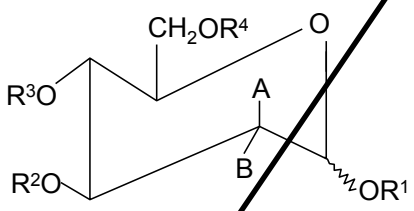
CLAIMS

1. A method of promoting recovery of cell viability of a damaged respiratory cell, the method including a step of administering to the cell at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on a surface of the respiratory cell.

2. A method according to claim 1 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2) wherein Formula (1) has the formula:



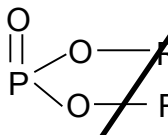
Formula (1)

wherein,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and



$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

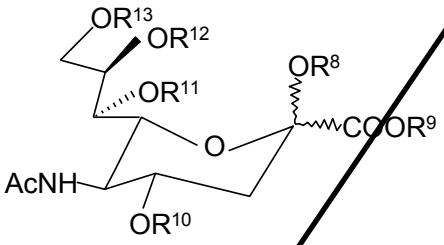
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, wherein HX represents a pharmaceutically suitable inorganic or organic acid;

and

wherein Formula (2) has the formula



Formula (2)

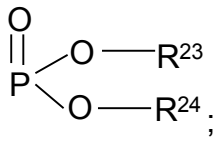
wherein,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; wherein R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ wherein R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$,

wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

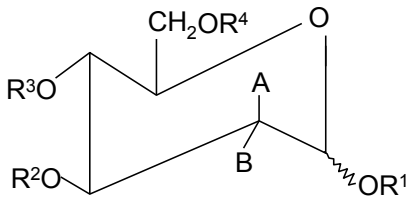
R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

3. A method according to claim 1 or 2 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

4. A method of treating or preventing a respiratory condition resulting from a damaged respiratory cell in a subject, the method including a step of administering to a damaged respiratory cell of the subject at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on the surface of a respiratory cell in the subject to promote recovery of cell viability of a damaged respiratory cell.

5. A method according to claim 4 wherein: the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2)

wherein Formula (1) has the formula:



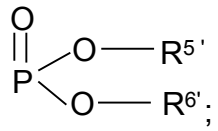
Formula (1)

wherein,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and



;

$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

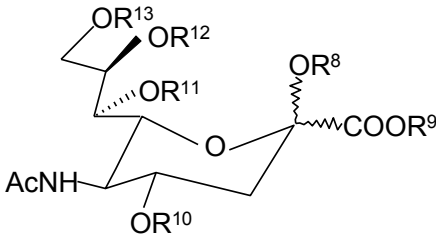
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, wherein HX represents a pharmaceutically suitable inorganic or organic acid;

and

wherein Formula (2) has the formula



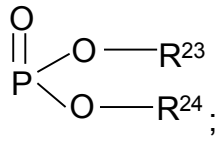
Formula (2)

wherein,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; wherein R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ wherein R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each

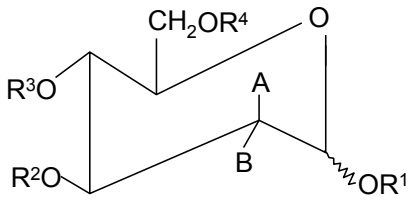
independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

6. A method according to any one of claims 4 or 5 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

7. A method according to any one of claims 4 to 6 wherein the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

8. A composition when used for promoting recovery of cell viability of a damaged respiratory cell, said composition comprising at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on the surface of the respiratory cell.

9. A composition according to claim 8 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2) wherein Formula (1) has the formula:



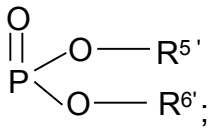
Formula (1)

wherein,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and



$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

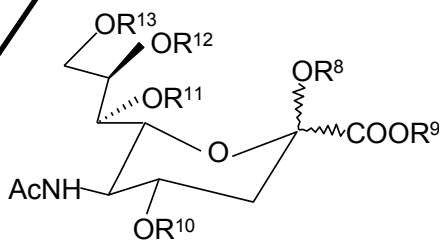
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, wherein HX represents a pharmaceutically suitable inorganic or organic acid;

and

wherein Formula (2) has the formula



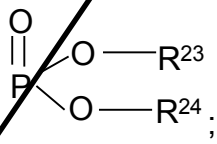
Formula (2)

wherein,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; wherein R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ wherein R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

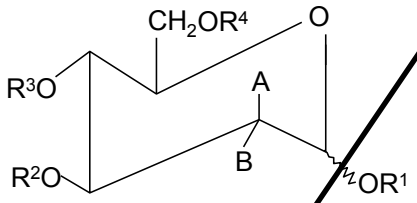
10. A composition according to claim 8 or 9 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

11. A pharmaceutical composition when used for treating or preventing a respiratory condition resulting from a damaged respiratory cell in a subject, wherein the composition includes at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on

the surface of a respiratory cell in the subject and promote recovery of cell viability of the damaged respiratory cell.

