Fig. 1a

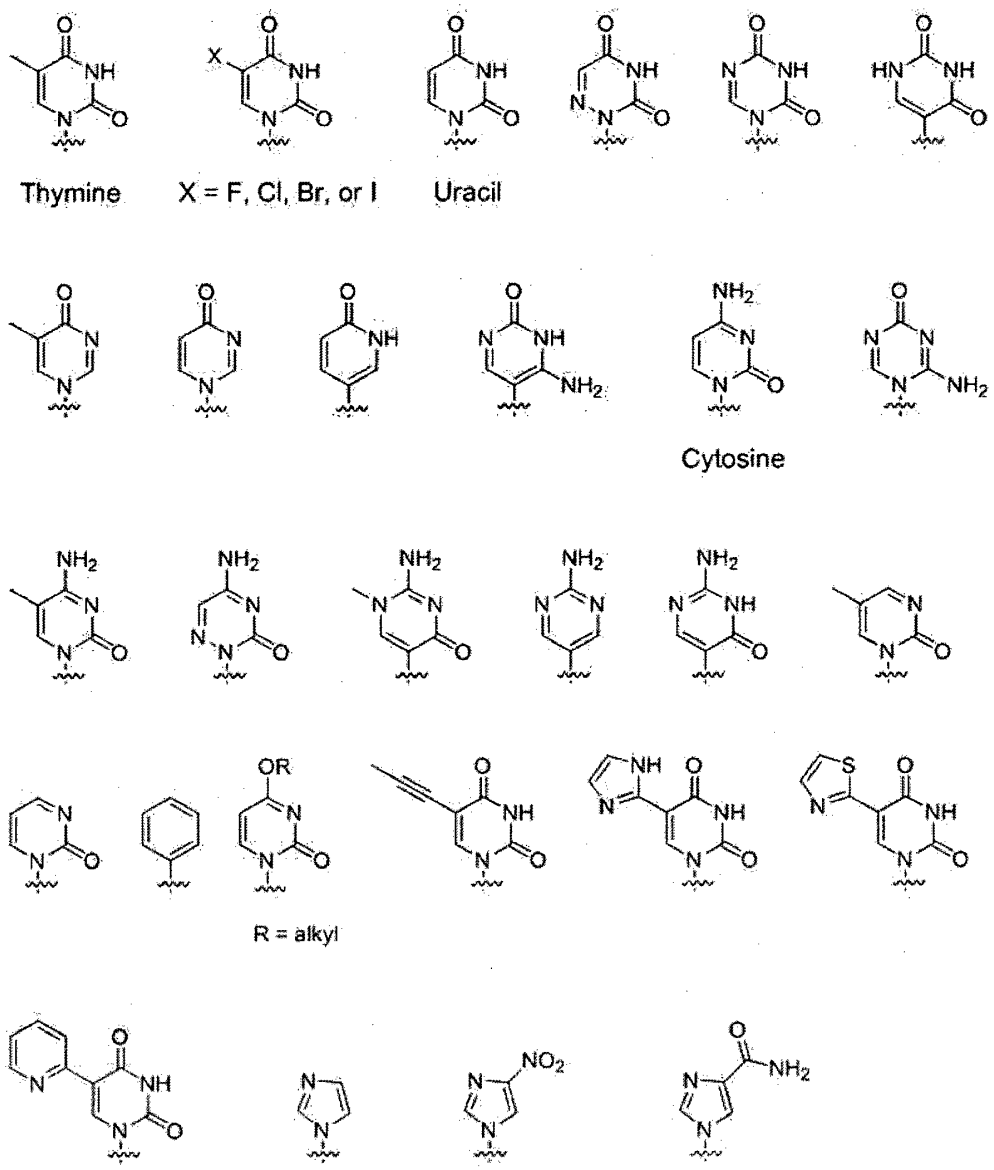


Fig. 1b

