

(19) (KR)  
(12) (A)

(51) 。 Int. Cl. <sup>7</sup> C07D 319/18		(11) (43)	10-2004-0018336 2004 03 03
(21)	10-2003-7011481		
(22)	2003 09 01		
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(86)	PCT/US2002/006256	(87)	WO 2002/70509
(86)	2002 02 28	(87)	2002 09 12

(30) 60/272,792 2001 03 01 (US)

(71) 94304 3165  
가 가 가 가 가 35

(72) 가  
94404 799  
94070 1349  
94134 783  
94131 80  
92037 5549  
94066 335

1-31-6

1-31-6

가 2-61-2

가 가 2735-1

가 1-4-19

3-22

159-1

(74)

:

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(54) M C P —1

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MCP-1

가

MCP-1

가

(monocyte)

:

가

가 (3) 가 [Springer, *Nature* 346:425 ~ 433 (1990); Lawrence Springer, *Cell* 65:859 ~ 873 (1991); Butcher, *Cell* 67:1033 ~ 1036 (1991)]. 2

가 (matrix)

가

(8 ~ 10 kD) [Schall, *Cytokine* 3:165 ~ 183 (1991); Murphy, *Rev Imm*  
un 12: 593 ~ 633 (1994)].

4 (CXC), 2), 1 (CC), [Baggiolini, *Adv Immunol* 55:97 ~ 179 (1994); Baggiolini, *Annu Rev Immunol* 15:675 ~ 705 (1997); Deng, *Nature* 381:661 ~ 666 (1996); Luster, *New Engl J Med* 338:436445 (1998); Saunders Tardy, *Drug Discovery Today* 4:80 ~ 92 (1999)].

IL-8, CXC (neutrophil), MCP-1, RANTES, MIP-1, MIP-1, CC.

M 10 nM 가, T (eosinophil) 500 p [Kelvin, *J Leukoc Biol* 54: 604 ~ 612 (1993); Murphy, *Annu Rev Immunol* 12:593 ~ 633 (1994); Raport, *J Leukoc Biol* 59:18 ~ 23 (1996); Premack Schall, *Nature Med* 2:1174 ~ 1178 (1996)].  
가 7 ('') G- (G-protein-coupled receptor: GPCR)

(, T, CXCR1 (dendritic), CCR2).  
2, MIP-1, RANTES, CCR1, CCR5, IL-8, CXCR1, CXCR2, CXC, CC, CXC, 1, 2 [Lodi, *Science* 263:1762 ~ 1767 (1994)].  
3, 4 가, 1, 2

cAMP (cytosolic), (upregulation), [Vaddi, *J Immunol* 153:4721 ~ 4732 (1994); Szabo, *Eur J Immunol* 27:1061 ~ 1068 (1997); Campbell, *Science* 279:381 ~ 384 (1998); Aregay, *Proc Natl Acad Sci USA* 95:2985 ~ 2990 (1998); Franci, *J Immunol* 157:5606 ~ 5612 (1996); Aramori, *EMBO J* 16:4606 ~ 4616 (1997); Haribabu, *J Biol Chem* 272:28726 ~ 28731 (1997); Newton, *Methods Enzymol* 287:174 ~ 186 (1997)].  
[Newton, *Methods Enzymol* 287:174 ~ 186 (1997); Zachariae, *J Exp Med* 171:2177 ~ 2182 (1990); Vaddi, *J Leukocyte Biol* 55:756 ~ 762 (1994)].

2, MCP-1, MCP-1/CCR2 [Jarnagin, *biochemistry* 38:16167 ~ 16177 (1999)].

7 GPCR 가, (GAG) (matrix), -GAG (haptotaxis) [Witt Land er, *Curr Biol* 4:394-400 (1994); Rot, *Eur J Immunol* 23:303 ~ 306 (1993); Webb, *Proc Natl Acad Sci USA* 90:7158 ~ 7162 (1993); Tanaka, *Nature* 361:79 ~ 82 (1993); Gilat, *J Immunol* 153:48799 ~ 4906 (1996)].  
-GAG FGF, IL-3, IL-7, GM-CSF, VEGF [Roberts, *Nature* 332:376 ~ 378 (1988); Gilat, *Immunol Today* 17:16 ~ 20 (1996); Clarke, *Cytokine* 7:325 ~ 330 (1995); Miao, *J Biol Chem* 271:4879 ~ 4886 (1996); Vlodavsky, *Cancer Metastasis Rev* 15:177 ~ 186 (1996)].

## MCP-1

가

[Robinson, *Clin Exp Immunol* 101:398 ~ 407 (1995); Hosoka, *J Clin Invest* 97:451 ~ 457 (1996); Koch, *J Clin Invest* 90:772 ~ 779 (1992); Villiger, *J Immunol* 149:722 ~ 727 (1992)],  
 [Hsieh, *J Allergy Clin Immunol* 98:580 ~ 587 (1996); Alam, *Am J Respir Crit Care Med* 153:1398 ~ 1404 (1996); Kurashima, *J Leukocyte Biol* 59:313 ~ 316 (1996); Sugiyama, *Eur Respir J* 8:1084 ~ 1090 (1995)],  
 [Yla-Herttuala, *Proc Natl Acad Sci USA* 88:5252 ~ 5256 (1991); Nelken, *J Clin Invest* 88:1121 ~ 1127 (1991)] [Proost, *Int J Clin Lab Res* 26:211 ~ 223 (1996); Taub, D.D. *Cytokine Growth Factor Rev* 7:355 ~ 376 (1996)] MCP-1

MCP-1 (mast) AHR (airways hyper-responsiveness: )  
 LTC4  
 [Campbell, *J Immunol* 163:2160 ~ 2167 (1999)].

MCP-1 (mesenchymal)  
 [Antoniades, *Proc Natl Acad Sci USA* 89:5371 ~ 5375 (1992)]. MCP-1 (mycobacterium tuberculosis)  
 [Strieter, *J Lab Clin Med* 123:183 ~ 197 (1994)].

MCP-1 [Koch, *J Clin Invest* 90:7472 ~ 779 (1992)]. MCP-1  
 가 MIP-1 RANTES [Kungel, *J Leukocyte Biol* 56:6 ~ 12 (1996)].

MCP-1 MCP-1 가  
 [Yla-Herttuala, *Proc Natl Acad Sci USA* 88:5252 ~ 5256 (1991); Nelken, *J Clin Invest* 88:1121 ~ 1127 (1991)] -MCP-1 [Takeya, *Human Pathol* 24:534 ~ 539 (1993)]  
 ] LDL- /MCP-1-  
 apoB- /MCP-1- MCP-1  
 [Alcami, *J Immunol* 160:624 ~ 633 (1998); Gosling, *J Clin Invest* 103:773 ~ 778 (1999); Gu, *Mol. Cell* 2:275 ~ 281 (1998); Boring, *Nature* 394:894 ~ 897 (1998)].

MCP-1 (elevation) (MS),

MCP-1

[Howard, *Trend Biotechnol* 14:46 ~ 51 (1996)].

-MIP-1 (Smith, *Leukocyte Biol* 57:782 ~ 787 (1994)); -IL-8 [Sekido, *Nature* 365:654 ~ 657 (1995)], -MCP-1 [Wada, *FASEB J* 10:1418 ~ 1425 (1996)]. MRL- *lpr* MCP-1  
 [Gong, *J Exp Med* 186:131 ~ 137 (1997)].

가

[White, *J. Biol Chem* 273:10

095 ~ 10098 (1998); Hesselgesser, *J. Biol Chem* 273:15687 ~ 15692 (1998); Bright, *Bioorg Med Chem Lett* 8:771 ~ 774 (1998); Lapierre, *26th Natl Med Chem Symposium*, 6 ~ 14 ~ 18, Richmond (VA), USA (1998); Forbes, *Bioorg Med Chem Lett* 10:1803 ~ 1806 (2000); Kato, WO 97/24325; Shiota, WO 97/44329; Naya, WO 98/04554; Takeda Industries, WO 98/0955572 (1998); Schwender, WO 98/02151; Hagmann, WO 98/27815; Connor, WO 98/06073, Wellington, 6,288, 103 B1 (2001)].

가

-GAG

가

GAG-

(leukocyte-taxis)

CC CXC

, GAG-

C-

[McFadden Kelvin, *Biochem Pharmacol* 54:1271 ~ 1280 (1997)].

GAG

FGF-

[Folkman Shing, *Adv Exp Med Biol* 313:355 ~ 364 (1992)].

[Wellstein Czubayko, *Breast Cancer Res Treat* 38:109 ~ 119 (1996)].

FGF

VEGF

[Waltenberger, *J Mol Cell Cardiol* 28:1523 ~ 1529 (1996)].

MIP-1

T

GAG

[T

anaka, *Nature* 361:79 ~ 82 (1993)].

MCP-1-

MCP-1

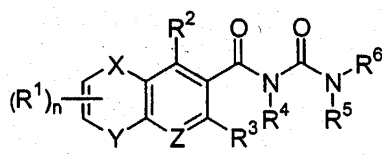
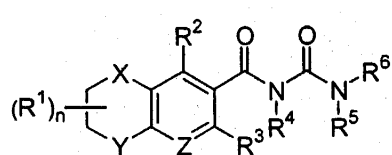
가

1

가

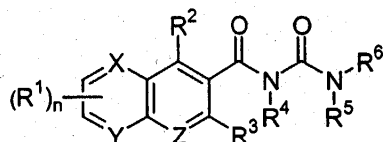
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I,



I

II



III

[

n I 0 4 , 0 2 ;

X Y I , , O, S, CH-R<sup>8</sup>, N-R<sup>7</sup> , , ,  
N C-R<sup>8</sup> ;

Z N C-R<sup>8</sup> ;

, X, Y, Z - ;

R<sup>1</sup> , , , , , ( ),  
, , -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup> ( ), ( ), -CF<sub>3</sub>,  
, -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)  
)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup> -NR<sup>9</sup>C(=O)  
R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub>, ( )  
, ( ), ( ), ( ),  
( O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub> C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>) 가  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) , I , n=2 , 2 R<sup>1</sup> =O ,

R<sup>2</sup>, R<sup>3</sup>, R<sup>8</sup> , , , , ( ),  
, , -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>N-(CH<sub>2</sub>)<sub>1-6</sub> C(=O)OR<sup>10</sup>, -C(=O)R<sup>9</sup>, -  
C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup>  
-NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub>, ( )  
, ( ), ( ), ( ),  
R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( ), N-( ( )), -N-( ( )) N-( C<sub>1-2</sub>) 가  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>7</sup> , , , , ( ),  
, ( ), ( ), ( ), -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, C(=O)NR<sup>9</sup>R<sup>10</sup>, -  
SO<sub>2</sub>OR<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub>, ( )  
, ( ), ( ), ( ),  
R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub> C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>) 가  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>4</sup> R<sup>5</sup> , , , , ( ) ,  
-(CH<sub>2</sub>)<sub>2-4</sub> - ,

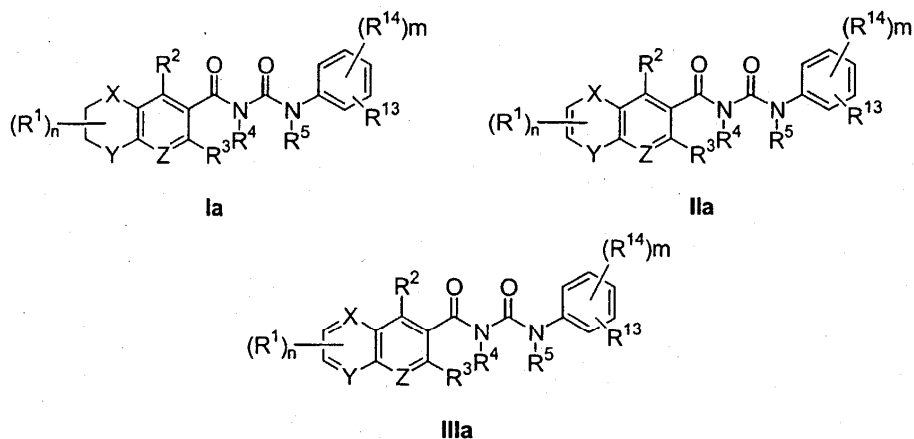
R<sup>6</sup> , , , , ( ),  
, ( ), ( ), -C(=O)R<sup>11</sup>,  
-C(=O)OR<sup>11</sup>, -C(=O)NR<sup>11</sup>R<sup>12</sup>, -SO<sub>2</sub>R<sup>11</sup>, -SO<sub>2</sub>NR<sup>11</sup>R<sup>12</sup> ( , R<sup>11</sup> R<sup>12</sup> , , ,  
( ) , R<sup>11</sup> R<sup>12</sup> , -(CH<sub>2</sub>)<sub>4-6</sub> - ) ].

, I, , 가 , 가  
 . 가 , ,  
 .

( )  
[[March J.: *Ad*  
].

