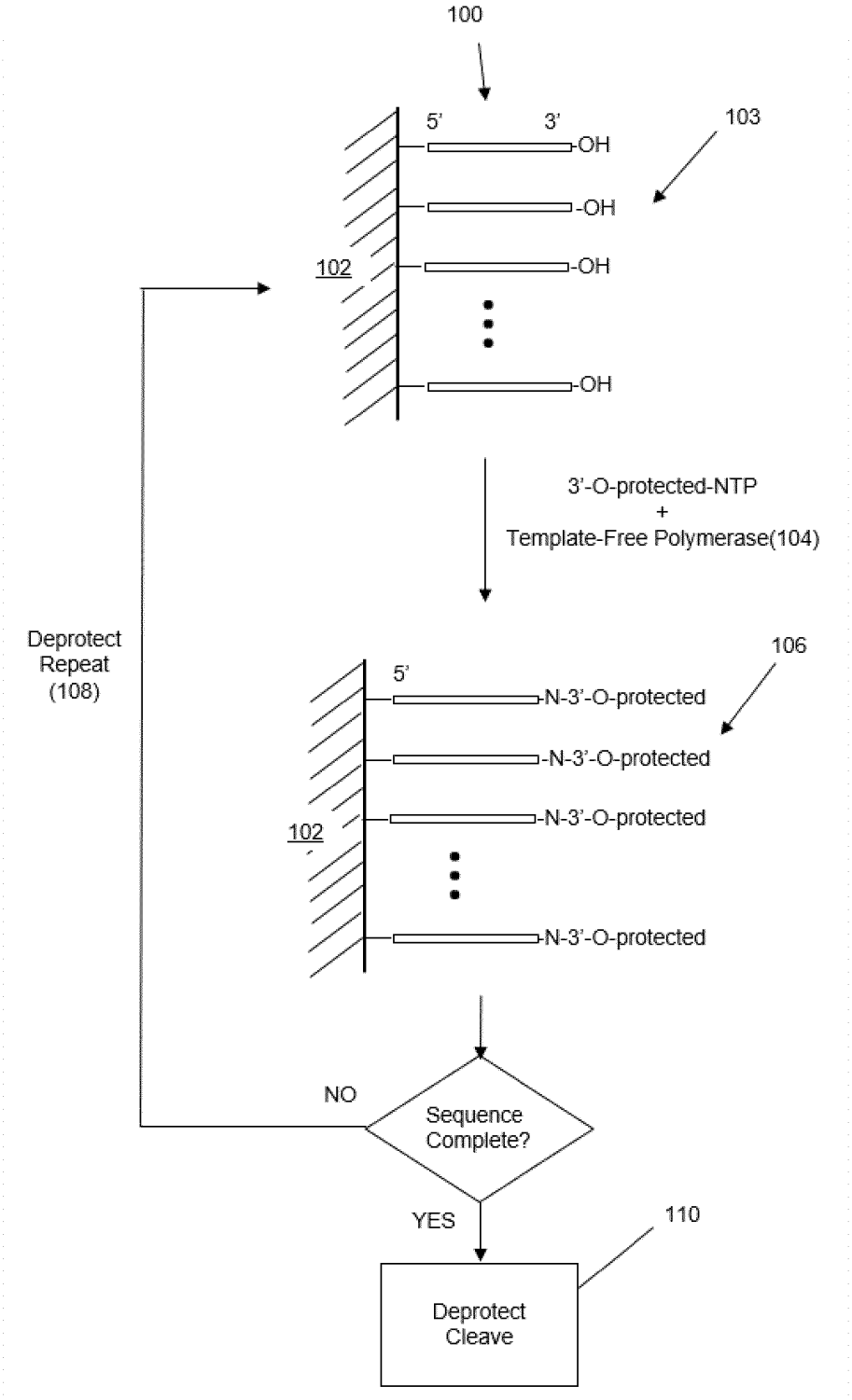

100
5'
3'
-OH
-OH
-OH
-OH
103
102
3'-O-protected-NTP
+
Template-Free Polymerase(104)
Deprotect
Repeat
(108)
106
5'
-N-3'-O-protected
-N-3'-O-protected
-N-3'-O-protected
-N-3'-O-protected
102
NO
Sequence
Complete?
YES
110
Deprotect
Cleave