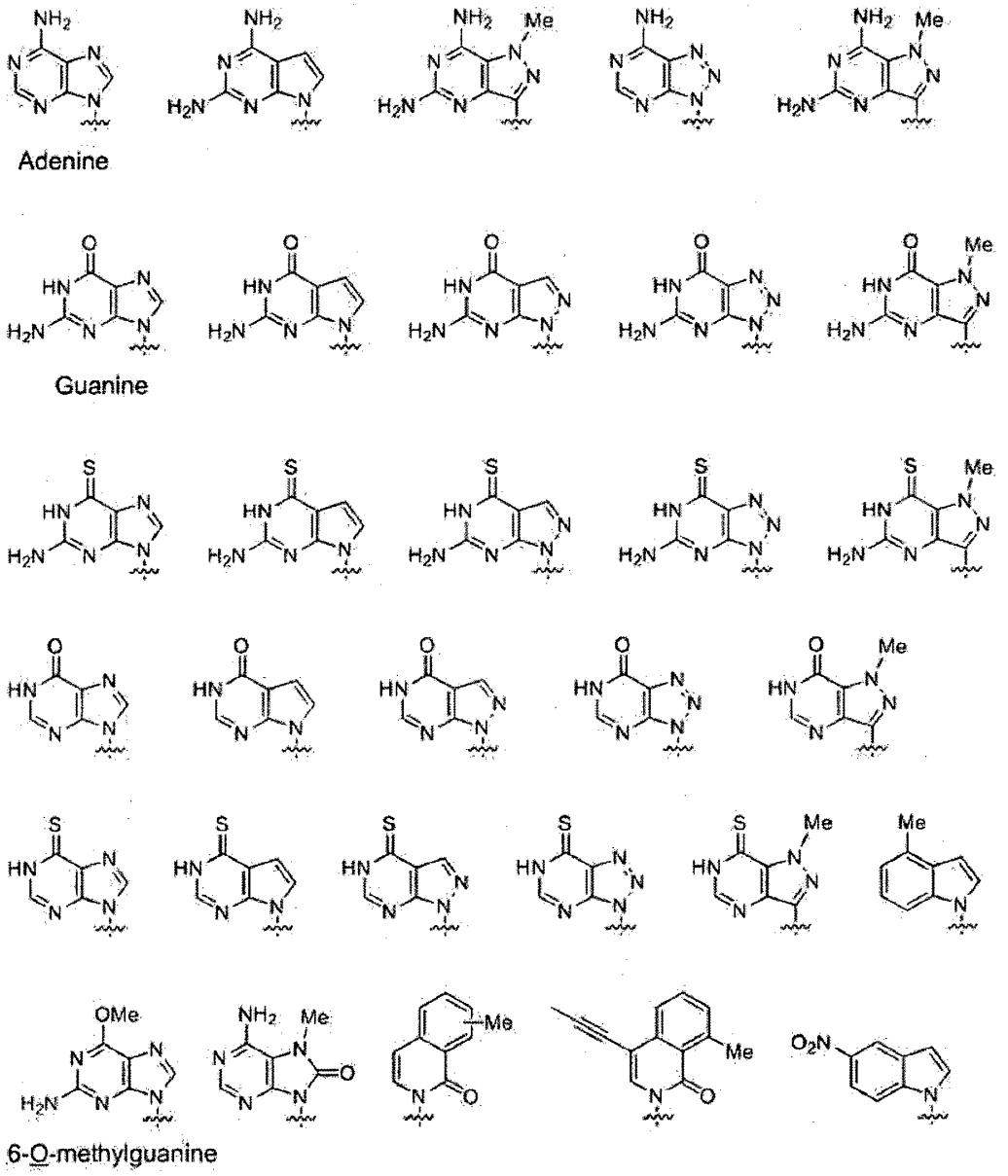


Fig. 1c