12. A pharmaceutical composition according to claim 11 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2),

wherein Formula (1) has the formula:



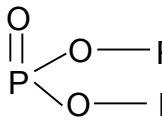
Formula (1)

wherein,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and



;

$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

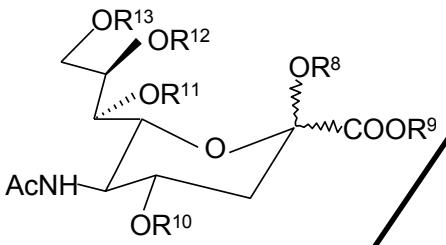
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, wherein HX represents a pharmaceutically suitable inorganic or organic acid;

and

wherein Formula (2) has the formula



Formula (2)

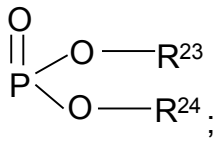
wherein,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; wherein R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ wherein R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected

from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

13. A pharmaceutical composition according to any one of claims 11 or 12 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

14. A pharmaceutical composition according to any one of claims 11 to 13 wherein the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

15. A method of screening for a compound for the treatment of a respiratory condition resulting from a damaged respiratory cell, said method comprising:

subjecting a respiratory cell having reduced sialoglycoconjugates on a surface of the cell to a test compound; and

measuring recovery of sialylglycoconjugates on the surface of the cell after exposure of the test compound to the cell.

16. A method according to claim 15 wherein the recovery of sialylglycoconjugates on the surface of the respiratory cell is measured by restoration of viability.

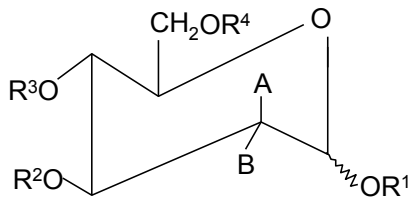
17. A method according to claim 16 wherein the respiratory cell is subjected to neuraminidase to reduce sialylglycoconjugates on a surface of the cell prior to subjecting the cell to the test compound.

18. A method of treating or preventing a respiratory condition resulting from a damaged respiratory cell in a subject, the method including the step of administering to the damaged respiratory cell in the subject at least one compound identified by the screening method of claim 15 to 17 to restore sialylglycoconjugates on a surface of the cell and promote recovery of cell viability of the damaged respiratory cell.

19. A method according to claim 18 wherein the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

20. A use of at least one pharmaceutically acceptable compound for restoring sialylglycoconjugates on a surface of a damaged respiratory cell and promoting recovery of cell viability of the damaged respiratory cell said compound selected from the group consisting of compounds of Formula (1) and compounds of Formula (2)

wherein Formula (1) has the formula:



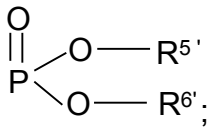
Formula (1)

wherein,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and



$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

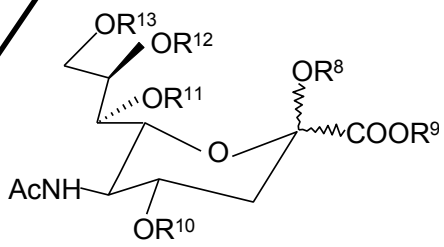
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, wherein HX represents a pharmaceutically suitable inorganic or organic acid;

and

wherein Formula (2) has the formula



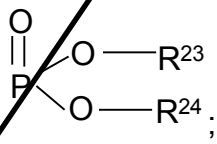
Formula (2)

wherein,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; wherein R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ wherein R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, wherein R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

in the preparation of a medicament for the treatment or prevention of a respiratory condition resulting from a damaged respiratory cell said condition selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

