

TABLE 1-continued

Transient transfection efficiency of cationic lipids in COS-7, SNB-19, RD and C8161 cells			
Lipid	Mean	SDV	REL
2-5/DOPE	134725	13224	0.71
2-5/7-1	172245	99236	0.91
1-9/DOPE	187651	5480	1
1-10	166179	18702	0.88
1-10/DOPE	188468	2650	1
C. Cell line RD			
None	743	32	0
Transfectam	51255	1490	0.29
Lipofectamine	85689	9618	0.48
Lipofectin	128481	8972	0.72
2-5	73921	3839	0.41
2-5/DOPE	104283	6701	0.58
2-5/7-1	178331	4630	1
1-9/DOPE	123060	5312	0.69
1-10	124232	5248	0.7
1-10/DOPE	42824	2629	0.24
D. Cell line C8161			
None	851	32	0
Transfectam	141138	2049	0.71
Lipofectamine	133571	5823	0.67
Lipofectin	144780	11981	0.73
2-5	137710	16610	0.69
2-5/DOPE	199253	5307	1
2-5/7-1	153079	13322	0.77
1-9/DOPE	61088	8087	0.31
1-10	159578	6067	0.8
1-10/DOPE	84229	7287	0.42

TABLE II

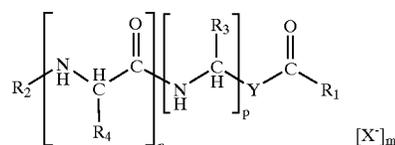
Demonstration of nuclear delivery of oligonucleotides of varying charge densities by novel cationic lipids				
Lipids:	Cell lines:			
	COS7	SNB19	C8161	RD
A. 3498-PS(phosphorothioate)				
TFM	4	3	5	4
LFA	4	3	4	4
LFN	5	3	3	4
2-5	2	3	3	3
2-5/DOPE	4	3	2	3
2-5/7-1	4	3	2	4
1-9/DOPE	5	3	2	3
1-10	4	4	5	5
1-10/DOPE	5	4	3	3
B. 3498 Chimera				
TFM	5	5	5	5
LFA	5	4	5	5
LFN	1	2	3	3
2-5	2	3	4	4
2-5/DOPE	4	2	3	3
2-5/7-1	4	2	4	4
1-9/DOPE	5	3	2	3
1-10	3	4	3	4
1-10/DOPE	3	3	0	1
C. 3793-2 alternating				
TFM	5	5	5	5
LFA	5	4	5	5
LFN	0	0	2	0
2-5	1	3	3	4

TABLE II-continued

Lipids:	Cell lines:			
	COS7	SNB19	C8161	RD
2-5/DOPE	3	1	1	2
2-5/7-1	4	3	3	4
1-9/DOPE	4	2	1	0
1-10	0	0	0	0
1-10/DOPE	0	0	0	0

We claim:

1. A composition comprising a polyanionic macromolecule and a lipid having the structure:



or a salt, or solvate, or enantiomer thereof wherein; (a) Y is a direct link or an alkylene of 1 to about 20 carbon atoms; (b) R₂, R₃ and R₄ are positively charged moieties, or at least one but not all of R₂, R₃ or R₄ is a positive moiety and the remaining are independently selected from H, an alkyl moiety of 1 to about 6 carbon atoms, or a heterocyclic moiety of about 5 to about 10 carbon atoms; (c) n and p are independently selected integers from 0 to 8, such that the sum of n and p is from 1 to 16; (d) X⁻ is an anion or polyanion and (e) m is an integer from 0 to a number equivalent to the positive charge(s) present on the lipid; provided that if Y is a direct link and the sum of n and p is 1 then one of either R₃ or R₄ must have an alkyl moiety of at least 10 carbon atoms.

2. An expression vector comprising a composition according to claim 1 wherein the polyanionic macromolecule is capable of expressing a polypeptide in a cell.

3. A composition according to claim 1 wherein the polyanionic macromolecule is an oligonucleotide or an oligomer.

4. A composition according to claim 1 wherein the polyanionic macromolecule is DNA.

5. A method of delivering a polyanionic macromolecule into a cell comprising contacting a composition of claim 1 with the cell.

6. A method to interfere with the expression of a protein in a cell comprising contacting a composition of claim 3 with the cell wherein the oligomer has a base sequence that is substantially complementary to an RNA sequence in the cell that encodes the protein.

7. A kit for delivering a polyanionic macromolecule into a cell comprising: a vial containing a composition of claim 1.