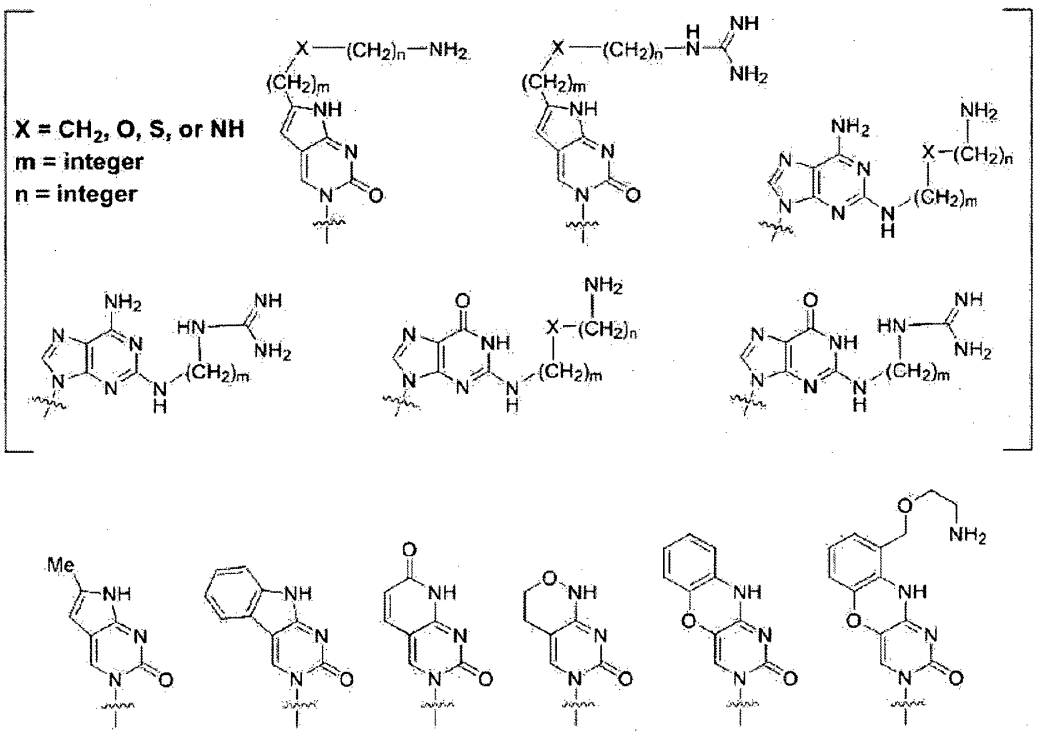
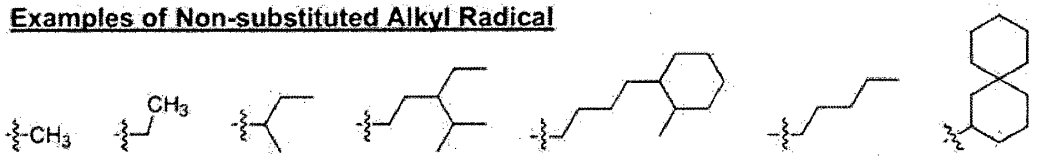