*vanced Organic Chemistry*, 4 , John Wiley and Sons, , 1992] 4

2 , la, a,  
a 가 :



[ : ]

m 0 4 ;

n Ia 0 4 , a a 0 2 ;

X Y Ia a , , O, S, CH-R<sup>8</sup>, N-R<sup>7</sup>, a ,  
, N C-R<sup>8</sup> ;Z N C-R<sup>8</sup> ;

, X, Y, Z - ;

R<sup>1</sup> , , , , , ( ),  
, -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>( ), -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( ),  
( ), ( ), , R<sup>9</sup> R<sup>10</sup> ,  
가 O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) , I , n=2 , 2 R<sup>1</sup> =O ,

R<sup>2</sup>, R<sup>3</sup>, R<sup>8</sup> , , , , ( ),  
CF<sub>3</sub>, , -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup>, -C(=O)R<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> ,  
( ), ( ), , ( ), R<sup>9</sup>  
R<sup>10</sup> , O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)  
C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>7</sup> , , , , ( ),  
SO<sub>2</sub>OR<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> ,  
( ), ( ), , ( ), R<sup>9</sup> R<sup>10</sup> ,  
O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)  
가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>4</sup> R<sup>5</sup> , , , ( )  
, -(CH<sub>2</sub>)<sub>2-4</sub> - ,





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' , ' 가 1 20 , n- , n- , sec- , tert- , n- , n- , 가 :

' , ' ( ) , ' ( ) , ' ( 6 ) , ' C<sub>1-10</sub> 가 1 6 .

' , ' 가 2 20 , - 가 : , 1- , .

' , ' 가 2 20 - 가 : , 1- .

' , ' 가 3 12 1가 . 가 :

' , ' 가 3 12 1가  
 , -CF<sub>3</sub> , -CN, -OR, -SR, -NRR', -C(=O)R, -OC(=O)R, -C(=O)OR, -SO<sub>2</sub> OR,  
 -OSO<sub>2</sub> R, -SO<sub>2</sub> NRR', -NRSO<sub>2</sub> R', -C(=O)NRR', -NRC(=O)R' -PO<sub>3</sub> HR ( , R R' , ,  
 ( ) , ( ) , ( ) ,  
 ) ) , 1, 2, 3 , 가 3 12 , 1 5  
 , N, O, S , 4- , 4- , , 1,4-  
 ) 가 .

' ( ) ' , , . ( )

' , ' 가 3 12 1가 , 1 5 ,  
 , N, O, S , 4- , 4- , , 1,4-  
 ) 가 .

' , ' 가 3 12 1가  
 , -CF<sub>3</sub> , -CN, -OR, -SR, -NRR', -C(=O)R, -OC(=O)R, -C(=O)OR, -SO<sub>2</sub>  
 OR, -OSO<sub>2</sub> R, -SO<sub>2</sub> NRR', -NRSO<sub>2</sub> R', -C(=O)NRR', -NRC(=O)R' -PO<sub>3</sub> HR ( , R R' , ,  
 ( ) , ( ) , ( ) ,  
 ) ) , 1, 2, 3 , 가 3 12 , 1  
 5 , , N, O, S , 4- , 4- , , 1,  
 4- ) 가 .

' ( ) ' 가 3 12 1가  
 , -CF<sub>3</sub> , -CN, -OR, -SR, -NRR', -  
 C(=O)R, -OC(=O)R, -C(=O)OR, -SO<sub>2</sub> OR, -OSO<sub>2</sub> R, -SO<sub>2</sub> NRR', -NRSO<sub>2</sub> R', -C(=O)NRR', -NRC(=O)R'  
 -PO<sub>3</sub> HR ( , R R' , , ( ) ,  
 ( ) , ( ) ) , 1, 2, 3 ,  
 가 3 12 , 1 5 , , N, O, S , 4- , 4- , , 1,4-  
 ) 가 .

' , ' , -CF<sub>3</sub> , , -CN, -OR, -SR,  
 -NRR', -C(=O)R, -OC(=O)R, -C(=O)OR, -SO<sub>2</sub> OR, -OSO<sub>2</sub> R, -SO<sub>2</sub> NRR', -NRSO<sub>2</sub> R', -C(=O)NRR', -NR

$C(=O)R'$ ,  $-PO_3HR$  ( $R, R'$ ),  $(\quad)$ ,  $1, 2, 3$  ( )  
 가 :  $-CF_3$ ,  $-C_2F_5$  .  
 $(\quad)$  ( $\quad$ ),  $2$   
 $2, 3$  ( $\quad$ ),  $2$  가  $6, 16$   
 $(\quad)$  ( $\quad$ ) 가  $6, 14$  .  
 $(\quad)$ ,  $-CN$ ,  $-OR$ ,  $-SR$ ,  $-NRR'$ ,  $-C(=O)R$ ,  $-OC(=O)R$ ,  $-C(=O)OR$ ,  $-SO_2OR$ ,  $-OSO_2R$ ,  $-SO_2NRR'$ ,  $-PO_3H_2$ ,  $-NRSO_2R'$ ,  $-C(=O)NRR'$ ,  $-NRC(=O)R'$  ( $R, R'$ ),  $(\quad)$ ,  $(\quad)$  ( $\quad$ )  $1, 2, 3$   
 $-CN$ ,  $-OR$ ,  $-NRR'$ ,  $-C(=O)NRR'$ ,  $-SO_2OR$ ,  $-SO_2NRR'$ ,  $-PO_3H_2$ ,  $-NRSO_2R'$ ,  $-NRC(=O)R'$   $1, 2, 3$  .  
 $(\quad)$   $1, 5$  ,  $N, O, S$  가  $5, 14$   
 $(\quad)$  ( $\quad$ )  
 $(\quad)$  가 .  
 $R, OC(=O)R, -C(=O)OR, -SO_2OR, -OSO_2R, -SO_2NRR', -NRSO_2R', -C(=O)NRR', -NRC(=O)R'$  ( $R, R'$ ),  $(\quad)$ ,  $(\quad)$  ( $\quad$ )  $1, 2, 3$   
 $-CN, -OR, -SR, -NRR'$  가 .  
 $(\quad)$  , .  
 $(\quad)$   $1, 3$  가 ( )  
 $(\quad)$  .  
 $(\quad)$  , .  
 $(\quad)$  ,  $1, 3$   
 $가$  ( $\quad$ ) .  
 $-OR$  ( $R$ ) .  
 $(\quad)$  .  
 $(\quad)$  .  
 $가$  .  
 $(Zwitterion)$  , 가  
 $(\quad)$  , 가  
 $가$  , 가  
 $가$  , 가



, X Y I , , O N-R<sup>7</sup> .

, R<sup>1</sup> , ( , , -OR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( ) ) .

, n 0 .

, R<sup>2</sup> , ( , , -OR<sup>9</sup>, -NR<sup>9</sup>(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>2</sup> , ( , , -OR<sup>9</sup>, -NR<sup>9</sup>(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>3</sup> , ( , , -OR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>3</sup> , ( , , -OR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>7</sup> , ( , , -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -SO<sub>2</sub>OR<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( ) ) .

, R<sup>8</sup> , ( , , -CF<sub>3</sub>, -OR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( , ( , , ( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>4</sup> R<sup>5</sup> , , -(CH<sub>2</sub>)<sub>2-4</sub> - .

, R<sup>6</sup> , , , ( , ,

$$\begin{aligned} & \text{O)R}^{11}, -\text{C(=O)OR}^{11}, -\text{C(=O)NR}^{11}\text{R}^{12}, -\text{SO}_2\text{R}^{11}, \\ & -\text{SO}_2\text{NR}^{11}\text{R}^{12} \left( \begin{array}{c} \text{( } \\ \text{), R}^{11} \\ \text{( } \end{array} \right), -\text{C(=} \\ & \text{, R}^{11} \text{R}^{12} \quad \text{-(CH}_2\text{)}_{4-6} \text{ )}. \end{aligned}$$

4 la. a. a. R<sup>13</sup>, 4 R<sup>14</sup>, R<sup>13</sup> R<sup>1</sup>

la, a a

1

가

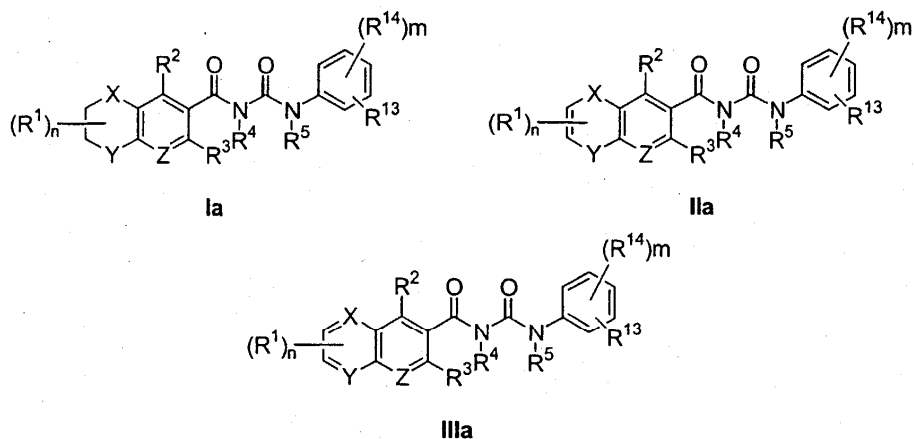
$$I \quad , Y \quad N-R^7 \quad , Z \quad C-R^8 \quad ,$$
 $R^{-1}$  $R^4 \quad R^5$ 
$$\begin{aligned} & \text{R}^6, (\quad), \\ & \text{R}^{11}, -\text{C}(=\text{O})\text{OR}^{11}, -\text{C}(=\text{O})\text{NR}^{11}\text{R}^{12}, -\text{SO}_2\text{R}^{11}, -\text{SO}_2\text{NR}^{11}\text{R}^{12}(\quad), \text{R}^{11}\text{R}^{12}, -\text{C}(=\text{O}), \\ & (\quad), \text{R}^{11}\text{R}^{12}, -(\text{CH}_2)_{4-6}- \end{aligned}$$

N(C<sub>1-2</sub>)<sub>2</sub>, R<sup>2</sup>-NR<sup>9</sup>R<sup>10</sup>(R<sup>9</sup>R<sup>10</sup>), , , , , , , O, S, NH, N-(CH<sub>2</sub>)<sub>4-6</sub>.

1

가 ,

$$I \quad , Y \quad N-R^7 \quad , Z \quad C-R^8 \quad ,$$
 $R^1 \quad R^8$ 
$$R^2 - NR^9 R^{10},$$
 $R^4 \quad R^5$ 
$$\begin{aligned} & \text{R}^6, (\quad), \\ & \text{R}^{11}, -\text{C}(=\text{O})\text{OR}^{11}, -\text{C}(=\text{O})\text{NR}^{11}\text{R}^{12}, -\text{SO}_2\text{R}^{11}, -\text{SO}_2\text{NR}^{11}\text{R}^{12}(\quad), \text{R}^{11}\text{R}^{12}, -\text{C}(=\text{O}), \\ & (\quad), \text{R}^{11}\text{R}^{12}, -(\text{CH}_2)_{4-6}- \end{aligned}$$
$$a^2, \dots, la, a$$



[ ] :

Y Ia a O, S, N-R<sup>7</sup>,X Y a, , N C-R<sup>7</sup>,Z N C-R<sup>8</sup>,R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>7</sup> R<sup>8</sup> 1,

R<sup>13</sup>, , , , , ( ), , , -CF<sub>3</sub>,  
 , , -CN, -OR<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -  
 OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>, -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>SO<sub>2</sub>R<sup>16</sup> -NR<sup>15</sup>C(=O)R<sup>16</sup> ( , R<sup>15</sup> R<sup>16</sup> ),  
 , , , -CF<sub>3</sub>, , ,  
 ( ), , ( ),  
 O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>14</sup>, , , , , -CF<sub>3</sub>,  
 -OR<sup>17</sup>, -NR<sup>17</sup>R<sup>18</sup>, -C(=O)R<sup>17</sup>, -C(=O)OR<sup>17</sup>, -C(=O)NR<sup>17</sup>R<sup>18</sup> ( , R<sup>17</sup> R<sup>18</sup> , ,  
 , , , -CF<sub>3</sub>, , ( ),  
 (CH<sub>2</sub>)<sub>4-6</sub> - ) O, S, NH N-(C<sub>1-2</sub>) 가 -

R<sup>13</sup> -OR<sup>15</sup>, R<sup>15</sup>, , , -C(=O)OR<sup>19</sup> ( , R<sup>19</sup> )

R<sup>9</sup> R<sup>10</sup>, , O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ,  
 , 4- , , .

n 0 4 . ' , , 가

, R<sup>13</sup>, , , , ( ,  
 ), , ( ), ( ), -CF<sub>3</sub>, , , -CN, -O  
 R<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>,  
 -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup> ( , R<sup>15</sup> R<sup>16</sup> , , ,  
 , , ( ),  
 ( ) , , O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - )

, R<sup>13</sup>, , , , ( ,  
 ), , ( ), ( ), -CF<sub>3</sub>, , , -CN, -O  
 R<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>,

-SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup>( , R<sup>15</sup> R<sup>16</sup> , , , ,  
( ) , , O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> -  
) .

-CF<sub>3</sub>, -OR<sup>14</sup>-NR<sup>17</sup>R<sup>18</sup>, -C(=O)R<sup>17</sup>, -C(=O)OR<sup>17</sup>, -C(=O)NR<sup>17</sup>R<sup>18</sup>( , R<sup>17</sup> R<sup>18</sup> , ,  
( ) ) .

