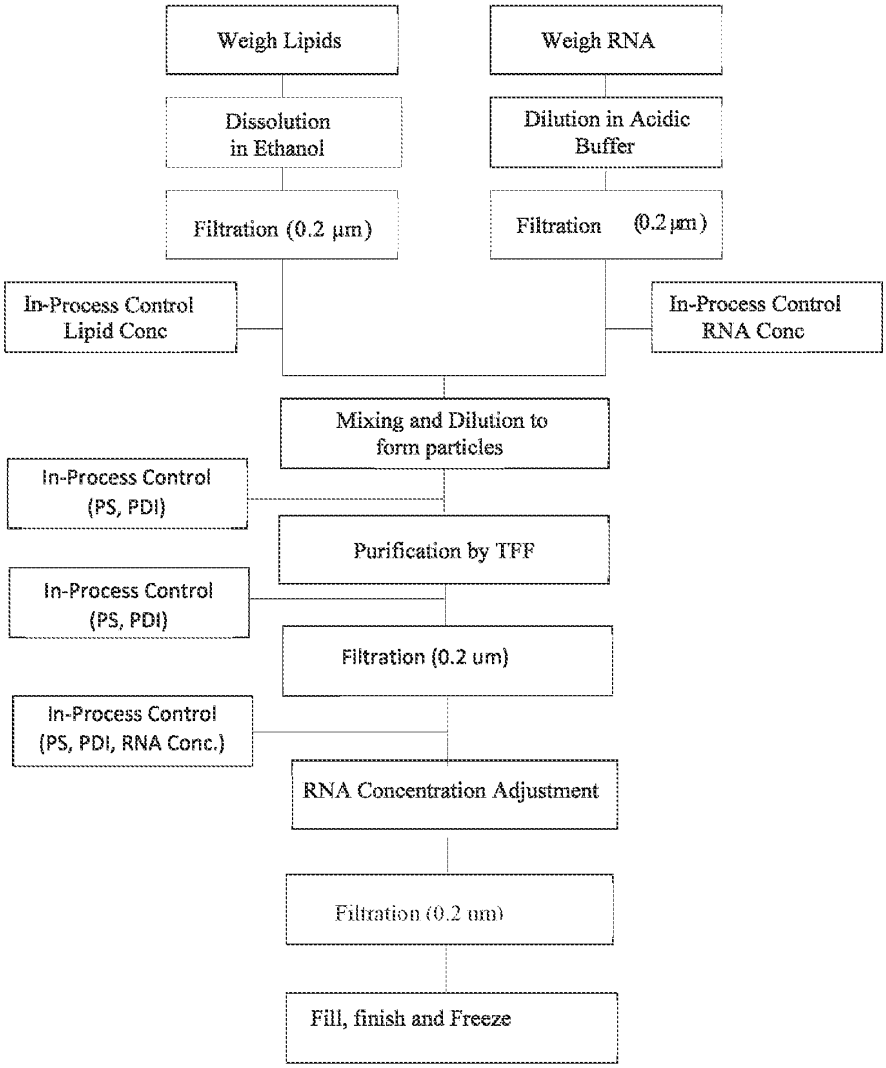

Weigh Lipids
Weigh RNA
Dissolution in Ethanol
Dilution in Acidic Buffer
Filtration (0.2 µm)
Filtration (0.2 µm)
In-Process Control Lipid Conc
In-Process Control RNA Conc
Mixing and Dilution to form particles
In-Process Control (PS, PDI)
Purification by TFF
In-Process Control (PS, PDI)
Filtration (0.2 um)
In-Process Control (PS, PDI, RNA Conc.)
RNA Concentration Adjustment
Filtration (0.2 um)
Fill, finish and Freeze