Fig. 2a

Examples of Non-substituted Alkyl Radical



Examples of Substituted Alkyl Radical

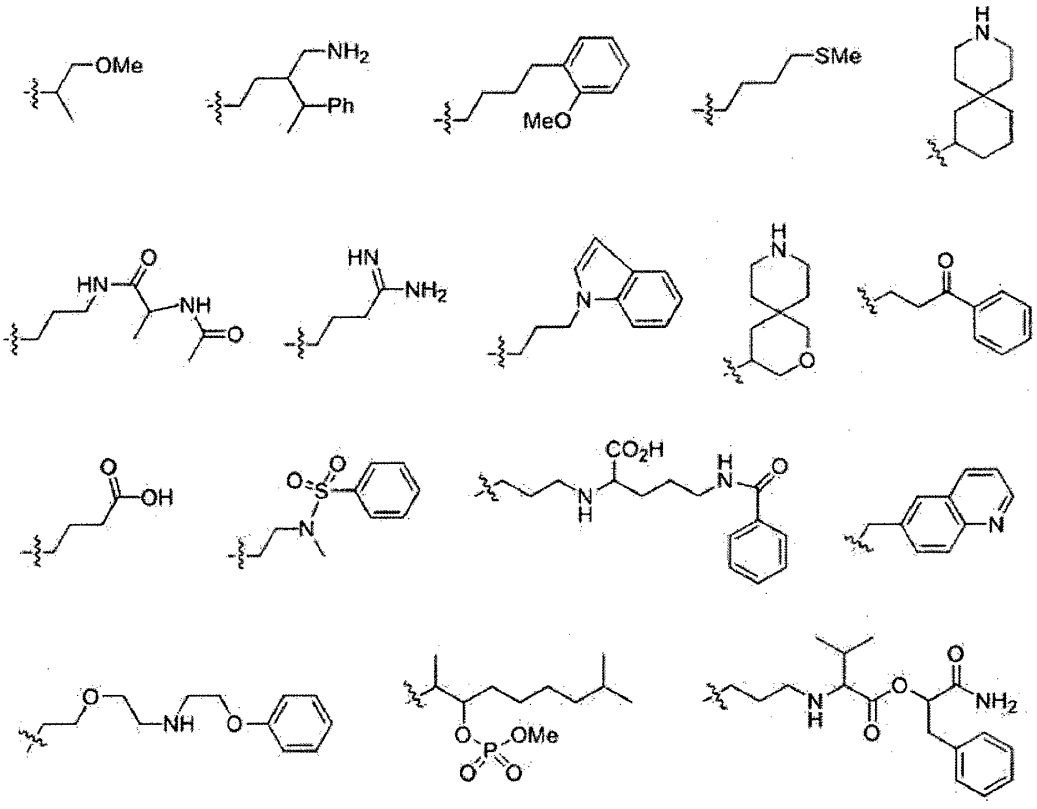
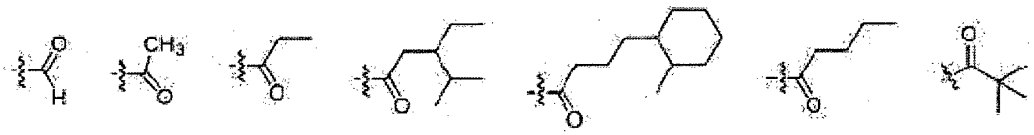
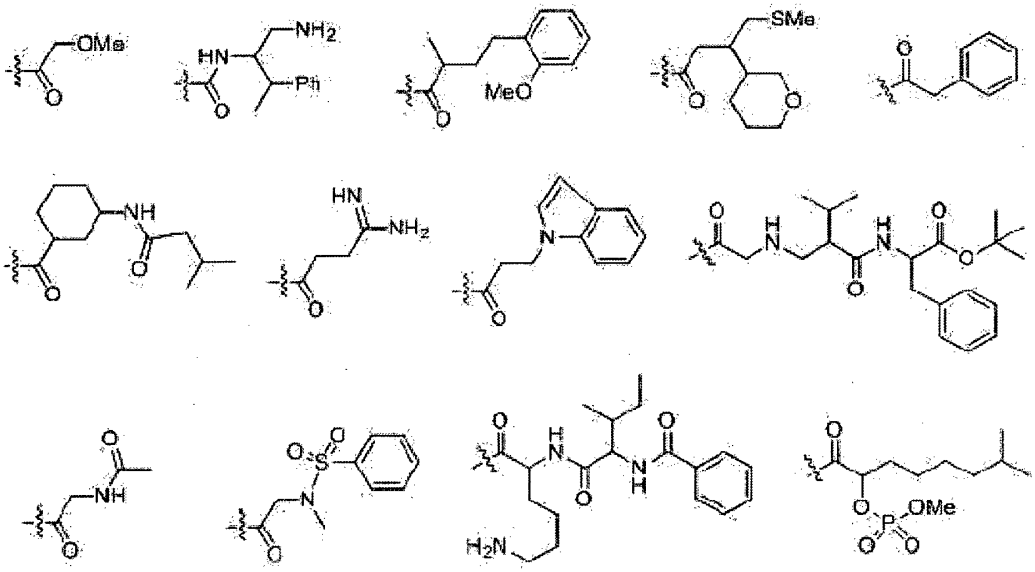