, R<sup>13</sup> 가 , n 1 2 . , R<sup>13</sup> 가 ,  
n 1 .

2

la a , Y N-R<sup>7</sup> , Z C-R<sup>8</sup> ,

R<sup>1</sup> ,

R<sup>2</sup> , , 4- , 4- , -NR<sup>9</sup>R<sup>10</sup>( , R<sup>9</sup> R<sup>10</sup>  
( , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( ,  
( , R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( , N-( ( ,  
0 N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>13</sup> , , , , ( ,  
( , ( , ( , -CF<sub>3</sub> ,  
, -CN, -OR<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>,  
, -SO<sub>2</sub>R<sup>15</sup>, -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>SO<sub>2</sub>R<sup>16</sup> -NR<sup>15</sup>C(=O)R<sup>16</sup>( , R<sup>15</sup> R<sup>16</sup> ,  
, , , , -CF<sub>3</sub> , ( ,  
( ) , R<sup>15</sup> R<sup>16</sup> , O, S,  
NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

, R<sup>4</sup> R<sup>5</sup> .

4 la, a, a R<sup>13</sup> , 4 R<sup>14</sup> , R<sup>13</sup> R<sup>1</sup>

R<sup>13</sup> -OR<sup>15</sup> , R<sup>15</sup> , -C(=O)OR<sup>19</sup>( , R<sup>19</sup>  
) .

R<sup>9</sup> R<sup>10</sup> , O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ,  
, 4- , , .

m 0 4 . ' ' , 가  
가 .

, R<sup>13</sup> , , , ( ,  
( , ( , ( , -CF<sub>3</sub> , , -CN, -O  
R<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>,  
-SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup>( , R<sup>15</sup> R<sup>16</sup> , , ,  
( , O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> -  
) .

, R<sup>13</sup> , , , ( ,  
( , ( , ( , -CF<sub>3</sub> , , -CN, -O  
R<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>,  
-SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup>( , R<sup>15</sup> R<sup>16</sup> , , ,  
, , , ,

[illegible]



(3- , -2- , 4- [2.2.2.] -2- -1- , , , 4,4'-  
) , 3- , , tert - , , ,  
, , 3- -2- , , , .  
가 , .  
.  
 , , 가 [

[Berge, (1977)] ].

11 .

3 가

가 가 , 5% , , , .

가 가

1 g 20 mg

(elixir),

가 .

4. 가, 가, 이,

MCP-1

(THP-1 )

- Thy-1 - , (balloon injury) ; (neointimal h  
yperplasia) , apoE- , (sinus)

가

가

0.1 50 mg/kg

0.01 1000 mg/kg,

0.01 100 mg/kg,

1 1 10

가

, ['Remington: The Science and Practice of Pharmacy', A. Gennaro, ed., 20 , Lippincott, Willi  
ams amp; Wilkins, ]

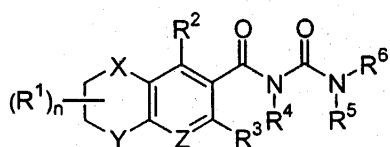
:

Aldrich Chemical Company ( ), Bachem (

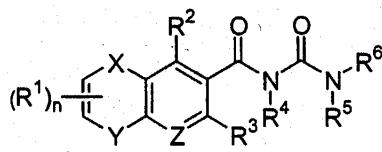
, Sigma ( ), [Fieser and Fieser's *Reag  
ents for Organic Synthesis*, 1-17 , John Wiley and Sons, , 1991]; [ *Rodd's Chemistry of Carbo  
n Compounds*, 1-5 , Elsevier Science Publishers, 1989]; [Organic Reactions, 1-40 , John Wiley  
and Sons, , 1991]; [March J.: *Advanced Organic Chemistry*, 4 , John Wiley and Sons,  
]; [Larock: *Comprehensive Organic Transformations*, VCH Publishers, , 1989]

[Greene , *Protective Groups in Organic Synthesis*, 2 , John Wiley and Sons, , 1991]

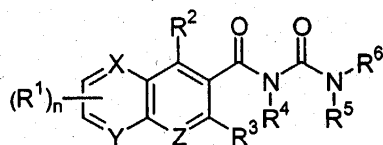
[Larock: *Comprehensive Organic Transformations*, VCH Publishers, ,  
, 1989]



I



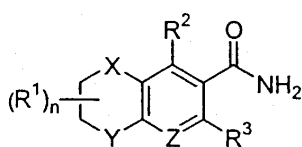
II



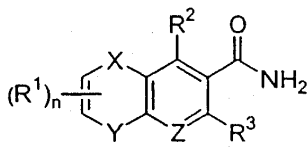
III

[ , X, Y, Z, R<sup>1</sup> ~ R<sup>6</sup> 1 ]

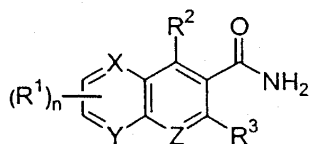
(a) Ib, b, b



Ib



IIb



IIIb

[ , X, Y, Z, R<sup>1</sup> ~ R<sup>3</sup> , I, ( , R<sup>4</sup> R<sup>5</sup> R<sup>6</sup>-N=C=O ( , R<sup>6</sup> H ) ]

(b) Ib, b b I, ( , R<sup>4</sup> H ) ( , R<sup>5</sup> R<sup>6</sup> )

(c) , I, (elaborating) ;

(d) I, 가 가 ;

(e) I, 가 ;

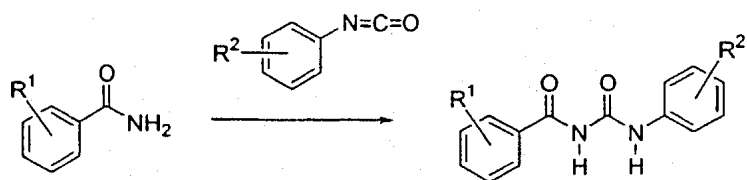
(f) I, , I, 가 ;

(g) I, .

(a) , , ,

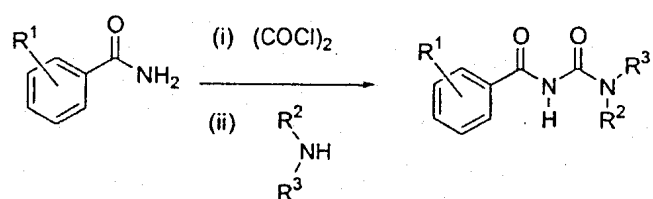
(b) , , , -COCl, -COBr A-(CO)-B ( (b) )

THF , 50 가

A:

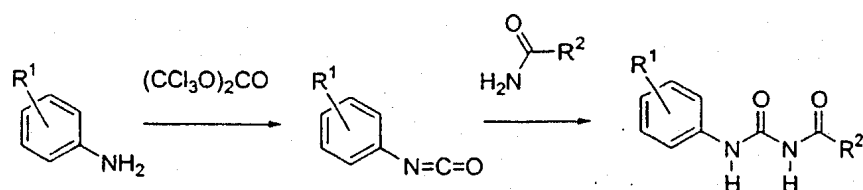
Aldrich Chemical Company

가 , 1.01 2 , 1.01 1.2 (1:1)  
 가 , 40 120 , 가 10 150 ,  
 6 24 , 10 가 24 ,  
 가 ,  
 가

B:

1 ,  
 , 2- THF ,  
 , 1.1 3.0 , 1.5 15 24 50 175 가  
 , 가 2 16 ,  
 0 20 , 0 5 , THF  
 가 , 0 5 1 24 ,

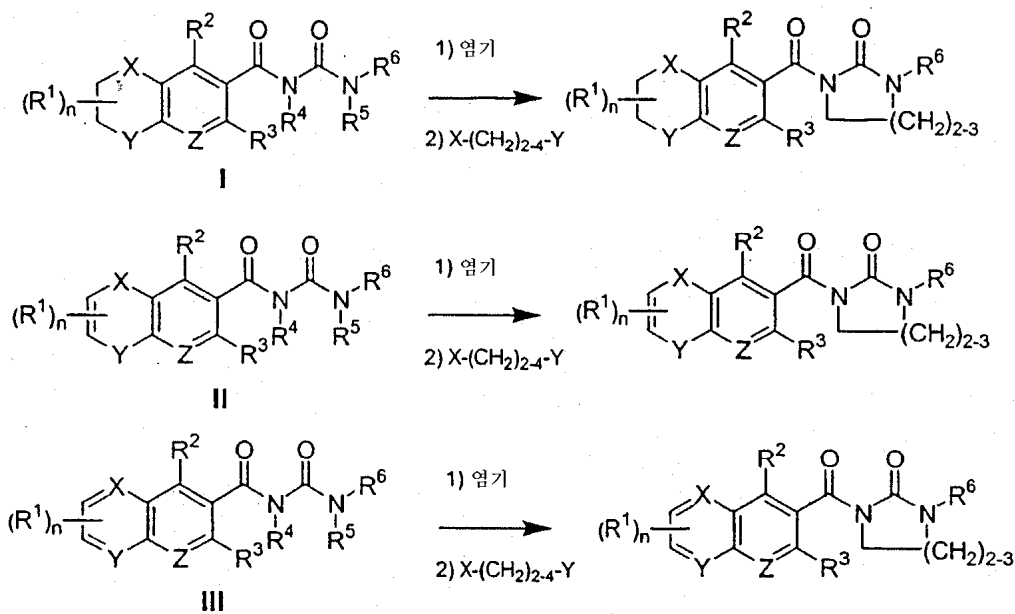
C:



TLC HPLC

가 2 50 24 150 75 115 가

D:



$H_2)_{2-4}-Y($  , X Y

X-(C

, p-  
1,2-

, p-  
1,3-

, 1,3-

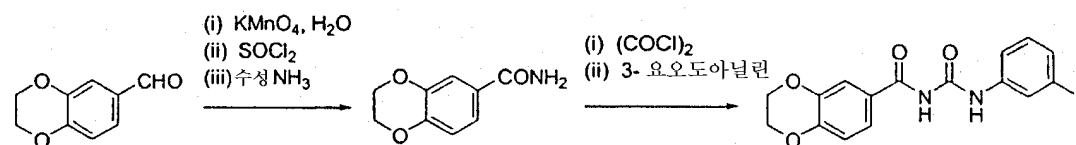
, p-

가

가 10 5 30 0 25 가

2

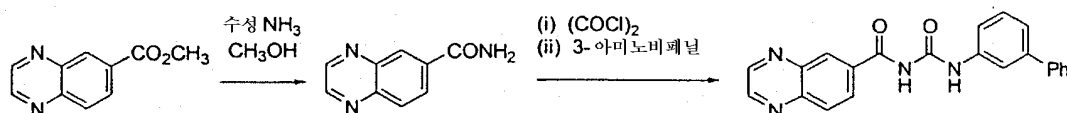
\_\_\_\_\_ 1: 2H,3H- [3,4-e]1,4- -6- - N - {[ (3- ) ] } ( 10 )



(100 Mℓ) (3.31 g) 30 (40 Mℓ) 1,4- -6- ( 2.50 g) 90 가 . 90 가 45 , , HCl pH 3 1 M KOH (pH 10) , , 2H,3H- [e]1,4- -6- - (1.05 g) (10 Mℓ) , 50 7 가 , , (10 Mℓ, 28 ~ 30% ) 0 5 , 2H,3H- [e] 가 1 , , (0.90 g) 15 , , ( 2 M 3.8 Mℓ) , (10 Mℓ) , , 3- (604 μℓ) , , 45 , ,

$^1\text{H NMR}$  (DMSO- $d_6$ )  $\delta$  4.29- 4.32 (m, 4H), 6.90 (d, 1H,  $J=8.3$  Hz), 7.14 (t, 1H,  $J=7.9$  Hz), 7.45 (d, 1H,  $J=7.9$  Hz), 7.50 (d, 1H,  $J=6.8$  Hz), 7.58- 7.61 (m, 2H), 8.10 (s, 1H), 10.88 (s, 2H). MS (ESI)  $m/z$  423.

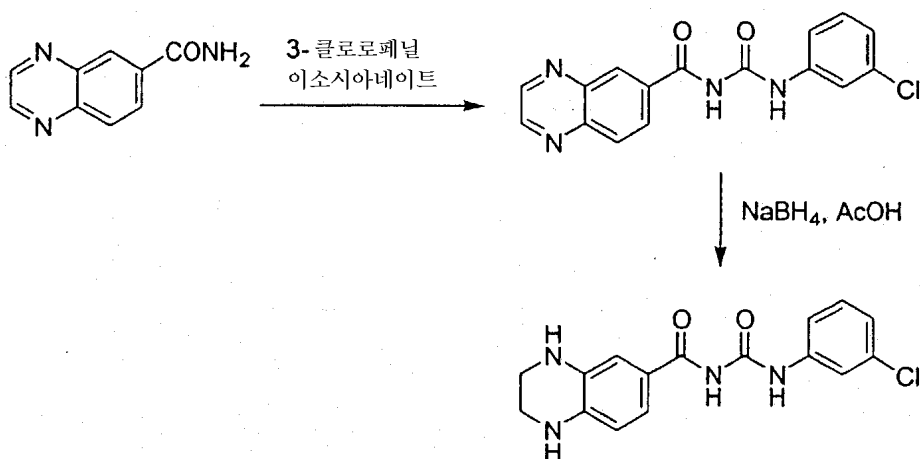
\_\_\_\_\_ 2: N - {[ (3- ) ] } -6- ( 78 )



(7.0 Mℓ) 28 ~ 30% (14 Mℓ) -6- (2.00 g) -6- 16 (0.10 g) , , ( 2 M 1.0 Mℓ) 16 가 , , (0.98 g) 가 , , (1 Mℓ) , , 3- N - {[ (3- ) ] } -6- (1 Mℓ)

$^1\text{H NMR}$  (DMSO- $d_6$ )  $\delta$  7.37-7.47 (m, 3H), 7.50 (t,  $J=7.2$  Hz, 2H), 7.65 (d,  $J=7.8$  Hz, 1H), 7.69 (d,  $J=7.2$  Hz, 2H) 7.91 (s, 1H), 8.25 (d,  $J=8.8$  Hz, 1H), 8.37 (dd,  $J=8.8$ , 1.9 Hz, 1H), 8.84 (d,  $J=1.9$  Hz, 1H), 9.09 (s, 2H), 10.85 (s, 1H), 11.44 (s, 1H). MS (ESI)  $m/z$  369.