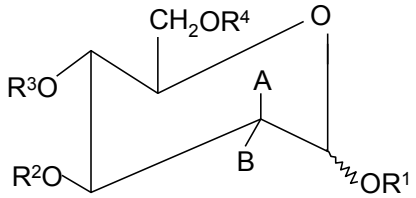
21. A use according to claim 20 wherein the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

22. A method according to claim 1 or 4 substantially as hereinbefore described with reference to the Examples.

5

CLAIMS

1. Use of at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on a surface of a damaged respiratory cell in the preparation of a medicament for promoting recovery of cell viability of the damaged respiratory cell in which the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2) in which Formula (1) has the formula:

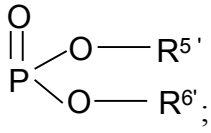


Formula (1)

in which,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and 

;

$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

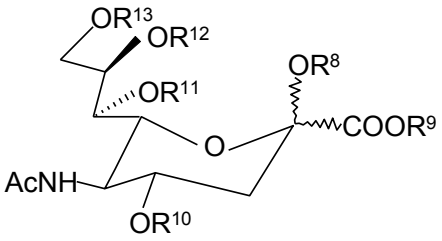
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, in which HX represents a pharmaceutically suitable inorganic or organic acid;

and

in which Formula (2) has the formula



Formula (2)

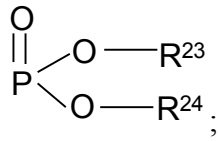
in which,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; in which R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ in which R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group

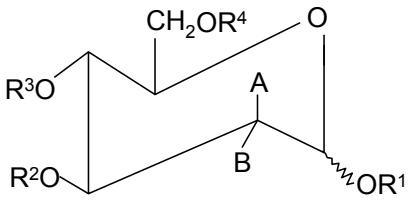
consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

2. Use according to Claim 1, in which the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

3. Use of at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on a surface of a damaged respiratory cell and to promote recovery of cell viability of the damaged respiratory cell in the preparation of a medicament for treating or preventing a respiratory condition resulting from the damaged respiratory cell in which: the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2)

in which Formula (1) has the formula:

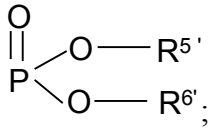


Formula (1)

in which,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and ;

$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

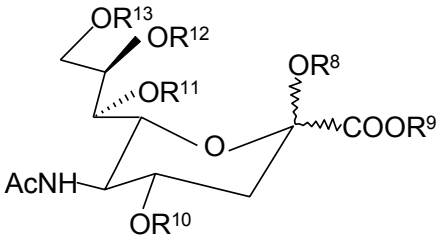
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, in which HX represents a pharmaceutically suitable inorganic or organic acid;

and

in which Formula (2) has the formula



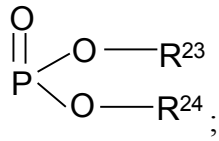
Formula (2)

in which,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; in which R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ in which R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

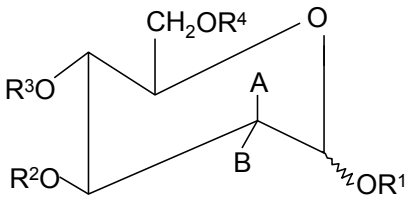
R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

4. Use according to Claim 3, in which the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

5. Use according to Claim 3 or 4, in which the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

6. A composition for use in a method for promoting recovery of cell viability of a damaged respiratory cell, the composition comprising at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on the surface of the respiratory cell, in which the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2) in which Formula (1) has the formula:

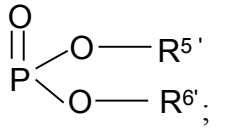


Formula (1)

in which,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and 

;

$R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

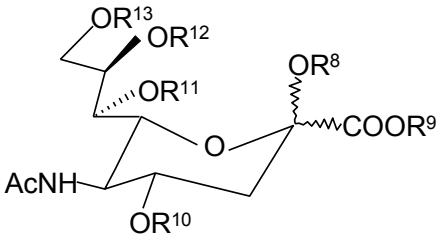
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, in which HX represents a pharmaceutically suitable inorganic or organic acid;

and

in which Formula (2) has the formula



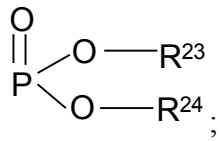
Formula (2)

in which,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; in which R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ in which R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and 