Fig. 2b

Examples of Non-substituted Alkylacyl Radical



Examples of Substituted Alkylacyl Radical



Examples of Substituted or Non-substituted Arylacyl Radical

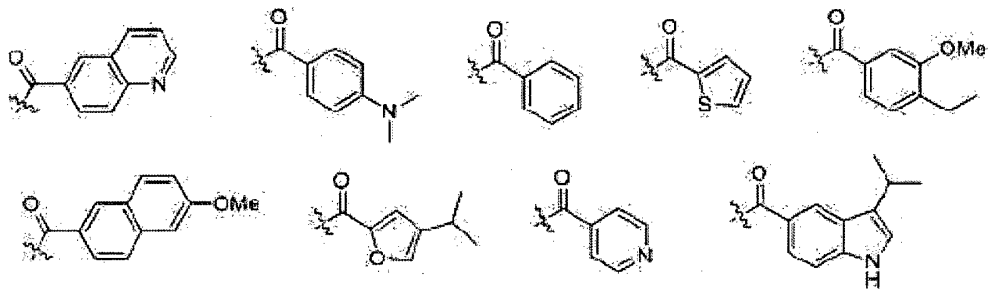
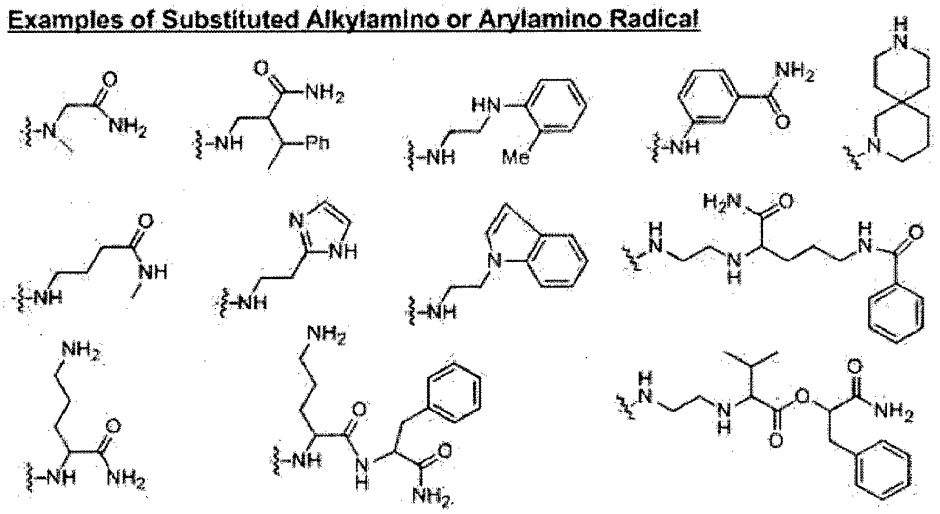
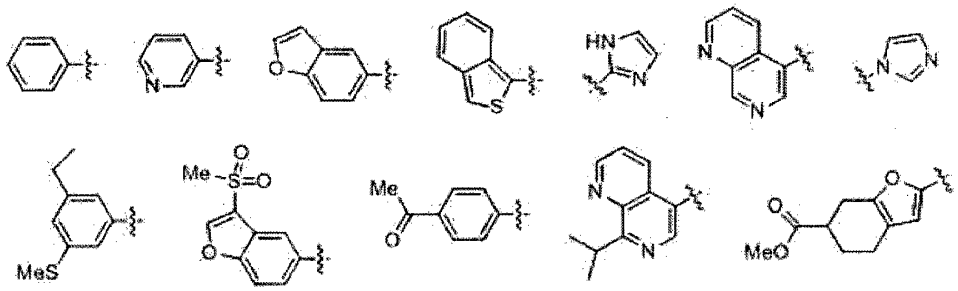


Fig. 2c

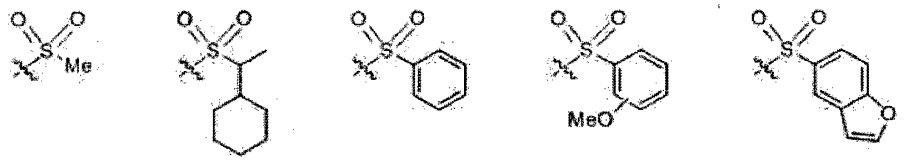
Examples of Substituted Alkylamino or Arylamino Radical