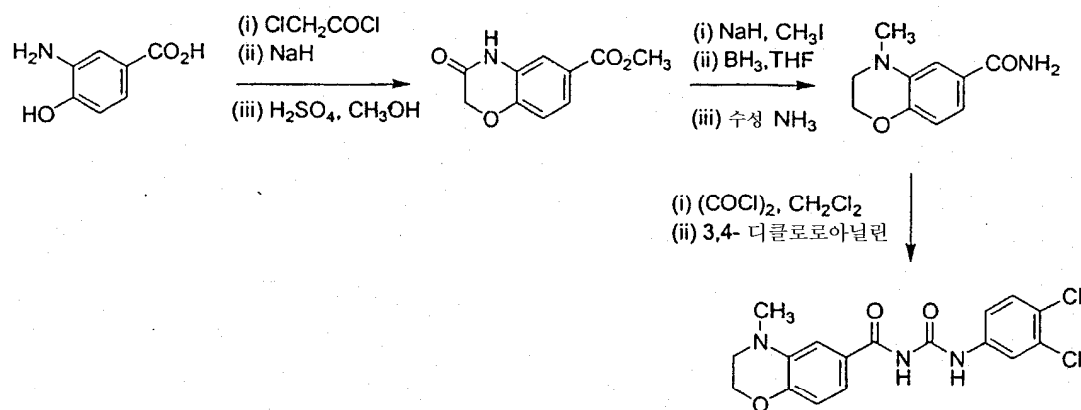
\_\_\_\_\_ 3: N - {[ (3- ) ] } -1,2,3,4- -6- ( 115 )



-6- (0.10 g) (hot) (30 Mℓ) , 1 (azeotrope)  
 가 , 3- (0.133 g) , 16  
 ) ] } -6- N- {[ (3-  
 (1.5 Mℓ) , (40 mg)  
 N- {[ (3- ) ] } -1,2,3,4- (9 mg) . TLC 가  
 -6- ,

<sup>1</sup>H NMR (DMSO-d<sub>6</sub>) δ 3.18 (br s, 2H), 3.32 (br s, 2H), 5.56 (br s, 1H), 6.37 (d, J=8.3 Hz, 1H), 6.38 (br s, 1H), 7.09 (d, J=1.9 Hz, 1H), 7.13 (dd, J=7.8, 1.9 Hz, 1H), 7.26 (dd, J=8.3, 1.9 Hz, 1H), 7.35 (t, J=7.8 Hz, 1H), 7.41 (dd, J=7.8, 1.9 Hz, 1H), 7.82 (t, J=1.9 Hz, 1H), 10.39 (s, 1H), 11.25 (s, 1H). MS (ESI) m/z 331.

4: N- {[ (3,4- ) ] } (4- (2H,3H- [3,4-e]1,4- -6- ))  
 ( 141 )

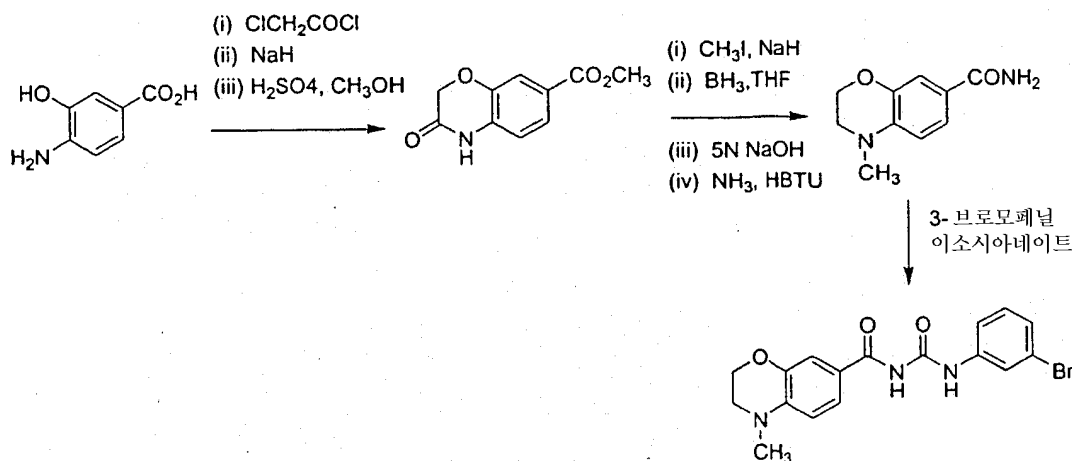


(2.23 g) -60 3- -4-  
 (3.00 g) (9 Mℓ) 가 , 16  
 (3.00 g) (150 Mℓ) , -60 ( / )  
 ( 60% 2.10 g) ,  
 pH 1 16 ,  
 가 -6- (84 Mℓ) (2.80 g) 3- -2H,4H- [e]1,4-  
 , 3- -2H,4H- (1.50 g) 0 -6- (0.5 Mℓ)  
 (50 Mℓ) 가 ,  
 0.87 g) 16 1 (3.08 g) ( 60%  
 , 16 ,

4- -3- -2H- [3,4-e]1,4-  
(1.00 g) (50 Mℓ)  
1 M 7.5 Mℓ)  
가  
-2H,3H- [3,4-e]1,4- -6-  
(15 Mℓ) , 28 ~ 30% (30 Mℓ)  
NaOH  
(21 mg) 가 2 M 0.2 Mℓ)  
THF (0.5 Mℓ)  
가 1  
N- {[ (3,4- ) ] } (4- (2H,3H- [3,4-e]1  
,4- -6- ))

$^1\text{H NMR}$  (DMSO- $d_6$ )  $\delta$  2.91 (s, 3H), 3.28 (t,  $J=4.1$  Hz, 2H), 4.31 (t,  $J=4.1$  Hz, 2H), 6.78(d,  $J=8.2$  Hz, 1H), 7.37(d,  $J=8.2$  Hz, 1H), 7.39 (s, 1H), 7.53 (dd,  $J=6.6$ , 2.2 Hz, 1H), 7.56(d,  $J=6.6$  Hz, 1H), 8.02 (d,  $J=2.2$  Hz, 1H), 10.94(s, 1H), 11.13 (s, 1H). MS (ESI)  $m/z$  378.

5: N- {[ (3- ) ] } (4- (2H,3H- [e]1,4- -7- ))  
( 144 )



4- -3- (5.00 g) (200 Mℓ) , -60  
(3.72 g) 가 , 16  
(15 Mℓ) 가 ,  
) -3- (8.00 g)  
(25 Mℓ) , -60 (60% 4.15 g) 가  
, 16 , 0  
pH 1  
, 3- -2H,4H- [e]1,4- -7-  
(3.50 g) (115 Mℓ) , (0.887 g)  
, 16 가 ,  
(100 Mℓ) , 0 (2.00 g)  
60% 0.77 g)  
, 16  
(1.89 g) 4- -3- -2H- [e]1,4- -7-  
1 M (100 Mℓ) , (14.2 Mℓ)  
n- / 가  
3H- [e]1,4- -7-  
(5 Mℓ) 5 N  $\text{NaOH}$  (2.55 Mℓ) , 4 가  
4- -2H,  
(0.53 g)

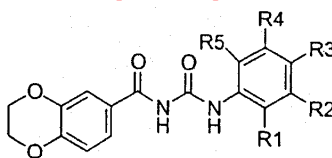


, pH 2 ,  
 4- -2H,3H- [e]1,4- -7-  
 (0.40 g) 0.5 M (10.4 Mℓ)  
 (1.34 g), O - -1- )- *N,N,N',N'* - (0.86 g) DMF (5 Mℓ)  
 16 /  
 , 3- (0.10 g) 4- -2H,3H- [e]1,4- -7-  
 (30 Mℓ) , 1  
 (0.226 g) 16  
 가 , N - { [(3- , ) ] } (4- (2H,3H- [e]1,4- -7- ))

<sup>1</sup>H NMR(DMSO-d<sub>6</sub>) δ 2.96 (s, 3H), 3.39 (t, J=4.2 Hz, 2H), 4.22 (m, 2H), 6.73  
 (d, J=8.6 Hz, 1H), 7.24-7.36 (m, 2H), 7.42 (d, J=1.9 Hz, 1H), 7.47 (m, 1H), 7.64 (dd,  
 J=8.6, 1.9 Hz), 7.98 (s, 1H), 10.68 (s, 1H), 11.16 (s, 1H). MS (ESI) m/z 388, 390.

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1 ~ 10

$$[1 - 1]$$


화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>1</u>	H	Cl	H	H	H	332.74	331, 333
<u>2</u>	H	Cl	Cl	H	H	367.19	365, 367, 369
<u>3</u>	H	Cl	OH	H	H	348.74	347, 349
<u>4</u>	H	H	CF <sub>3</sub>	H	H	366.29	365
<u>5</u>	H	H	Cl	H	H	332.74	331, 333
<u>6</u>	H	Br	H	H	H	377.19	375, 377
<u>7</u>	H	CN	H	H	H	323.31	322
<u>8</u>	Cl	H	Cl	H	H	367.18	365, 367, 369
<u>9</u>	H	H	I	H	H	424.19	423
<u>10</u>	H	I	H	H	H	424.19	423
<u>11</u>	H	OCF <sub>3</sub>	H	H	H	382.29	381
<u>12</u>	H	i-Pr	H	H	H	340.38	339
<u>13</u>	H	Me	H	H	H	312.32	311
<u>14</u>	I	H	H	H	H	424.19	423
<u>15</u>	H	CF <sub>3</sub>	H	H	H	366.29	365

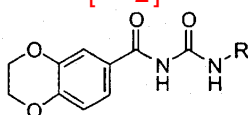
[ 1-2]

<u>16</u>	H	SCF <sub>3</sub>	H	H	H	398.36	397
<u>17</u>	H	Et	H	H	H	326.35	325
<u>18</u>	H	OEt	H	H	H	342.35	341
<u>19</u>	H	Oi-Pr	H	H	H	356.38	355
<u>20</u>	H	Ph	H	H	H	374.39	373
<u>21</u>	H	t-Bu	H	H	H	354.40	353
<u>22</u>	H	Cl	Me	H	H	346.79	345, 347
<u>23</u>	H	I	Me	H	II	438.21	437
<u>24</u>	H	CF <sub>3</sub>	Me	H	H	380.32	379
<u>25</u>	H	CF <sub>3</sub>	F	H	H	384.28	383
<u>26</u>	H	CF <sub>3</sub>	CF <sub>3</sub>	H	H	434.29	433
<u>27</u>	H	CF <sub>3</sub>	H	CF <sub>3</sub>	H	434.29	433
<u>28</u>	H	CF <sub>3</sub>	Cl	H	H	400.74	399, 401
<u>29</u>	H	OPh	H	H	H	390.39	389
<u>30</u>	H	NO <sub>2</sub>	H	H	H	343.29	342
<u>31</u>	H	Cl	H	Cl	H	367.19	365, 367, 369
<u>32</u>	H	Ac	H	H	H	340.33	339
<u>33</u>	H	CO <sub>2</sub> Me	H	H	H	356.33	355
<u>34</u>	H	1H-1,2,3,4-테트라졸-5-일	H	H	H	366.34	365
<u>35</u>	H	에티닐	H	H	H	322.32	321
<u>36</u>	Me	Cl	H	H	H	346.77	345, 347
<u>37</u>	Me	H	H	Cl	H	346.77	345, 347
<u>38</u>	Me	H	H	I	H	438.22	437

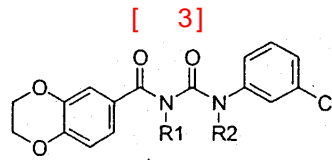
## [ 1-3]