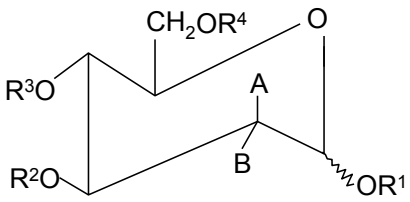
;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

7. A composition according to Claim 6, in which the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

8. A pharmaceutical composition for use in a method for treating or preventing a respiratory condition resulting from a damaged respiratory cell in a subject, in which the composition includes at least one pharmaceutically acceptable compound capable of accelerating sialylglycoconjugate biosynthesis to restore sialylglycoconjugates on the surface of a respiratory cell in the subject and promote recovery of cell viability of the damaged respiratory cell in which the at least one pharmaceutically acceptable compound is selected from the group consisting of compounds of Formula (1) and compounds of Formula (2),

in which Formula (1) has the formula:

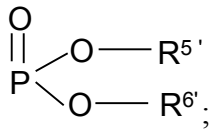


Formula (1)

in which,

R^1, R^2, R^3, are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, and CO-active esters;

R^5, R^6, R^7 are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_3CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^4 is the same or different to R^1, R^2, R^3 and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCR^5R^6R^7$, CO-active esters and ; $R^{5'}$, $R^{6'}$ are the same or different and are each independently selected from the group consisting of H or a pharmaceutically suitable inorganic or organic salt, and a pharmaceutically suitable ester;

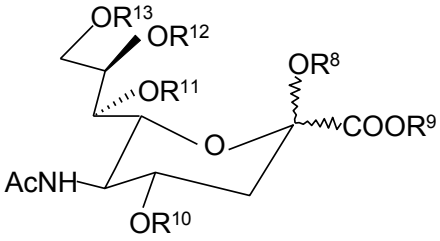
one of A and B is H, with the proviso that:

when B is H, then A is selected from the group consisting of $NHCOCH_3$, NH_2, OH, $NH_2 \cdot HX$ or

when A is H, B is selected from the group consisting of $NHCOCH_3$, NH_2, and $NH_2 \cdot HX$, in which HX represents a pharmaceutically suitable inorganic or organic acid;

and

in which Formula (2) has the formula



Formula (2)

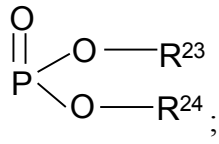
in which,

R^8 is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, $COCH_2Ph$, CO-active ester and $COCR^{14}R^{15}R^{16}$; in which R^{14}, R^{15}, R^{16} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200); cytidine, cytidine monophosphate, cytidine diphosphate, cytidine triphosphate, adenosine, adenosine monophosphate, adenosine diphosphate, and adenosine triphosphate;

R^9 is selected from the group consisting of H, CH_3, pharmaceutically acceptable inorganic or organic salt, or a pharmaceutically suitable active ester; $CH_2CR^{17}R^{18}R^{19}$ in which R^{17}, R^{18}, R^{19} are the same or different and are each independently selected from

the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), C_6H_5, and CH_2Ph;

R^{10}, R^{11}, R^{12} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, and $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200);

R^{13} is the same or different to R^{10}, R^{11}, R^{12} and is selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), CH_2Ph, active ester, and $COCR^{20}R^{21}R^{22}$, in which R^{20}, R^{21}, R^{22} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), C_6H_5, CH_2Ph, $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200) and ;

R^{23}, R^{24} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), $CH_2CH_2(OCH_2CH_2)_mCH_3$ (m=1-200), CH_2Ph, or active ester, and $CH_2CR^{25}R^{26}R^{27}$, or pharmaceutically acceptable inorganic or organic salt, and R^{25}, R^{26}, R^{27} are the same or different and are each independently selected from the group consisting of H, CH_3, $(CH_2)_nCH_3$ (n=1-20), and C_6H_5, CH_2Ph.

9. A pharmaceutical composition according to Claim 8, in which the at least one pharmaceutically acceptable compound is selected from the group consisting of N-acetylmannosamine, N-acetylglucosamine, N-acetylneuraminic acid, CMP-sialic acid, their pharmaceutically acceptable derivatives and combinations thereof.

10. A pharmaceutical composition according to Claim 8 or 9, in which the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

11. An *in vitro* method of screening for a compound for the treatment of a respiratory condition resulting from a damaged respiratory cell, the method comprising:

subjecting a respiratory cell having reduced sialoglycoconjugates on a surface of the cell to a test compound *in vitro*; and

measuring recovery of sialylglycoconjugates on the surface of the cell after exposure of the test compound to the cell.