FIG. 2

			Lipids Mol %										
Example #	mRNA Length (Number of Nucleotides)	mRNA MW	DOTAP	Lipid	DSPC	CHOL	PEG	mRNA/Lipid (wt/wt)	N/P	Particle Size (nm)	PDI	%Encap	mRNA purity (%)
1	4867	1582818	25	25	10	38.5	1.5	0.09	3	99.7	0.1	97.6	75.0
2	4867	1582818	25	25	10	38.5	1.5	0.07	4	87.7	0.1	99.3	79.0
3	4867	1582818	25	25	10	38.5	1.5	0.05	5	85.9	0.1	99.7	80.0
4	4867	1582818	25	25	10	38.5	1.5	0.04	6	81.2	0.2	99.8	76.0
5	4867	1582818	25	25	10	37	3	0.06	4	72.9	0.2	99.5	82.0
6	4867	1582818	25	25	10	35	5	0.06	4	72.0	0.1	99.5	77.0
7	4867	1582818	25	25	10	38.5	1.5	0.06	4	82.4	0.1	99.2	78.0
8	4867	1582818	25	25	10	38.5	1.5	0.05	5	81.8	0.1	99.4	80.0
9	4867	1582818	20	20	7	51.5	1.5	0.06	4	80.3	0.1	99.5	77.0
10	4867	1582818	20	25	10	42	3	0.06	4	84.4	0.2	97.2	74.0
11	4867	1582818	20	30	13	32	5	0.06	4	80.8	0.1	94.7	64.0
12	4867	1582818	25	20	10	40	5	0.05	4	70.2	0.1	99.7	74.0
13	4867	1582818	25	25	13	35.5	1.5	0.06	4	87.7	0.1	98.8	78.0
14	4867	1582818	25	30	7	35	3	0.07	4	81.2	0.1	95.8	72.0
15	4867	1582818	30	20	13	34	3	0.06	4	70.2	0.2	99.5	76.0
16	4867	1582818	30	25	7	33	3	0.06	4	71.7	0.2	97.9	72.0
17	4867	1582818	30	30	10	25.8	1.5	0.07	4	85.9	0.1	99.2	76.0
18	4867	1582818	20	15	13	49	3	0.05	4	68.8	0.2	98.6	76.9
19	4867	1582818	20	20	13	44	3	0.05	4	73.5	0.1	99.4	78.9
20	4867	1582818	20	25	13	39	3	0.06	4	78.6	0.1	98.9	76.2
21	4867	1582818	25	15	13	44	3	0.05	4	67.2	0.1	98.5	73.5
22	4867	1582818	25	20	13	39	3	0.06	4	71.2	0.2	99.5	78.8
23	4867	1582818	25	25	13	34	3	0.06	4	75.2	0.1	99.3	79.1
24	4867	1582818	30	20	13	34	3	0.06	4	72.7	0.2	99.4	78.0
25	4867	1582818	30	30	13	29	3	0.07	4	78.2	0.2	99.4	79.0

FIG. 3

Batch Size (mRNA in g)	mRNA size (# of Nucleotides)	mRNA MW	Lipid Composition	Lipid Mol%	Particle size (nm)	PDI	%Encap	%Yield
0.10	1331	435111	Lipid:DSPC: Cholesterol: PEG2000-DMG	50:7:41.5:1.5	64.9	0.16	97.3	78%
0.25	1331	435111	Lipid:DSPC: Cholesterol: PEG2000-DMG	50:7:41.5:1.5	67.5	0.11	97.8	84%
1.00	1331	435111	Lipid:DSPC: Cholesterol: PEG2000-DMG	50:7:41.5:1.5	64	0.07	95.5	88%
3.00	1331	435111	Lipid:DSPC: Cholesterol: PEG2000-DMG	50:7:41.5:1.5	64.4	0.08	97.5	82%
10.00	1331	435111	Lipid:DSPC: Cholesterol: PEG2000-DMG	50:7:41.5:1.5	63.2	0.10	96.4	88%

FIG. 4

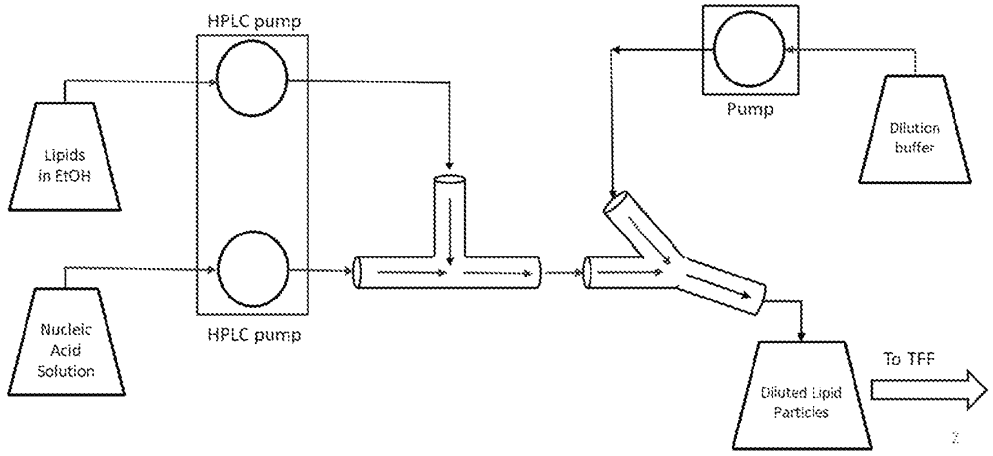

HPLC pump
Lipids in EtOH
Nucleic Acid Solution
HPLC pump
Pump
Dilution buffer
To TFF
Diluted Lipid Particles