<u>39</u>	OMe	H	H	Cl	H	362.77	361, 363
<u>40</u>	Et	Cl	H	H	Et	388.85	387, 389
<u>41</u>	H	1,3-티아졸-2-일	H	H	H	381.41	382
<u>42</u>	H	2-티에닐	H	H	H	380.42	381
<u>42</u>	H	3-티에닐	H	H	H	380.42	379
<u>44</u>	H	2-푸르푸릴	H	H	H	364.56	363
<u>45</u>	H	2-피리딜	H	H	H	375.38	374
<u>46</u>	H	H	1H-1,2,3,4-테트라졸-5-일	H	H	366.34	365
<u>47</u>	H	CO <sub>2</sub> Me	Br	H	H	435.22	435
<u>48</u>	H	CF <sub>3</sub>	H	CO <sub>2</sub> H	H	410.30	409
<u>49</u>	H	CF <sub>3</sub>	H	OH	H	382.29	381
<u>50</u>	H	CO <sub>2</sub> H	Br	H	H	412.20	419
<u>51</u>	H	Cl	OC(O)CH <sub>3</sub>	H	H	390.77	389, 391
<u>52</u>	H	Cl	OC(O)CH <sub>2</sub> CO <sub>2</sub> CH <sub>3</sub>	H	H	448.81	447, 449
<u>53</u>	H	Cl	OC(O)CH <sub>2</sub> CO <sub>2</sub> H	H	H	434.78	433, 435
<u>54</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> CH <sub>3</sub>	H	H	420.80	419, 421
<u>55</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> H	H	H	406.77	405
<u>56</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> CH <sub>2</sub> Ph	H	H	496.90	495, 497
<u>57</u>	H	Cl	CO <sub>2</sub> Na	H	H	398.03	ND
<u>58</u>	H	CO <sub>2</sub> H	Cl	H	H	376.75	375, 377
<u>59</u>	H	H	CO <sub>2</sub> Na	H	H	364.28	ND
<u>60</u>	H	CO <sub>2</sub> Na	H	H	H	364.28	ND

## [ 2]

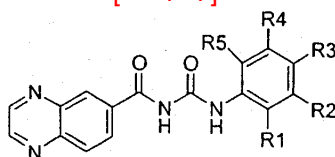


화합물	R	MW	MS (m/z)
<u>61</u>	2-클로로-4-(피리딜)	333.73	333, 334
<u>62</u>	6-클로로-4-메틸피리미딘-2-일	348.74	332, 334
<u>63</u>	5-(트리플루오로메틸)(1,3,4-티아디아졸-2-일)	374.30	373



화합물	R1	R2	MW	MS (m/z)
<u>64</u>	CH <sub>2</sub> OCH <sub>3</sub>	CH <sub>2</sub> OCH <sub>3</sub>	420.84	421, 423
<u>65</u>	CH <sub>2</sub> OCH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub>	H	420.84	421, 423

[ 4-1 ]

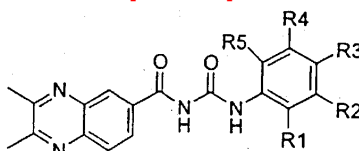


화합물	R1	R2	R3	R4	R5	MW	MS(m/z)
<u>66</u>	H	Cl	H	H	H	326.74	325, 327
<u>67</u>	H	Br	H	H	H	371.19	369, 371
<u>68</u>	H	H	CF <sub>3</sub>	H	H	360.29	359
<u>69</u>	H	CF <sub>3</sub>	H	H	H	360.29	359
<u>70</u>	H	OCF <sub>3</sub>	H	H	H	376.29	375
<u>71</u>	H	i-Pr	H	H	H	334.38	333
<u>72</u>	H	I	H	H	H	418.19	417
<u>73</u>	H	CF <sub>3</sub>	F	H	H	378.28	379
<u>74</u>	H	Cl	OH	H	H	342.74	343, 345
<u>75</u>	H	CF <sub>3</sub>	Cl	H	H	394.74	395
<u>76</u>	H	CN	H	H	H	317.31	318
<u>77</u>	Cl	H	Cl	H	H	361.19	361, 363
<u>78</u>	H	Ph	H	H	H	368.39	369
<u>79</u>	H	Oi-Pr	H	H	H	350.38	351
<u>80</u>	H	OPh	H	H	H	384.39	385
<u>81</u>	H	CF <sub>3</sub>	H	CF <sub>3</sub>	H	428.29	429
<u>82</u>	H	Cl	Cl	H	H	361.87	359, 361, 363
<u>83</u>	H	CO <sub>2</sub> Me	Cl	H	H	384.78	383, 385
<u>84</u>	H	CO <sub>2</sub> Et	Cl	H	H	398.80	397
<u>85</u>	H	CO <sub>2</sub> Na	Cl	H	H	392.73	369, 371
<u>86</u>	H	H	CO <sub>2</sub> Na	H	H	358.29	335
<u>87</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> Et	H	H	428.83	427
<u>88</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> Na	H	H	422.76	399, 401
<u>89</u>	H	CO <sub>2</sub> Na	H	H	H	358.29	335

## [ 4-2]

<u>90</u>	CO <sub>2</sub> Na	Cl	H	H	H	392.73	371
<u>91</u>	H	Oi-Pr	CO <sub>2</sub> Na	H	H	416.37	393
<u>92</u>	H	CO <sub>2</sub> Na	H	CF <sub>3</sub>	H	426.29	403
<u>93</u>	OH	Cl	H	H	H	342.74	341, 343
<u>94</u>	H	OH	CO <sub>2</sub> H	H	H	352.30	351
<u>95</u>	H	3-티에닐	H	H	H	374.42	373
<u>96</u>	H	1,3-티아졸-2-일	H	H	H	375.54	374
<u>97</u>	H	2-푸르푸릴	H	H	H	358.36	357
<u>98</u>	H	Cl	CO <sub>2</sub> H	H	H	370.75	369
<u>99</u>	H	2-피리딜	H	H	H	369.38	368
<u>100</u>	H	2-티에닐	H	H	H	374.42	373
<u>101</u>	H	OPh	CO <sub>2</sub> H	H	H	428.40	427
<u>102</u>	H	벤조일	H	H	H	396.40	395
<u>103</u>	H	CO <sub>2</sub> i-Pr	Cl	H	H	412.83	411
<u>104</u>	CO <sub>2</sub> H	H	Cl	H	H	370.75	369
<u>105</u>	H	CF <sub>3</sub>	CO <sub>2</sub> Me	H	H	418.33	417
<u>106</u>	H	OH	CO <sub>2</sub> Me	H	H	366.33	365
<u>107</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> CH <sub>2</sub> Ph	H	H	490.10	489, 491
<u>108</u>	H	Cl	OCH <sub>2</sub> CO <sub>2</sub> H	H	H	400.06	399, 401

## [ 5-1]

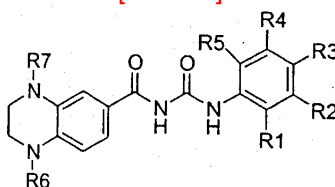


화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>109</u>	H	Cl	H	H	H	354.8	353, 355
<u>110</u>	H	Br	H	H	H	399.25	397, 399
<u>111</u>	H	CF <sub>3</sub>	H	H	H	388.35	387

## [ 5-2]

<u>112</u>	H	Cl	Cl	H	H	389.24	387, 389, 391
<u>113</u>	H	CN	H	H	H	345.36	344

## [ 6-1]



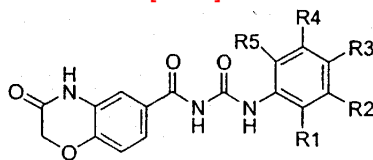
화합물	R1	R2	R3	R4	R5	R6	R7	MW	MS (m/z)
<u>114</u>	H	H	CF <sub>3</sub>	H	H	H	H	364.33	363
<u>115</u>	H	Cl	H	H	H	H	H	330.77	331, 333
<u>116</u>	H	Br	H	H	H	H	H	375.22	375, 377
<u>117</u>	H	CF <sub>3</sub>	H	H	H	H	H	364.33	365
<u>118</u>	H	CF <sub>3</sub>	H	H	H	Et	Et	420.43	421
<u>119</u>	H	OCF <sub>3</sub>	H	H	H	H	H	380.32	381
<u>120</u>	H	i-Pr	H	H	H	H	H	338.41	339
<u>121</u>	H	I	H	H	H	H	H	422.22	423
<u>122</u>	H	CF <sub>3</sub>	F	H	H	H	H	382.32	383
<u>123</u>	H	CF <sub>3</sub>	H	H	H	Me	Me	392.38	393
<u>124</u>	H	CF <sub>3</sub>	Cl	H	H	H	H	398.77	399, 401
<u>125</u>	H	CN	H	H	H	H	H	321.34	322
<u>126</u>	H	Ph	H	H	H	H	H	372.43	373
<u>127</u>	H	Oi-Pr	H	H	H	H	H	354.41	355
<u>128</u>	H	OPh	H	H	H	H	H	388.43	389
<u>129</u>	H	CF <sub>3</sub>	H	CF <sub>3</sub>	H	H	H	432.32	433
<u>130</u>	H	Cl	OH	H	H	H	H	346.77	345
<u>131</u>	H	CF <sub>3</sub>	H	H	H	CH <sub>2</sub> CH <sub>2</sub> OH	CH <sub>2</sub> CH <sub>2</sub> OH	452.43	453

## [ 6-2]

<u>132</u>	H	CF <sub>3</sub>	H	H	H	H	CH <sub>2</sub> CH <sub>2</sub> OH	408.38	407
<u>133</u>	H	Cl	OCH <sub>2</sub> - CO <sub>2</sub> Et	H	H	H	H	432.86	431
<u>134</u>	H	CO <sub>2</sub> Et	Cl	H	H	H	H	402.84	401
<u>135</u>	H	CO <sub>2</sub> Na	Cl	H	H	H	H	396.76	373

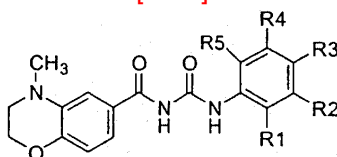


[ 7 ]



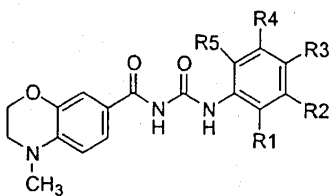
화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>136</u>	H	CF <sub>3</sub>	H	H	H	379.29	378
<u>137</u>	H	Cl	H	H	H	345.74	344, 346

[ 8 ]



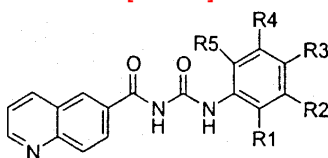
화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>138</u>	H	Cl	H	H	H	345.78	344, 346
<u>139</u>	H	CF <sub>3</sub>	H	H	H	379.37	378
<u>140</u>	H	Br	H	H	H	390.24	389, 391
<u>141</u>	H	Cl	Cl	H	H	380.23	378, 380, 382

[ 9 ]



화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>142</u>	H	CF <sub>3</sub>	H	H	H	379.34	378
<u>143</u>	H	Cl	H	H	H	345.78	344, 346
<u>144</u>	H	Br	H	H	H	390.24	389, 391
<u>145</u>	H	Cl	Cl	H	H	380.23	378, 380, 382
<u>146</u>	H	CF <sub>3</sub>	H	CF <sub>3</sub>	H	447.33	446
<u>147</u>	H	CN	H	H	H	336.35	335
<u>148</u>	H	CF <sub>3</sub>	F	H	H	397.32	396

[ 10]



화합물	R1	R2	R3	R4	R5	MW	MS (m/z)
<u>149</u>	H	Cl	H	H	H	370.20	368
<u>150</u>	H	Br	H	H	H	325.75	324, 326
<u>151</u>	H	CF <sub>3</sub>	H	H	H	359.30	358
<u>152</u>	H	Cl	Cl	H	H	360.20	358, 360, 362

1 ~ 10

11

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Chemistry 4-D Draw™

[ 11]

	IUPAC
<u>1</u>	2H,3H- [e]1,4- -6- -N- {[ (3- ) ] }
<u>2</u>	2H,3H- [e]1,4- -6- -N- {[ (3,4- ) ] }
<u>3</u>	2H,3H- [e]1,4- -6- -N- {[ (3- -4- ) ] }
<u>4</u>	2H,3H- [e]1,4- -6- -N- ( {[ 4- ( ) ] } )
<u>5</u>	2H,3H- [e]1,4- -6- -N- {[ (4- ) ] }
<u>6</u>	2H,3H- [e]1,4- -6- -N- {[ (3- ) ] }
<u>7</u>	2H,3H- [e]1,4- -6- -N- {[ (3- ) ] }
<u>8</u>	2H,3H- [e]1,4- -6- -N- {[ (2,4- ) ] }
<u>9</u>	2H,3H- [e]1,4- -6- -N- {[ (4- ) ] }
<u>10</u>	2H,3H- [e]1,4- -6- -N- {[ (3- ) ] }
<u>11</u>	2H,3H- [e]1,4- -6- -N- ( {[ 3- ( ) ] } )
<u>12</u>	2H,3H- [e]1,4- -6- -N- ( {[ 3- ( ) ] } )
<u>13</u>	2H,3H- [e]1,4- -6- -N- {[ (3- ) ] }
<u>14</u>	2H,3H- [e]1,4- -6- -N- {[ (2- ) ] }
<u>15</u>	2H,3H- [3,4-e]1,4- -6- -N- ( {[ 3- ( ) ] } )
<u>16</u>	2H,3H- [3,4-e]1,4- -6- -N- ( {[ 3- ( ) ] } )
<u>17</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ] }
<u>18</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ] }
<u>19</u>	2H,3H- [3,4-e]1,4- -6- -N- ( {[ 3- ( ) ] } )
<u>20</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ] }
<u>21</u>	2H,3H- [3,4-e]1,4- -6- -N- ( {[ 3- (tert- ) ] } )
<u>22</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- -4- ) ] }
<u>23</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- -4- ) ] }
<u>24</u>	2H,3H- [3,4-e]1,4- -6- -N- ( {[ 4- -3- ( ) ] } )
<u>25</u>	