12. A method according to Claim 11, in which the recovery of sialylglycoconjugates on the surface of the respiratory cell is measured by restoration of viability.

13. A method according to Claim 11 or 12, in which the respiratory cell is subjected to neuraminidase to reduce sialylglycoconjugates on a surface of the cell prior to subjecting the cell to the test compound.

14. Use of at least one compound identified by a screening method according to any of Claims 11 to 13 as being capable of restoring sialylglycoconjugates on a surface of a damaged respiratory cell and promoting recovery of cell viability of the damaged respiratory cell in the preparation of a medicament for treating or preventing a respiratory condition resulting from the damaged respiratory cell.

15. Use according to Claim 14, in which the respiratory condition is selected from the group consisting of coughs, post viral or bacterial infections, acute/chronic bronchitis, chronic obstructive pulmonary disease (COPD), cystic fibrosis and other respiratory inflammatory conditions.

16. Use according to Claim 1, in which the pharmaceutically acceptable compound is selected from the group comprising:

Formula (1), in which B=H, A=$NHCOCH_3$, $R^1=R^2=R^3=R^4=H$;

Formula (2), in which $R^8=R^{10}=R^{11}=R^{12}=R^{13}=H$, $R^9=Na$;

Formula (2), in which $R^8=R^{10}=R^{11}=R^{12}=R^{13}=H$, $R^9=C_2H_5$;

Formula (2), in which $R^8=H$, $R^9=C_2H_5$, $R^{10}=R^{11}=R^{12}=R^{13}=CH_3CO$

Formula (2), in which R^8=cytidine monophosphate, $R^9=R^{10}=R^{11}=R^{12}=R^{13}=H$; and

Formula (2), in which $R^8=H$, $R^9=C_2H_5$, $R^{10}=R^{11}=H$, R^{12} and R^{13}= >C $(CH_3)_2$.

17. A use according to Claim 3, in which the pharmaceutically acceptable compound is selected from the group comprising:

Formula (1), in which B=H, A=$NHCOCH_3$, $R^1=R^2=R^3=R^4=H$;

Formula (2), in which $R^8=R^{10}=R^{11}=R^{12}=R^{13}=H$, $R^9=Na$;

Formula (2), in which R^8 =R^{10}=R^{11}=R^{12}=R^{13}=H, R^9=C_2H_5;

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=R^{12}=R^{13}=CH_3CO

Formula (2), in which R^8=cytidine monophosphate, R^9=R^{10}=R^{11}=R^{12}=R^{13}=H; and

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=H, R^{12} and R^{13}= >C $(CH_3)_2$.

18. A composition according to Claim 6, in which the pharmaceutically acceptable compound is selected from the group comprising:

Formula (1), in which B=H, A=$NHCOCH_3$, R^1=R^2=R^3=R^4=H;

Formula (2), in which R^8=R^{10}=R^{11}=R^{12}=R^{13}=H, R^9=Na;

Formula (2), in which R^8 =R^{10}=R^{11}=R^{12}=R^{13}=H, R^9=C_2H_5;

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=R^{12}=R^{13}=CH_3CO

Formula (2), in which R^8=cytidine monophosphate, R^9=R^{10}=R^{11}=R^{12}=R^{13}=H; and

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=H, R^{12} and R^{13}= >C $(CH_3)_2$.

19. A pharmaceutical composition according to Claim 8, in which the pharmaceutically acceptable compound is selected from the group comprising:

Formula (1), in which B=H, A=$NHCOCH_3$, R^1=R^2=R^3=R^4=H;

Formula (2), in which R^8=R^{10}=R^{11}=R^{12}=R^{13}=H, R^9=Na;

Formula (2), in which R^8 =R^{10}=R^{11}=R^{12}=R^{13}=H, R^9=C_2H_5;

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=R^{12}=R^{13}=CH_3CO

Formula (2), in which R^8=cytidine monophosphate, R^9=R^{10}=R^{11}=R^{12}=R^{13}=H; and

Formula (2), in which R^8=H, R^9=C_2H_5, R^{10}=R^{11}=H, R^{12} and R^{13}= >C $(CH_3)_2$.

20. Use according to Claim 1 or 3 or a composition according to Claim 6 or 8 substantially as hereinbefore described with reference to the examples.