FIG. 5

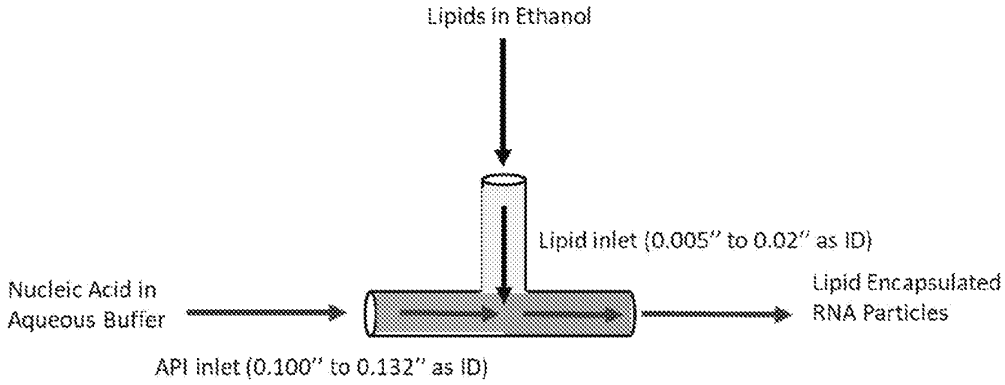

Lipids in Ethanol
Lipid inlet (0.005'' to 0.02'' as ID)
Nucleic Acid in
Aqueous Buffer
Lipid Encapsulated
RNA Particles
API inlet (0.100'' to 0.132'' as ID)

FIG. 6A

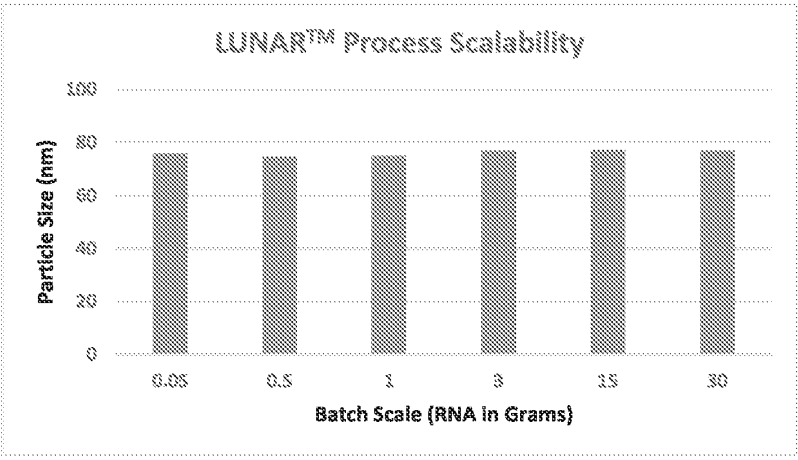

LUNAR™ Process Scalability
Particle Size (nm)
100
80
60
40
20
0
0.05
0.5
1
3
15
30
Batch Scale (RNA in Grams)

FIG. 6B

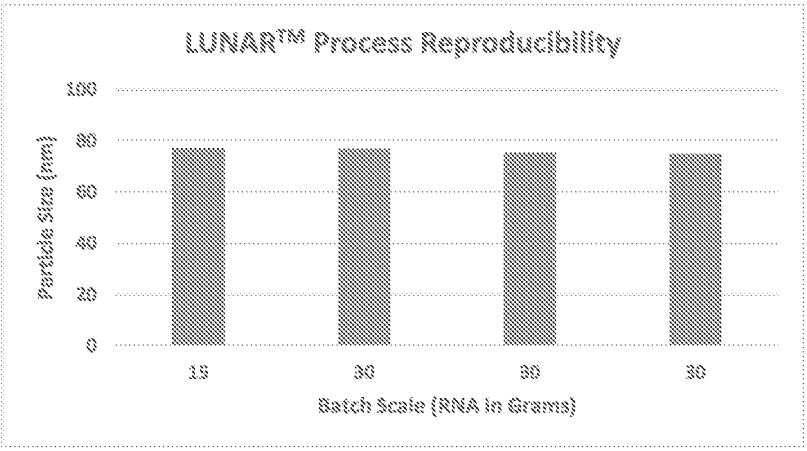

LUNAR™ Process Reproducibility
Particle Size (nm)
100
80
60
40
20
0
15
30
30
30
Batch Scale (RNA in Grams)

FIG. 7