	2H,3H- [3,4-e]1,4- -6- -N-([4- -3-( ) ] } )
<u>26</u>	2H,3H- [3,4-e]1,4- -6- -N-([3,4- ( ) ] } )
<u>27</u>	2H,3H- [3,4-e]1,4- -6- -N-([3,5- ( ) ] } )
<u>28</u>	2H,3H- [e]1,4- -6- -N-([4- -3-( ) ] } )
<u>29</u>	2H,3H- [e]1,4- -6- -N-[(3- ) ] }
<u>30</u>	2H,3H- [e]1,4- -6- -N-[(3- ) ] }
<u>31</u>	2H,3H- [e]1,4- -6- -N-[(3,5- ) ] }
<u>32</u>	2H,3H- [e]1,4- -6- -N-[(3- ) ] }
<u>33</u>	3- {[(2H,3H- [e]1,4- -6- ) ] }
<u>34</u>	2H,3H- [e]1,4- -6- -N-[(3-(1H-1,2,3,4- -5- ) ) ] }

<u>35</u>	2H,3H- [3,4-e]1,4- -6- -N-[(3- ) ] }
<u>36</u>	2H,3H- [3,4-e]1,4- -6- -N-[(3- -2- ) ] }
<u>37</u>	2H,3H- [3,4-e]1,4- -6- -N-[(5- -2- ) ] }
<u>38</u>	2H,3H- [3,4-e]1,4- -6- -N-[(5- -2- ) ] }
<u>39</u>	2H,3H- [3,4-e]1,4- -6- -N-[(5- -2- ) ] }
<u>40</u>	2H,3H- [3,4-e]1,4- -6- -N-[(3- -2,6- ) ] }
<u>41</u>	2H,3H- [3,4-e]1,4- -6- -N-[(3-(1,3- -2- ) ) ] }
<u>42</u>	2H,3H- [e]1,4- -6- -N-[(3-(2- ) ) ] }
<u>43</u>	2H,3H- [e]1,4- -6- -N-[(3-(3- ) ) ] }
<u>44</u>	2H,3H- [e]1,4- -6- -N-[(3-(2- ) ) ] }
<u>45</u>	2H,3H- [e]1,4- -6- -N-[(3-(2- ) ) ] }
<u>46</u>	2H,3H- [e]1,4- -6- -N-[(4-(1H-1,2,3,4- -5- ) ) ] }
<u>47</u>	5- {[(2H,3H- [e]1,4- -6- ) ] }-2-
<u>48</u>	3- {[(2H,3H- [e]1,4- -6- ) ] }-5-( )
<u>49</u>	2H,3H- [e]1,4- -6- -N-([3- -5-( ) ] } )
<u>50</u>	5- {[(2H,3H- [e]1,4- -6- ) ] }-2-
<u>51</u>	4- {[(2H,3H- [e]1,4- -6- ) ] }-2-
<u>52</u>	4- {[(2H,3H- [e]1,4- -6- ) ] }-2- -1,3-
<u>53</u>	2- [(4- {[(2H,3H- [e]1,4- -6- ) ] }-2- ) ]
<u>54</u>	2- (4- {[(2H,3H- [e]1,4- -6- ) ] }-2- )
<u>55</u>	2- (4- {[(2H,3H- [e]1,4- -6- ) ] }-2- )
<u>56</u>	2- (4- {[(2H,3H- [e]1,4- -6- ) ] }-2- )

<u>57</u>	4 - {[ (2H,3H- [e]1,4- -6- ) ] }-2-
<u>58</u>	5 - {[ (2H,3H- [3,4-e]1,4- -6- ) ] }-2-
<u>59</u>	4 - {[ (2H,3H- [3,4-e]1,4- -6- ) ] }
<u>60</u>	3 - {[ (2H,3H- [3,4-e]1,4- -6- ) ] }
<u>61</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (2- (4- )) ] }
<u>62</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (6- -4- -2- ) ] }
<u>63</u>	2H,3H- [3,4-e]1,4- -6- -N- ({ [5- ( ) (1,3,4- -2- ) ] } )
<u>64</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ( ) ] }-N- ( )

<u>65</u>	2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ] }-N- [(2- ) ]
<u>66</u>	N- {[ (3- ) ] } -6-
<u>67</u>	N- {[ (3- ) ] } -6-
<u>68</u>	-6- -N- ({ [4- ( ) ] } )
<u>69</u>	-6- -N- ({ [3- ( ) ] } )
<u>70</u>	-6- -N- ({ [3- ( ) ] } )
<u>71</u>	N- ({ [3- ( ) ] } ) -6-
<u>72</u>	N- ({ [3- ( ) ] } ) -6-
<u>73</u>	N- ({ [4- -3- ( ) ] } ) -6-
<u>74</u>	N- {[ (3- -4- ) ] } -6-
<u>75</u>	N- ({ [4- -3- ( ) ] } ) -6-
<u>76</u>	N- {[ (3- ) ] } -6-
<u>77</u>	N- {[ (2,4- ) ] } -6-
<u>78</u>	N- {[ (3- ) ] } -6-
<u>79</u>	N- ({ [3- ( ) ] } ) -6-
<u>80</u>	N- {[ (3- ) ] } -6-
<u>81</u>	N- ({ [3,5- ( ) ] } ) -6-
<u>82</u>	N- {[ (3,4- ) ] } -6-
<u>83</u>	2- -5- {[ ( -6- ) ] }
<u>84</u>	2- -5- {[ ( -6- ) ] }
<u>85</u>	2- -5- {[ ( -6- ) ] }
<u>86</u>	4- {[ ( -6- ) ] }
<u>87</u>	2- (2- -4- {[ ( -6- ) ] } )
<u>88</u>	2- (2- -4- {[ ( -6- ) ] } )
<u>89</u>	3- {[ ( -6- ) ] }
<u>90</u>	6- -2- {[ ( -6- ) ] }
<u>91</u>	2- ( ) -4- {[ ( -6- ) ] }
<u>92</u>	3- {[ ( -6- ) ] }-5- ( )
<u>93</u>	2- -4- {[ ( -6- ) ] }

<u>94</u>	2- -4- {[( -6- ) ] }
<u>95</u>	-6- -N- {[(3-(3- ) ) ] }
<u>96</u>	-6- -N- {[(3-(1,3- -2- ) ) ] }
<u>97</u>	N- {[(3-(2- ) ) ] } -6-
<u>98</u>	2- -4- {[( -6- ) ] }
<u>99</u>	N- {[(3-(2- ) ) ] } -6-
<u>100</u>	-6- -N- {[(3-(2- ) ) ] }
<u>101</u>	2- -4- {[( -6- ) ] }
<u>102</u>	N- ({[3-( ) ] } ) -6-
<u>103</u>	2- -5- {[( -6- ) ] }
<u>104</u>	5- -2- {[( -6- ) ] }
<u>105</u>	4- {[( -6- ) ] } -2-( )
<u>106</u>	2- -4- {[( -6- ) ] }
<u>107</u>	2-(2- -4- {[( -6- ) ] } )
<u>108</u>	2-(2- -4- {[( -6- ) ] } )
<u>109</u>	2,3- -6- )-N- {[(3- ) ] }
<u>110</u>	(2,3- -6- )-N- {[(3- ) ] }
<u>111</u>	(2,3- -6- )-N- ({[3-( ) ] } )
<u>112</u>	N- {[(3,4- ) ] } (2,3- -6- )

<u>11</u> <u>3</u>	(2,3- -6- )-N- {[(3- ) ] }
<u>11</u> <u>4</u>	1,2,3,4- -6- -N- ({[4-( ) ] } )
<u>11</u> <u>5</u>	N- {[(3- ) ] } -1,2,3,4- -6-
<u>11</u> <u>6</u>	N- {[(3- ) ] } -1,2,3,4- -6-
<u>11</u> <u>7</u>	1,2,3,4- -6- -N- ({[3-( ) ] } )
<u>11</u> <u>8</u>	(1,4- (1,2,3,4- -6- ))-N- ({[3-( ) ] } )
<u>11</u> <u>9</u>	1,2,3,4- -6- -N- ({[3-( ) ] } )
<u>12</u> <u>0</u>	N- ({[3-( ) ] } ) -1,2,3,4- -6-
<u>12</u> <u>1</u>	N- {[(3- ) ] } -1,2,3,4- -6-
<u>12</u> <u>2</u>	N- ({[4- -3-( ) ] } ) -1,2,3,4- -6-
<u>12</u> <u>3</u>	(1,4- (1,2,3,4- -6- ))-N- ({[3-( ) ] } )
<u>12</u> <u>4</u>	N- ({[4- -3-( ) ] } ) -1,2,3,4- -6-

<u>12</u> <u>5</u>	N-{{[(3- ) ] }-1,2,3,4- -6-
<u>12</u> <u>6</u>	N-{{[(3- ) ] }-1,2,3,4- -6-
<u>12</u> <u>7</u>	N-({[(3-( ) ] } )-1,2,3,4- -6-
<u>12</u> <u>8</u>	N-{{[(3- ) ] }-1,2,3,4- -6-
<u>12</u> <u>9</u>	N-({[(3,5- ( ) ] } )-1,2,3,4- -6-
<u>13</u> <u>0</u>	N-{{[(3- -4- ) ] }-1,2,3,4- -6-
<u>13</u> <u>1</u>	[1,4- (2- )](1,2,3,4- -6- )]-N-({[(3-( ) ]
<u>13</u> <u>2</u>	[4-(2- )](1,2,3,4- -6- )]-N-({[(3-( ) ] }
<u>13</u> <u>3</u>	2-(2- -4-{{[(1,2,3,4- -6- ) ] } })
<u>13</u> <u>4</u>	2- -5-{{[(1,2,3,4- -6- ) ] }
<u>13</u> <u>5</u>	2- -5-{{[(1,2,3,4- -6- ) ] }
<u>13</u> <u>6</u>	(3- (2H,4H- [3,4-e]1,4- -6- ))-N-({[(3-( ) ] }
<u>13</u> <u>7</u>	N-{{[(3- ) ] }(3- (2H,4H- [3,4-e]1,4- -6- ))
<u>13</u> <u>8</u>	N-{{[(3- ) ] }(4- (2H,3H- [3,4-e]1,4- -6- ))
<u>13</u> <u>9</u>	(4- (2H,3H- [3,4-e]1,4- -6- ))-N-({[(3-( ) ] }
<u>14</u> <u>0</u>	N-{{[(3- ) ] }(4- (2H,3H- [3,4-e]1,4- -6- ))
<u>14</u> <u>1</u>	N-{{[(3,4- ) ] }(4- (2H,3H- [3,4-e]1,4- -6- ))
<u>14</u> <u>2</u>	(4- (2H,3H- [e]1,4- -7- ))-N-({[(3-( ) ] }

<u>143</u>	N-{{[(3- ) ] }(4- (2H,3H- [e]1,4- -7- ))
<u>144</u>	N-{{[(3- ) ] }(4- (2H,3H- [e]1,4- -7- ))
<u>145</u>	N-{{[(3,4- ) ] }(4- (2H,3H- [e]1,4- -7- ))
<u>146</u>	N-({[(3,5- ( ) ] } )(4- (2H,3H- [e]1,4- -7- ))
<u>147</u>	N-{{[(3- ) ] }(4- (2H,3H- [e]1,4- -7- ))
<u>148</u>	N-({[(4- -3-( ) ] } )(4- (2H,3H- [e]1,4- -7- ))
<u>149</u>	N-{{[(3- ) ] }-6-
<u>150</u>	N-{{[(3- ) ] }-6-

151	6- -N-({[3-( ) ] } )
152	N-{[(3,4- ) ] }-6-

## 6: MCP-1

가 5  $\mu\text{m}$  , PVP- 96 (Neuro Probe Inc.,  
 $\times 10^6$  /Ml) 0.1% F127 . DMSO 10 mM . THP-1 (2  
5  $\mu\text{M}$  Calcein AM (Molecular Probe, , ) 37 30  
가 30 12.5 nM hMCP-1  
(4  $\times 10^5$  /RPMI1640 50  $\mu\text{l}$  ) 가 , 5% CO<sub>2</sub> 37 2 THP-1  
(LJL BioSystems, , ) 12  
IC<sub>50</sub> ( 50% )

## [ 12-1]

MCP-1 유발 주화성에 대한 선택된 화합물의 효과

화합물	IC <sub>50</sub> ( $\mu\text{M}$ )	화합물	IC <sub>50</sub> ( $\mu\text{M}$ )	화합물	IC <sub>50</sub> ( $\mu\text{M}$ )
1	0.577	3	4.339	5	>50
6	0.875	7	0.891	8	47.885
9	>50	10	0.204	11	10.476
12	0.789	15	3.433	18	2.836
19	0.355	20	1.46	24	0.068
25	0.026	26	4.213	27	0.406
29	0.024	30	2.022	31	1.555
32	0.788	35	0.380	36	0.133
37	8.741	38	8.743	39	8.797
41	0.065	42	0.238	43	0.173
44	1.367	45	0.364	61	3.103
66	3.585	67	7.479	68	2.72
69	0.775	70	1.764	71	0.493

## [ 12-2]

72	3.429	73	0.629	74	1.491
75	0.498	76	0.629	77	0.810
78	0.062	79	0.175	80	0.094
81	0.324	83	0.687	84	0.035
85	>50	86	36.829	88	>50
89	0.741	90	>50	91	0.266
92	>50	113	6.954	115	0.995
117	1.981	121	0.478	123	15.246
131	>50	135	>50	141	22.003
143	1.326	144	6.383	146	9.971
148	16.887	151	40.471		

## 7:

3% Brewer's  
, 3 16  
MOMA2-

(Difco, , ) ICR , 0  
. 96 ,  
EPICS XL Beckman Coulter 13 .