**Figure 1A**

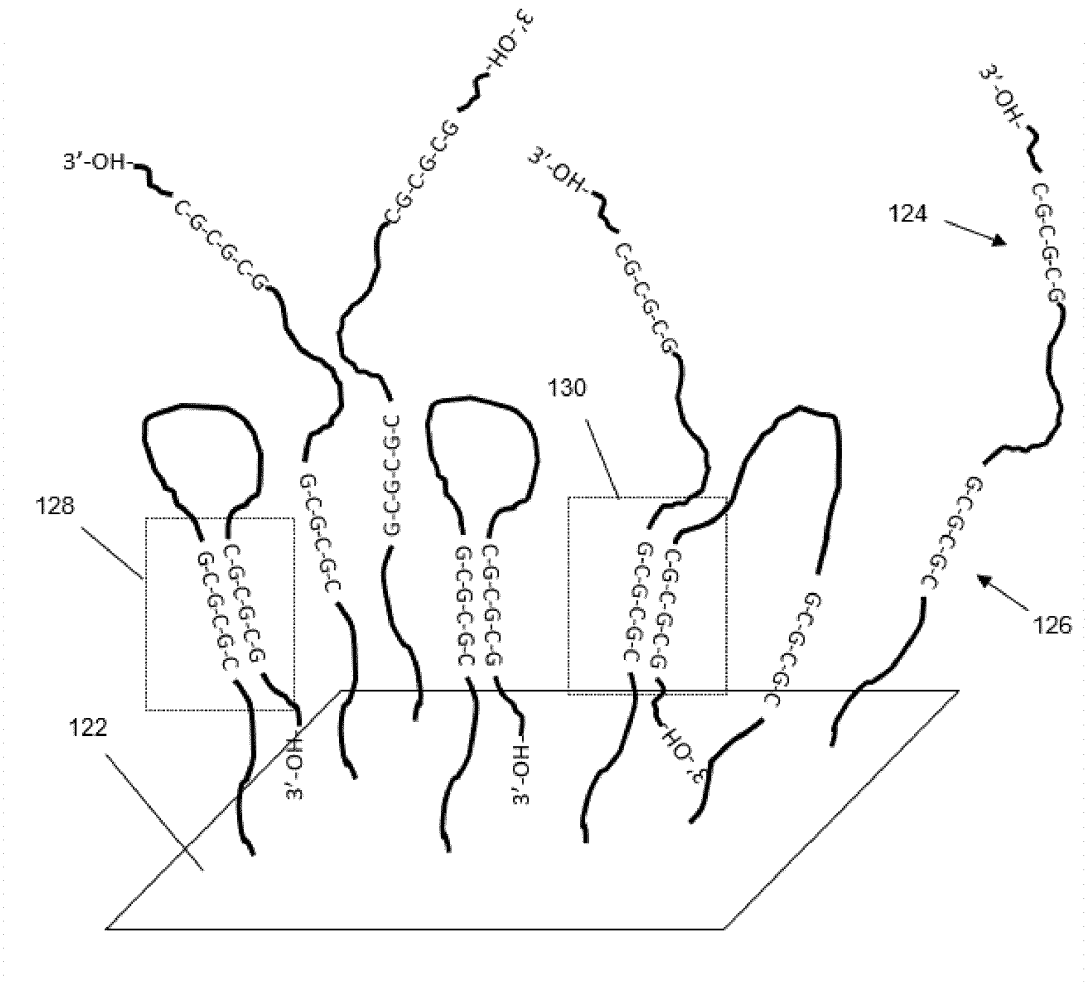

3'-OH
C-G-C-G-C-G
3'-OH
C-G-C-G-C-G
3'-OH
