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(54) Title: PH-SENSITIVE CATIONIC LIPIDS, LIPID NANOPARTICLES COMPRISING THE SAME AND METHODS OF DELIVERING NUCLEIC ACIDS

(57) Abstract: A pH-sensitive cationic lipid, a lipid nanoparticle including the pH-sensitive lipid, and a method of delivering a nucleic acid encapsulated in the lipid nanoparticle to a cell or a subject. The lipid nanoparticle may include a compound represented by general formula (I) or pharmaceutically acceptable salt thereof:  $(R^1)(R^2)C(OH)-(CH_2)_a-(O-CO)_b-X$  (I) wherein a represents an integer of 3-5; b represents 0 or 1;  $R^1$  and  $R^2$  each independently represent a group represented by general formula (A):  $(R^{11})(R^{12})-CH-(CH_2)_w-(CO-O)_c-(CH_2)_v-(A)$ , wherein  $R^{11}$  and  $R^{12}$  each independently represent  $C_{5-15}$  alkoxy group; each c independently represents 0 or 1; each v independently represents an integer of 4-12; each w independently represents an integer of 0-3; and X represents a 5- to 7-membered non-aromatic heterocyclic group, wherein a carbon atom of the heterocyclic group is bound to  $(O-CO)_b-$  and one or two hydrogen atoms of the heterocyclic group may optionally be replaced with  $C_{1-4}$  alkyl group or  $C_{2-4}$  alkenyl group.

WO 2025/199302 A1