Examples of Substituted or Non-substituted Aryl Radical



Examples of Substituted or Non-substituted Alkylsulfonyl or Arylsulfonyl Radical



Examples of Substituted or Non-substituted Alkyl- or Aryl-phosphonyl Radical

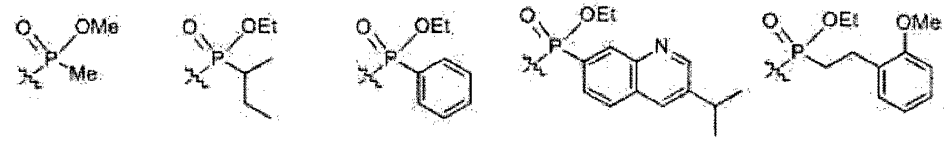
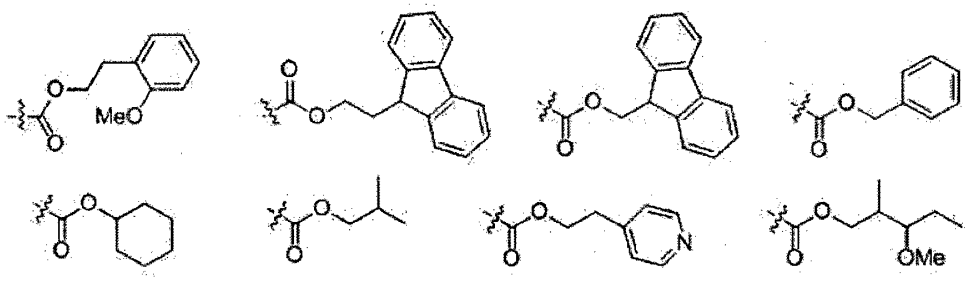
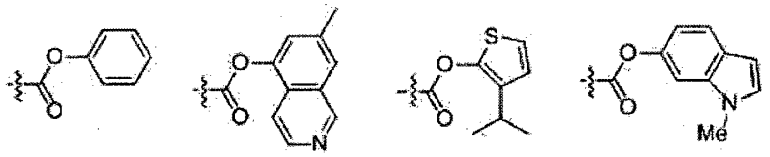


Fig. 2d

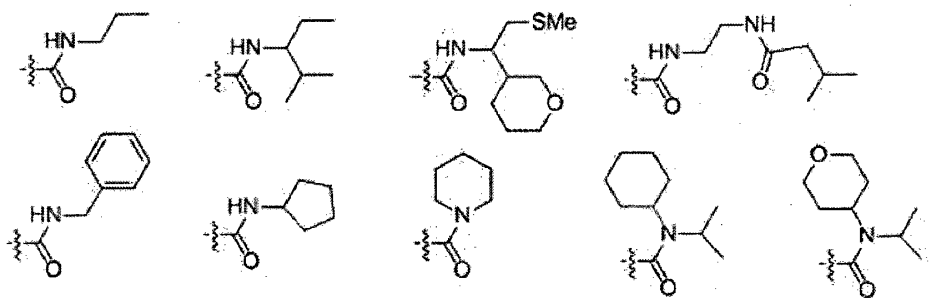
Examples of Substituted or Non-substituted Alkyloxycarbonyl Radical