C-G-C-G-C-G
124
130
128
126
122
3'-OH
3'-OH
3'-OH

**Figure 1B**

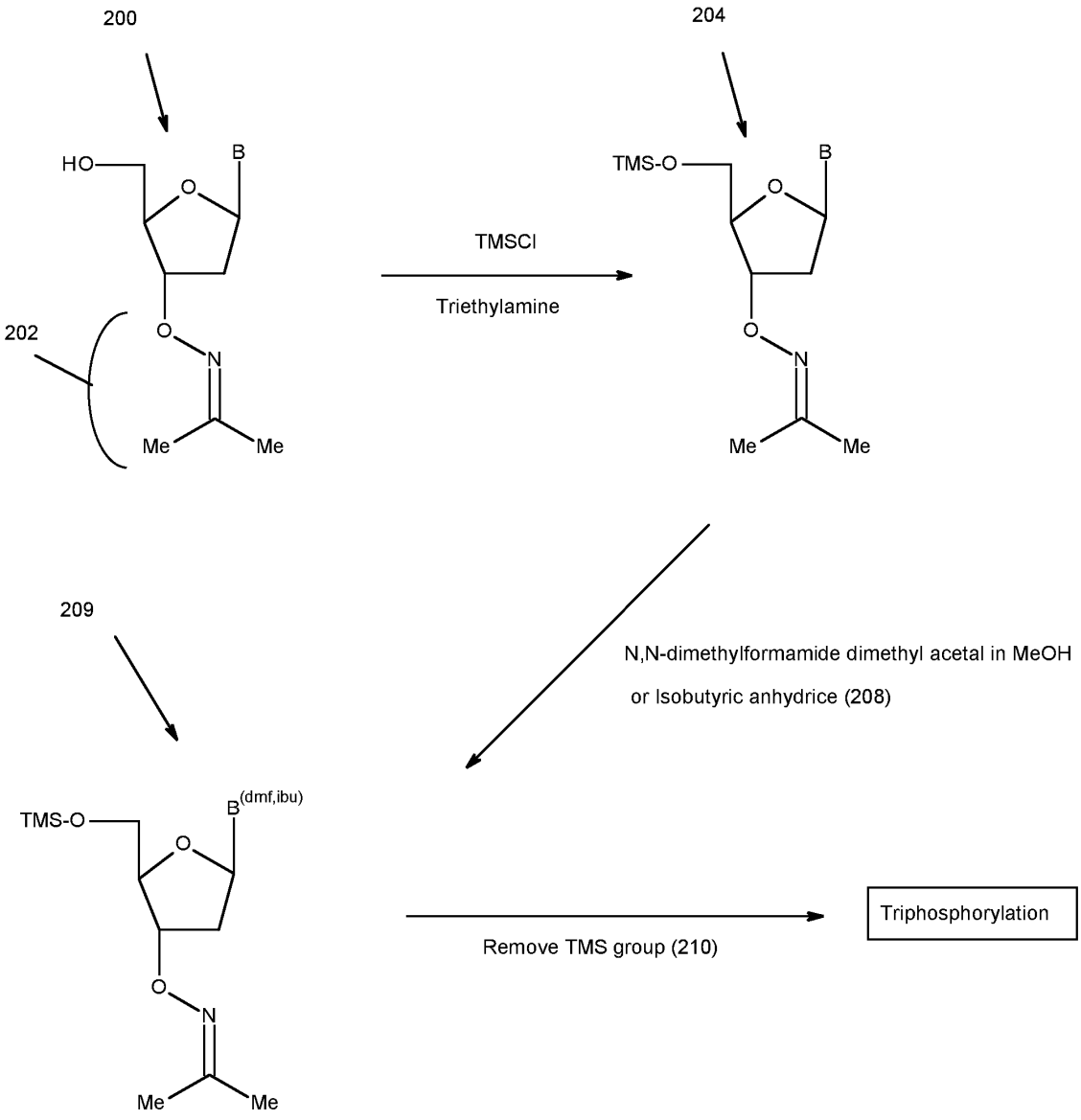
