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Schwartz et al.

[45] **Date of Patent:** **Feb. 1, 2000**[54] **AMIDE-BASED CATIONIC LIPIDS**

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[73] Assignee: **Genta, Incorporated**, San Diego, Calif.[21] Appl. No.: **08/681,297**[22] Filed: **Jul. 22, 1996**[51] **Int. Cl.**⁷ **C07C 233/05**[52] **U.S. Cl.** **564/153**; 562/561; 562/563;
564/159; 564/197[58] **Field of Search** 554/35, 36, 51,
554/52; 564/153, 159, 197, 163; 562/561,
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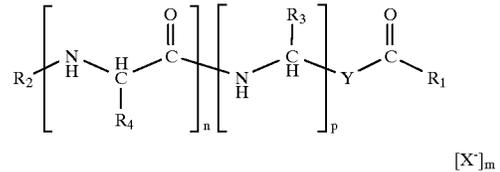
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[57] **ABSTRACT**

The present invention provides novel amide-based cationic lipids of the general structure:



or a salt, or solvate, or enantiomers thereof wherein; (a) Y is a direct link or an alkylene of 1 to about 20 carbon atoms; (b) R₁ is H or a lipophilic moiety; (c) 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; (d) n and p are independently selected integers from 0 to 8, such that the sum of n and o is from 1 to 16; (e) X⁻ is an anion or polyanion and (f) 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.

The present invention further provides compositions of these lipids with polyanionic macromolecules, methods for interfering with protein expression in a cell utilizing these compositions and a kit for preparing the same.

11 Claims, 6 Drawing Sheets