### [ 13 ]

티오글리콜레이트-유발 염증 모델에 대한 선택된 화합물의 효과

화합물	복용량 (mg/kg)	총 세포 ( $\times 10^6$ )	MOMA2- 양성 세포 ( $\times 10^6$ )
비처리	-	$2.1 \pm 0.3^{**}$	$1.2 \pm 0.2^{**}$
대조군	-	$24.4 \pm 1.1$	$18.5 \pm 0.9$
<u>55</u>	10	$14.1 \pm 1.6^{**}$	$10.1 \pm 1.5^{**}$
<u>59</u>	10	$17.3 \pm 1.7^{**}$	$13.2 \pm 1.4^{**}$
항-MCP-1 Ab	1	$12.3 \pm 1.8^{**}$	$8.8 \pm 1.2^{**}$

<sup>a</sup> 항-MCP-1 Ab를 복막 내로 주사하였다.

대조군으로부터의 유의차 : \*P<0.05, \*\*P<0.01 (ANOVA).

### 8:

(apolipoprotein) E-

E (apoE) (chylomicron), VLDL, HDL  
apoE LDL (LDLR) LDLR- (LRP)  
ApoE-가

4 apoE- (15% , 1.25% ) 8  
가 . 12 , 4  
PBS (pH 7.4), 4% 5

OCT , 10  $\mu$ m  
O 가 ; IPAP-WIN RGB  
(Sumika Tekno, )  
. 5 Determiner (Kyowa Medex, )  
14



## [ 14]

<sup>a</sup> 아테롬성 동맥 경화증의 ApoE-결핍 마우스 모델에 대한  
선택된 화합물의 효과

화합물	복용량 (mg/kg)	아테롬성 동맥경화증성 병소 % (평균 ±SD)
대조군	-	25.08 ± 6.93
<u>59</u>	50	21.08 ± 6.86
<u>55</u>	50	17.80 ± 3.43*

<sup>a</sup> 대조군으로부터 유의차 : \*P<0.05(t-검정).

9:

ICR 6 1 15  
3 6 , ,  
15

## [ 15]

<sup>a</sup> 카에롤레인-유발 췌장염에 대한 선택된 화합물의 효과

화합물	복용량 (mg/kg)	혈청 아밀라아제 수준 (U, 캐러웨이, 평균 ±SD)
비처리	-	1079 ± 98
대조군	-	1531 ± 279
<u>57</u>	20	551 ± 157**
Anti-MCP-1	1	1104 ± 222

<sup>a</sup> 대조군으로부터의 유의차 : \*\*P<0.05 (LSD).

10:

% w/w

10.0  
0.5  
2.0  
( ) 1.0  
86.5

( , ( ) ) , ( , ( ) ) 가 ( , ( ) ) 2.0% 6.0%, 3 .0%

11:

% w/w

20

400 80

, , 가 , ,

12:

:

(%)

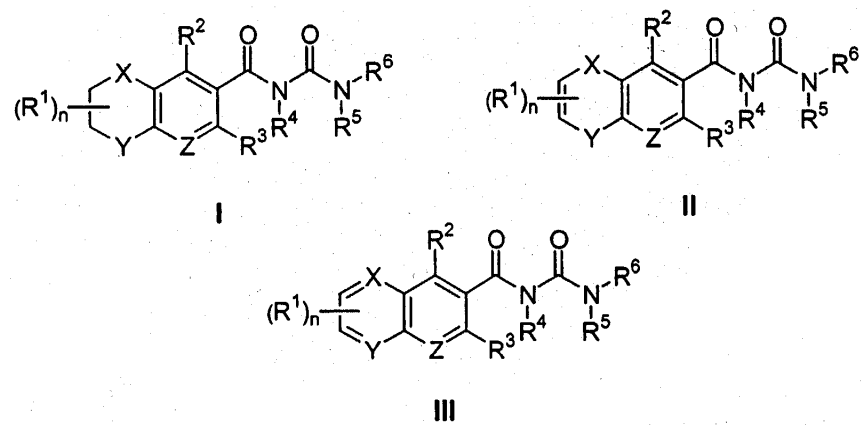
1.0

99.0

(57)

1.

가 :



[ :

n l 0 4 , 0 2 ;

X Y l , , O, S, CH-R<sup>8</sup>, N-R<sup>7</sup> , , ,  
N C-R<sup>7</sup> ;

Z N C-R<sup>8</sup> ;

, X, Y, Z - ;

R<sup>1</sup> , , , , , ( ),  
, , -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>( ( )), -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup> -NR<sup>9</sup>C(=O)R<sup>10</sup>( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( ),  
( ), ( ), , R<sup>9</sup> R<sup>10</sup> ,  
가 O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)<sub>2</sub> ,  
-(CH<sub>2</sub>)<sub>4-6</sub> - , l , n=2 , 2 R<sup>1</sup> =O ) ,

R<sup>2</sup>, R<sup>3</sup>, R<sup>8</sup> , , , , ( ),  
CF<sub>3</sub> , , -CN, -OR<sup>9</sup>, -SR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup>, -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -OSO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup> -NR<sup>9</sup>C(=O)R<sup>10</sup>( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> ,  
, ( ), ( ), , , ( ),  
R<sup>10</sup> , O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)<sub>2</sub> ) 가  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>7</sup> , , , , ( ),  
, ( ), ( ), ( ), -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>,  
-SO<sub>2</sub>OR<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>( , R<sup>9</sup> R<sup>10</sup> , , , -N(C<sub>1-2</sub>)<sub>2</sub> , ( ),  
, R<sup>9</sup> R<sup>10</sup> , O, S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub>)<sub>2</sub> ) 가  
-(CH<sub>2</sub>)<sub>4-6</sub> - ) ,

R<sup>4</sup> R<sup>5</sup> , , , ( )  
, -(CH<sub>2</sub>)<sub>2-4</sub> - ,

R<sup>6</sup> , , , , ( ),  
, ( ), ( ), -C(=O)R<sup>11</sup>,  
-C(=O)OR<sup>11</sup>, -C(=O)NR<sup>11</sup>R<sup>12</sup>, -SO<sub>2</sub>R<sup>11</sup>, -SO<sub>2</sub>NR<sup>11</sup>R<sup>12</sup>( , R<sup>11</sup> R<sup>12</sup> , , ,  
( ) , R<sup>11</sup> R<sup>12</sup> , -(CH<sub>2</sub>)<sub>4-6</sub> - ) ].

## 2.

1 , , l  
가 .

## 3.

1 , ,  
가 .

## 4.

1 , ,  
가 .



13.

1, I, X, Y 가, N-R<sup>7</sup> [ , R<sup>7</sup> , , -C(=O)R<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -SO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , -N(C<sub>1-2</sub>)<sub>2</sub>, ( ) ) ]

14.

1, R<sup>8</sup>, ( ), ( ), -CF<sub>3</sub>, -OR<sup>9</sup>, -NR<sup>9</sup>R<sup>10</sup>, -C(=O)R<sup>9</sup>, -C(=O)OR<sup>9</sup>, -C(=O)NR<sup>9</sup>R<sup>10</sup>, -OC(=O)R<sup>9</sup>, -SO<sub>2</sub>R<sup>9</sup>, -SO<sub>2</sub>NR<sup>9</sup>R<sup>10</sup>, -NR<sup>9</sup>SO<sub>2</sub>R<sup>10</sup>, -NR<sup>9</sup>C(=O)R<sup>10</sup> ( , R<sup>9</sup> R<sup>10</sup> , , -N(C<sub>1-2</sub>)<sub>2</sub>, ( ), S, NH, N-( ), N-( ( )), -N-(CH<sub>2</sub>)<sub>1-6</sub>C(=O)OR<sup>10</sup> N-( C<sub>1-2</sub> ) 가

15.

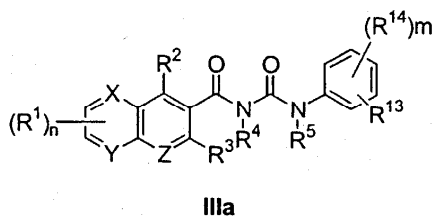
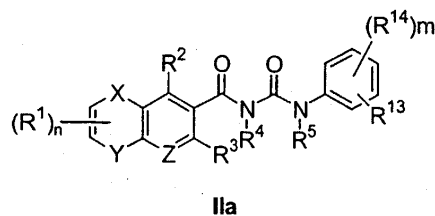
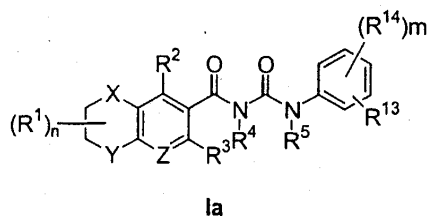
1, R<sup>4</sup> R<sup>5</sup> 가,

16.

1, R<sup>6</sup>, ( ), C(=O)R<sup>11</sup>, -C(=O)OR<sup>11</sup>, -C(=O)NR<sup>11</sup>R<sup>12</sup>, -SO<sub>2</sub>R<sup>11</sup>, -SO<sub>2</sub>NR<sup>11</sup>R<sup>12</sup> ( , R<sup>11</sup> R<sup>12</sup> , ) , R<sup>11</sup> R<sup>12</sup> -(CH<sub>2</sub>)<sub>4-6</sub> - )

17.

가 : la, a, a



[ :

m 0 4 ;

n la 0 4 , a a 0 2 ;

X Y la a , O, S, CH-R<sup>8</sup>, N-R<sup>7</sup> , a ,  
N C-R<sup>8</sup> ;

Z N C-R<sup>8</sup> ;

, X, Y, Z - ;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>7</sup> R<sup>8</sup> 1 ,

$R^{13}$ , ( ), ( ), ( ), -CF<sub>3</sub>, -CN, -OR<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>, -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>SO<sub>2</sub>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup> ( , R<sup>15</sup> R<sup>16</sup> ), -CF<sub>3</sub>, ( ), O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ,  
 $R^{14}$ , -OR<sup>17</sup>, -NR<sup>17</sup>R<sup>18</sup>, -C(=O)R<sup>17</sup>, -C(=O)OR<sup>17</sup>, -C(=O)NR<sup>17</sup>R<sup>18</sup> ( , R<sup>17</sup> R<sup>18</sup> ), -CF<sub>3</sub>, ( ), O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) ].

**18.**

$R^{17}$  , la  
 가 .

**19.**

$R^{17}$  , a  
 가 .

**20.**

$R^{17}$  , a  
 가 .

**21.**

$R^{17}$  , X Y 가 O , Z 가 C-H , R<sup>1</sup> la .

**22.**

$R^{17}$  ,  $R^{13}$ , ( ), ( ), ( ), -CF<sub>3</sub>, -CN, -OR<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>, -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup> ( , R<sup>15</sup> R<sup>16</sup> ), ( ), O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

**23.**

$R^{17}$  ,  $R^{13}$ , ( ), ( ), ( ), -CF<sub>3</sub>, -CN, -OR<sup>15</sup>, -SR<sup>15</sup>, -NR<sup>15</sup>R<sup>16</sup>, -C(=O)R<sup>15</sup>, -C(=O)OR<sup>15</sup>, -C(=O)NR<sup>15</sup>R<sup>16</sup>, -OC(=O)R<sup>15</sup>, -SO<sub>2</sub>R<sup>15</sup>, -SO<sub>2</sub>NR<sup>15</sup>R<sup>16</sup>, -NR<sup>15</sup>C(=O)R<sup>16</sup> ( , R<sup>15</sup> R<sup>16</sup> ), ( ), O, S, NH N-(C<sub>1-2</sub>) 가 -(CH<sub>2</sub>)<sub>4-6</sub> - ) .

**24.**

$R^{17}$  ,  $R^{14}$  가, -CF<sub>3</sub>, -OR<sup>17</sup>, -NR<sup>17</sup>R<sup>18</sup>, -C(=O)R<sup>18</sup>, -C(=O)OR<sup>18</sup>, -C(=O)NR<sup>17</sup>R<sup>18</sup> ( , R<sup>17</sup> R<sup>18</sup> ) .

**25.**

$R^{17}$  ,  $R^{13}$  가 , m 1 2 .

**26.**

$R^{17}$  ,  $R^{13}$  가 , m 1 .

27.

<sup>17</sup> , X 가 O , Y 가 N-R<sup>7</sup> ( , R<sup>7</sup> ) , Z 가 C-H , R<sup>1</sup> la .

28.