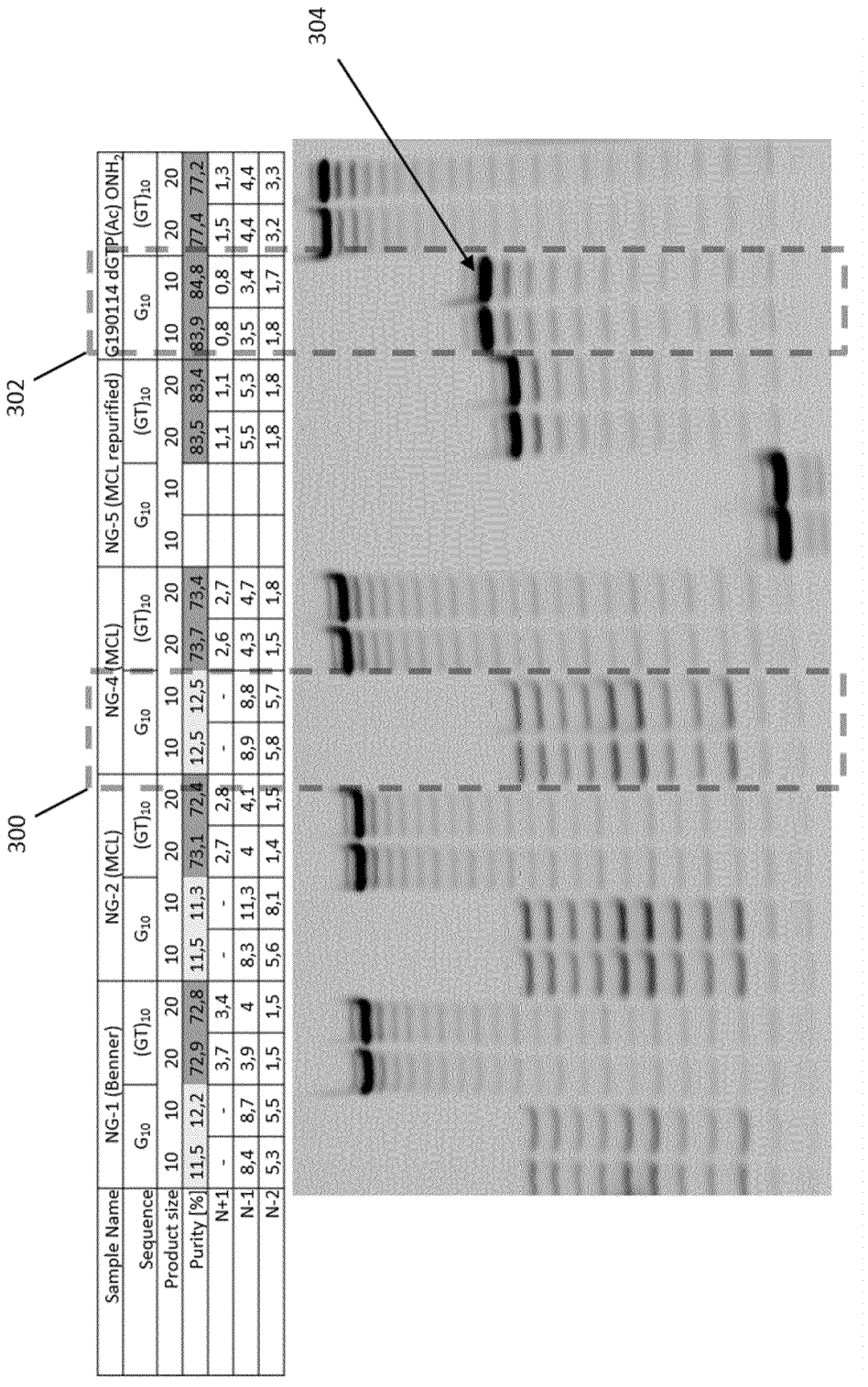
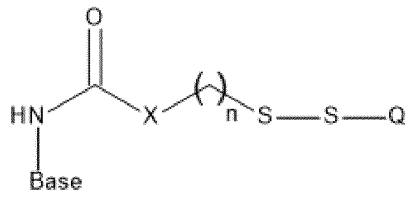

200
HO
B
O
O
N
202
Me
Me
TMSCl
Triethylamine
204
TMS-O
B
O
O
N
Me
Me
N,N-dimethylformamide dimethyl acetal in MeOH
or Isobutyric anhydrice (208)
209
TMS-O
B(dmf,ibu)
O
O
N
Me
Me
Remove TMS group (210)
Triphosphorylation

**Figure 2**



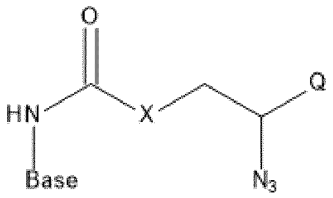

| Sample Name | NG-1 (Benner) | | | | NG-2 (MCL) | | | | NG-4 (MCL) | | | | NG-5 (MCL repurified) | | | | G190114 dGTP(Ac) $ONH_2$ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sequence | $G_{10}$ | | $(GT)_{10}$ | | $G_{10}$ | | $(GT)_{10}$ | | $G_{10}$ | | $(GT)_{10}$ | | $G_{10}$ | | $(GT)_{10}$ | | $G_{10}$ | | $(GT)_{10}$ | |
| Product size | 10 | 10 | 20 | 20 | 10 | 10 | 20 | 20 | 10 | 10 | 20 | 20 | 10 | 10 | 20 | 20 | 10 | 10 | 20 | 20 |
| Purity [%] | 11,5 | 12,2 | 72,9 | 72,8 | 11,5 | 11,3 | 73,1 | 72,4 | 12,5 | 12,5 | 73,7 | 73,4 | | | 83,5 | 83,4 | 83,9 | 84,8 | 77,4 | 77,2 |
| N+1 | - | - | 3,7 | 3,4 | - | - | 2,7 | 2,8 | - | - | 2,6 | 2,7 | | | 1,1 | 1,1 | 0,8 | 0,8 | 1,5 | 1,3 |
| N-1 | 8,4 | 8,7 | 3,9 | 4 | 8,3 | 11,3 | 4 | 4,1 | 8,9 | 8,8 | 4,3 | 4,7 | | | 5,5 | 5,3 | 3,5 | 3,4 | 4,4 | 4,4 |
| N-2 | 5,3 | 5,5 | 1,5 | 1,5 | 5,6 | 8,1 | 1,4 | 1,5 | 5,8 | 5,7 | 1,5 | 1,8 | | | 1,8 | 1,8 | 1,8 | 1,7 | 3,2 | 3,3 |

**Figure 3**



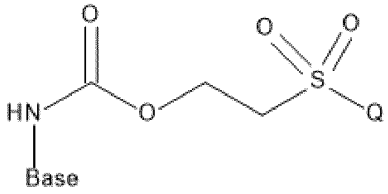

(1)

(where X is O, NH, S or CH2)

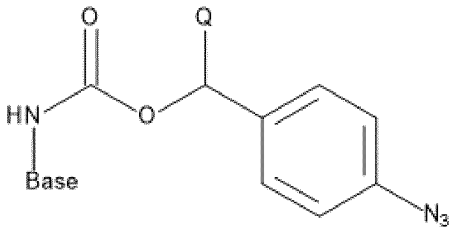



(2)

(where X is O or CH2)

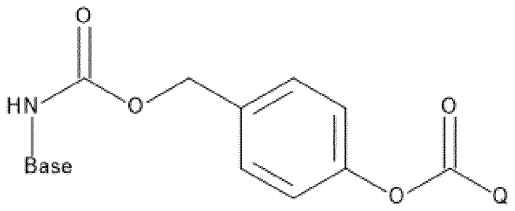



(3)

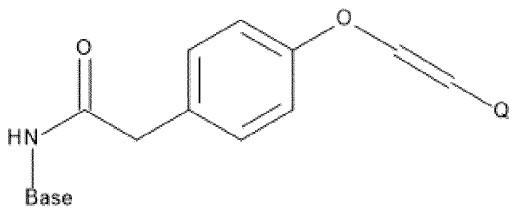



(4)

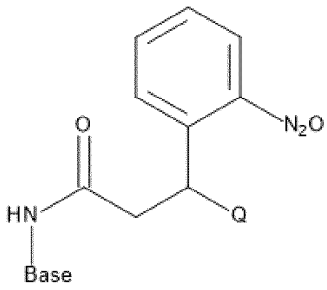
**Figure 4A**



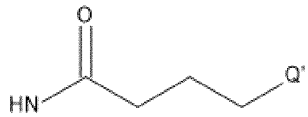

(5)




(6)

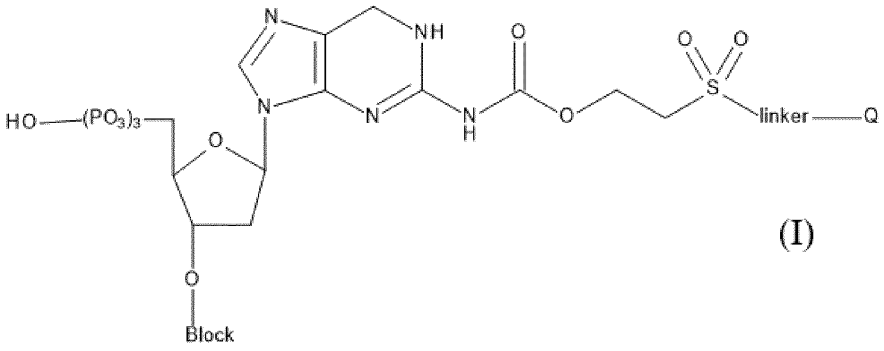



(7)