<sup>17</sup> , X 가 N-R<sup>7</sup> ( , R<sup>7</sup> ) , Y 가 O , Z 가 C-H , R<sup>1</sup> la .

29.

<sup>17</sup> , X Y 가 N-R<sup>7</sup> ( , R<sup>7</sup> , , la , ( ) ) , Z 가 C-H , R<sup>1</sup> .

30.

<sup>17</sup> , X Y 가 N , Z 가 C-H , R<sup>1</sup> a .

31.

<sup>17</sup> , R<sup>2</sup> R<sup>3</sup> , , , .

32.

<sup>17</sup> , R<sup>4</sup> R<sup>5</sup> 가, , .

33.

<sup>17</sup> , R<sup>13</sup> , , , , , -CF<sub>3</sub>, -CN, -OR<sup>15</sup>, -CO<sub>2</sub>R<sup>15</sup> ( , R<sup>15</sup> , ) .

34.

<sup>17</sup> , R<sup>14</sup> 가, , , -CF<sub>3</sub>, -OR<sup>17</sup>, -CO<sub>2</sub>R<sup>17</sup>, -OCH<sub>2</sub>CO<sub>2</sub>R<sup>17</sup> ( , R<sup>17</sup> , ) .

35.

<sup>1</sup> , 가 : ,

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3,4- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3- -4- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(4- ) } } ) ;

2H,3H- [e]1,4- -6- -N-{{(4- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(2,4- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(4- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ) ;

2H,3H- [e]1,4- -6- -N-{{(3- ) } } ) ;

2H,3H- [e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [e]1,4- -6- -N-{{(2- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-({[3-( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-({[3-( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-({[3-( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-({[3-(tert- ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- -4- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- -4- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-({[4- -3-( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-({[4- -3-( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-({[3,4- ( ) ] } ) ;

2H,3H- [3,4-e]1,4- -6- -N-({[3,5- ( ) ] } ) ;

2H,3H- [e]1,4- -6- -N-({[4- -3-( ) ] } ) ;

2H,3H- [e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [e]1,4- -6- -N-{{(3,5- ) ] } ;

2H,3H- [e]1,4- -6- -N-{{(3- ) ] } ;

3-{{(2H,3H- [e]1,4- -6- ) ] } ;

2H,3H- [e]1,4- -6- -N-{{(3-(1H-1,2,3,4- -5- ) ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- -2- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(5- -2- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(5- -2- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(5- -2- ) ] } ;

2H,3H- [3,4-e]1,4- -6- -N-{{(3- -2,6- ) ] } ;



2H,3H- [3,4-e]1,4- -6- -N- {[ (3-(1,3- -2- ) ) ] } ;  
 2H,3H- [e]1,4- -6- -N- {[ (3-(2- ) ) ] } ;  
 2H,3H- [e]1,4- -6- -N- {[ (3-(3- ) ) ] } ;  
 2H,3H- [e]1,4- -6- -N- {[ (3-(2- ) ) ] } ;  
 2H,3H- [e]1,4- -6- -N- {[ (3-(2- ) ) ] } ;  
 2H,3H- [e]1,4- -6- -N- {[ (4-(1H-1,2,3,4- -5- ) ) ] } ;  
 5- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ;  
 3- {[ (2H,3H- [e]1,4- -6- ) ] }-5-( ) ;  
 2H,3H- [e]1,4- -6- -N- ({ [3- -5-( ) ] } ) ;  
 5- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ;  
 4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ;  
 4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- -1,3-  
 ;  
 2- [(4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ) ]  
 ;  
 2-(4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ) ;  
 2-(4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ) ;  
 2-(4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- )  
 ;  
 4- {[ (2H,3H- [e]1,4- -6- ) ] }-2- ;  
 5- {[ (2H,3H- [3,4-e]1,4- -6- ) ] }-2- ;  
 4- {[ (2H,3H- [3,4-e]1,4- -6- ) ] } ;  
 3- {[ (2H,3H- [3,4-e]1,4- -6- ) ] } ;  
 2H,3H- [3,4-e]1,4- -6- -N- {[ (2- (4- )) ] } ;  
 2H,3H- [3,4-e]1,4- -6- -N- {[ (6- -4- -2- ) ] } ;  
 2H,3H- [3,4-e]1,4- -6- -N- ({ [5-( ) (1,3,4- -2- ) ] } )  
 ;  
 2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ( ) ] }-N-( )  
 ;  
 2H,3H- [3,4-e]1,4- -6- -N- {[ (3- ) ] }-N- [(2- ) ]  
 ;  
 N- {[ (3- ) ] } -6- ;

$N-\{(3- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $-6- \quad -N-\{(4-( \quad ) \quad ] \quad \} \quad ) \quad ;$   
 $-6- \quad -N-\{(3-( \quad ) \quad ] \quad \} \quad ) \quad ;$   
 $-6- \quad -N-\{(3-( \quad ) \quad ] \quad \} \quad ) \quad ;$   
 $N-\{(3-( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(3-( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(4- \quad -3-( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(3- \quad -4- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $N-\{(4- \quad -3-( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(3- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $N-\{(2,4- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $N-\{(3- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $N-\{(3-( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(3- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $N-\{(3,5- \quad ( \quad ) \quad ] \quad \} \quad ) \quad -6- \quad ;$   
 $N-\{(3,4- \quad ) \quad ] \quad \} \quad -6- \quad ;$   
 $2- \quad -5-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2- \quad -5-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2- \quad -5-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2-(2- \quad -4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ) \quad ;$   
 $2-(2- \quad -4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ) \quad ;$   
 $3-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $6- \quad -2-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2-( \quad )-4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $3-\{[( \quad -6- \quad ) \quad ] \quad \}-5-( \quad ) \quad ;$   
 $2- \quad -4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2- \quad -4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$   
 $2- \quad -4-\{[( \quad -6- \quad ) \quad ] \quad \} \quad ;$

$-6- -N-\{[(3-(1,3- -2- ) ) ] \}$  ;  
 $N-\{[(3-(2- ) ) ] \}$   $-6-$  ;  
 $2- -4-\{[( -6- ) ] \}$  ;  
 $N-\{[(3-(2- ) ) ] \}$   $-6-$  ;  
 $-6- -N-\{[(3-(2- ) ) ] \}$  ;  
 $2- -4-\{[( -6- ) ] \}$  ;  
 $N-\{[(3-( ) ) ] \}$   $-6-$  ;  
 $2- -5-\{[( -6- ) ] \}$  ;  
 $5- -2-\{[( -6- ) ] \}$  ;  
 $4-\{[( -6- ) ] \}-2-( )$  ;  
 $2- -4-\{[( -6- ) ] \}$  ;  
 $2-(2- -4-\{[( -6- ) ] \})$  ;  
 $2-(2- -4-\{[( -6- ) ] \})$  ;  
 $2,3- -6- )-N-\{[(3- ) ] \}$  ;  
 $(2,3- -6- )-N-\{[(3- ) ] \}$  ;  
 $(2,3- -6- )-N-\{[(3-( ) ) ] \}-$  ;  
 $N-\{[(3,4- ) ] \}(2,3- -6- )$  ;  
 $(2,3- -6- )-N-\{[(3- ) ] \}$  ;  
 $1,2,3,4- -6- -N-\{[(4-( ) ) ] \})$  ;  
 $N-\{[(3- ) ] \}-1,2,3,4- -6-$  ;  
 $N-\{[(3- ) ] \}-1,2,3,4- -6-$  ;  
 $1,2,3,4- -6- -N-\{[(3-( ) ) ] \})$  ;  
 $(1,4- (1,2,3,4- -6- ))-N-\{[(3-( ) ) ] \})$  ;  
 $1,2,3,4- -6- -N-\{[(3-( ) ) ] \})$  ;  
 $N-\{[(3-( ) ) ] \}-1,2,3,4- -6-$  ;  
 $N-\{[(3- ) ] \}-1,2,3,4- -6-$  ;  
 $N-\{[(4- -3-( ) ) ] \}-1,2,3,4- -6-$  ;  
 $(1,4- (1,2,3,4- -6- ))-N-\{[(3-( ) ) ] \})$

;

$N-\{([3-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$

;

$N-\{([3-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$N-\{([3-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$N-\{([3-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$N-\{([3-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$N-\{([3,5-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$N-\{([3-(\quad)-4-(\quad)\quad])\quad\}-1,2,3,4-\quad-6-$  ;

$[1,4-(2-(\quad)\quad)](1,2,3,4-\quad-6-)-N-\{([3-(\quad)\quad])\quad\}$

;

$[4-(2-(\quad)\quad)](1,2,3,4-\quad-6-)-N-\{([3-(\quad)\quad])\quad\}$

;

$2-(2-(\quad)-4-\{[(1,2,3,4-\quad-6-(\quad)\quad])\quad\})\quad$  ;

$2-(\quad)-5-\{[(1,2,3,4-\quad-6-(\quad)\quad])\quad\}$  ;

$2-(\quad)-5-\{[(1,2,3,4-\quad-6-(\quad)\quad])\quad\}$  ;

$(3-(2H,4H-\quad[3,4-e]1,4-\quad-6-))-N-\{([3-(\quad)\quad])\quad\}$

;

$N-\{([3-(\quad)\quad])\quad\}(3-(2H,4H-\quad[3,4-e]1,4-\quad-6-))\quad$  ;

$N-\{([3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[3,4-e]1,4-\quad-6-))\quad$  ;

$(4-(2H,3H-\quad[3,4-e]1,4-\quad-6-))-N-\{([3-(\quad)\quad])\quad\}$

;

$N-\{([3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[3,4-e]1,4-\quad-6-))\quad$  ;

$N-\{([3,4-(\quad)\quad])\quad\}(4-(2H,3H-\quad[3,4-e]1,4-\quad-6-))\quad$

;

$(4-(2H,3H-\quad[e]1,4-\quad-7-))-N-\{([3-(\quad)\quad])\quad\}$  ;

$N-\{([3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$  ;

$N-\{([3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$  ;

$N-\{([3,4-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$  ;

$N-\{([3,4-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$  ;

$N-\{([3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$  ;

$N-\{([4-(\quad)-3-(\quad)\quad])\quad\}(4-(2H,3H-\quad[e]1,4-\quad-7-))\quad$

;

$N-\{[(3- \quad) \quad ] \quad \}-6-$  ;

$N-\{[(3- \quad) \quad ] \quad \}-6-$  ;

$6- \quad -N-\{[(3-( \quad) \quad ] \quad \}) \quad \}$  ;

$N-\{[(3,4- \quad) \quad ] \quad \}-6-$  .

36.

:

(a) , 1 35 ;

(b) 가 .

37.

36 , , , 가 .

38.

36 37 , , , 가 .

39.

38 , , , 가 .

40.

38 , , , 가 .

41.

38 , , , 가 .

42.

38 , , , 가 .

43.

38 , , , 가 .

44.

38 , , , 가 .

45.

38 , , , 가 .

46.

38 , , , 가 .

47.

38 , , , 가 .

48.

38 , , , 가 .

49.

38 , , , 가 .

50.

, , , 가 , 1 35 .

51.

50 , , , .

52.

50 , , , 가 , , , , , , , .

53.

50 , , , 가 / .

54.

, , 1 35 .

55.

1 35 , , , 가 .

56.

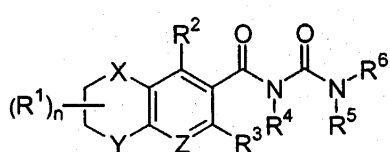
55 , , , 가 , , , , , , , .

57.

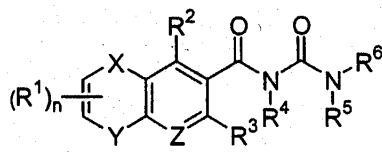
55 , , , 가 / .

58.

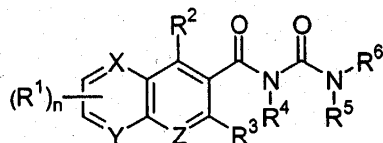
, I, ,



I



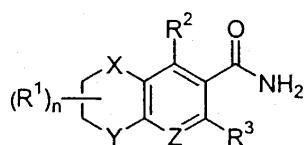
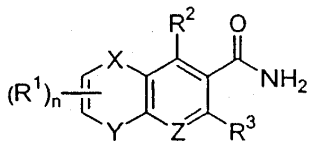
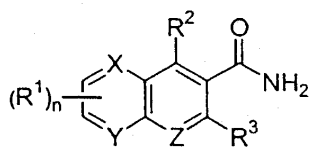
II



III

[ , X, Y, Z, R<sup>1</sup> ~ R<sup>6</sup> 1 ] :

(a) Ib, b, b

**Ib****IIb****IIIb**

[ , X, Y, Z,  $R^1 \sim R^3$  ], I, ( ,  $R^4$   $R^5$  )  $R^6-N=C=O$  ( ,  $R^6$  )  
H

(b) Ib, b b I, ( ,  $R^4$  H )  $R^6$   
 $R^5-N-H$  ( ,  $R^5$   $R^6$  )

(c) , I, (elaborating) ;

(d) I, 가 가 ;

(e) I, 가 ;

(f) I, , I, 가 ;

(g) I, .

**59.**

58 , (a) .

**60.**

59 , 가 , .

**61.**

58 , (b) , .

**62.**

58 , (b) , THF 50 가