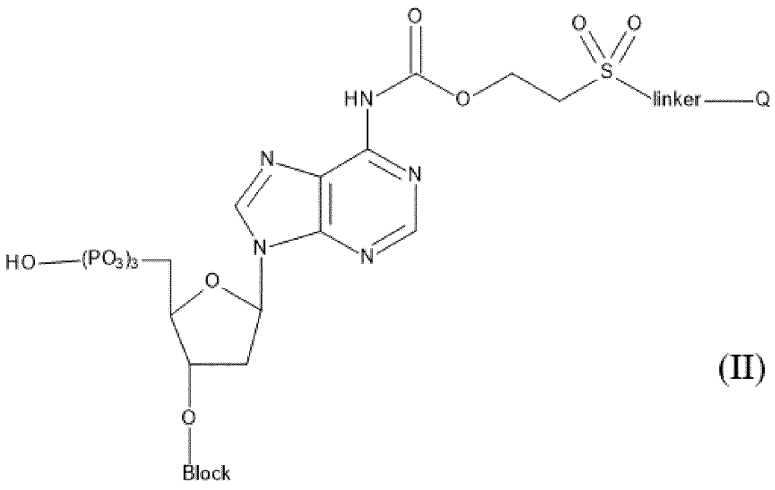

(8)

**Figure 4A (continued)**




(I)

3'-O-blocked, base protected dGTP




(II)

3'-O-blocked, base protected dATP

**Figure 4B**

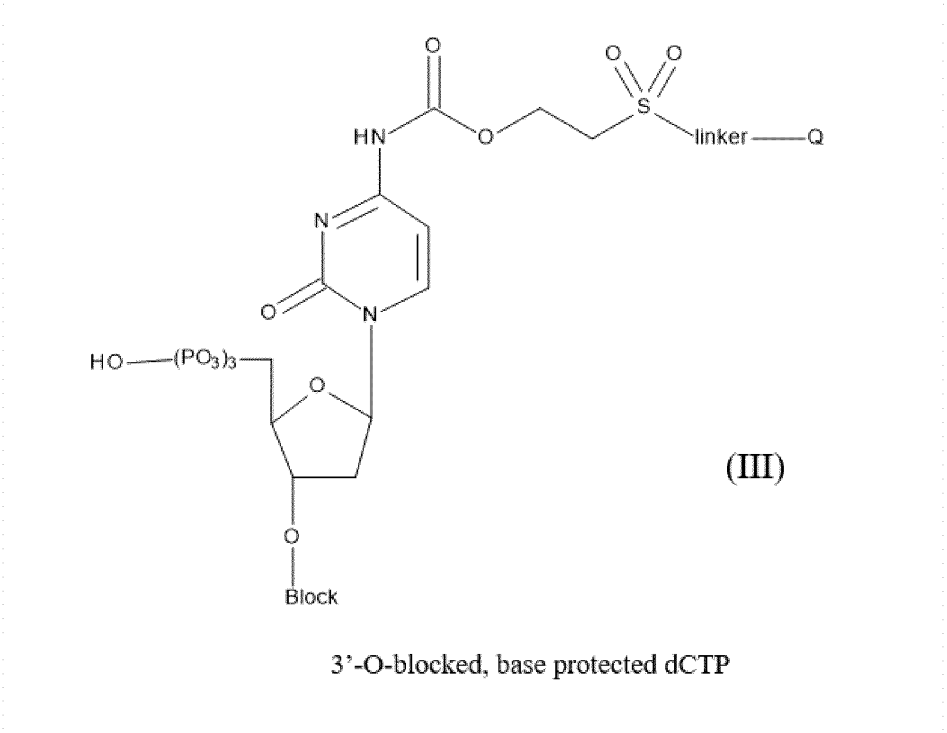



**Figure 4B (Continued)**