Examples of Substituted or Non-substituted Aryloxycarbonyl Radical



Examples of Substituted or Non-substituted Alkylaminocarbonyl Radical



Examples of Substituted or Non-substituted Arylaminocarbonyl Radical

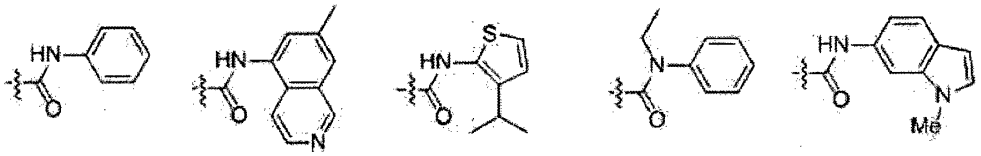
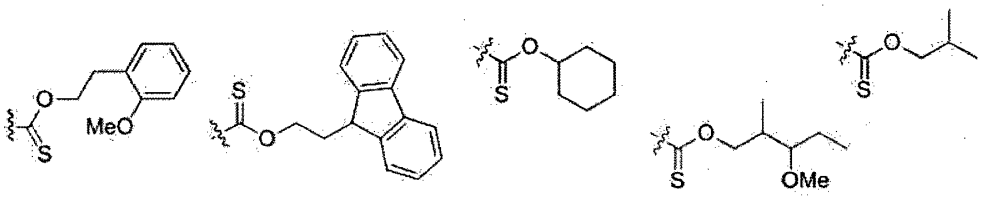
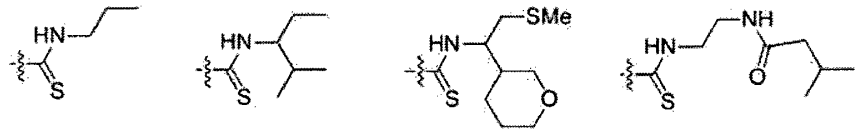


Fig. 2e

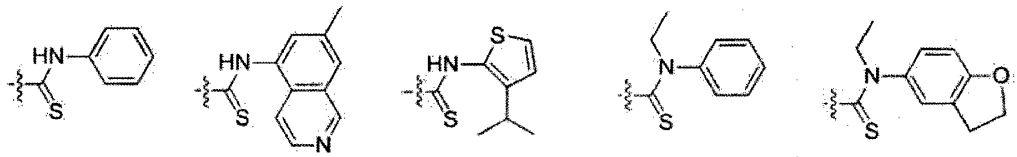
Examples of Substituted or Non-substituted Alkyloxythiocarbonyl Radical



Examples of Substituted or Non-substituted Alkylaminothiocarbonyl Radical



Examples of Substituted or Non-substituted Arylaminothiocarbonyl Radical



Examples of Substituted or Non-substituted Aryloxythiocarbonyl Radical

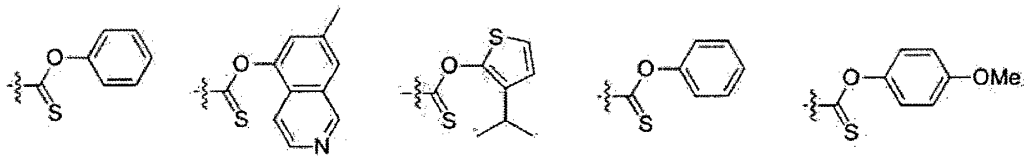
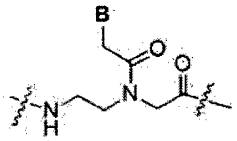


Fig. 3

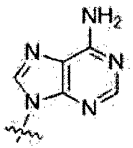
PNA Monomer



B : Nucleobase
X : O (oxygen atom)
m : Integer
n : Integer

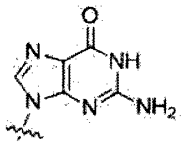
Adenine

B =



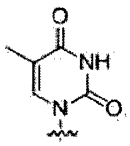
Guanine

B =



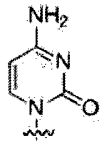
Thymine

B =



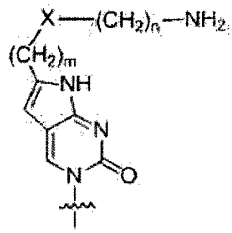
Cytosine

B =



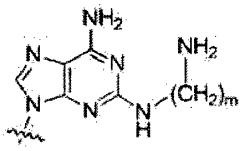
Modified Cytosine

C(mXn) : B =



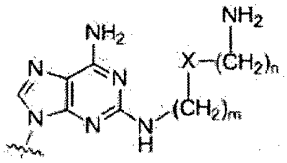
Modified Adenine

A(m) : B =



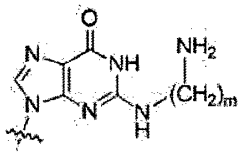
A(mXn) :

B =



Modified Guanine

G(m) : B =



G(mXn) :

B =

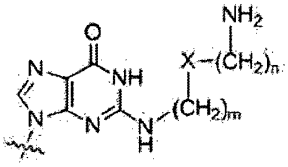


Fig. 4

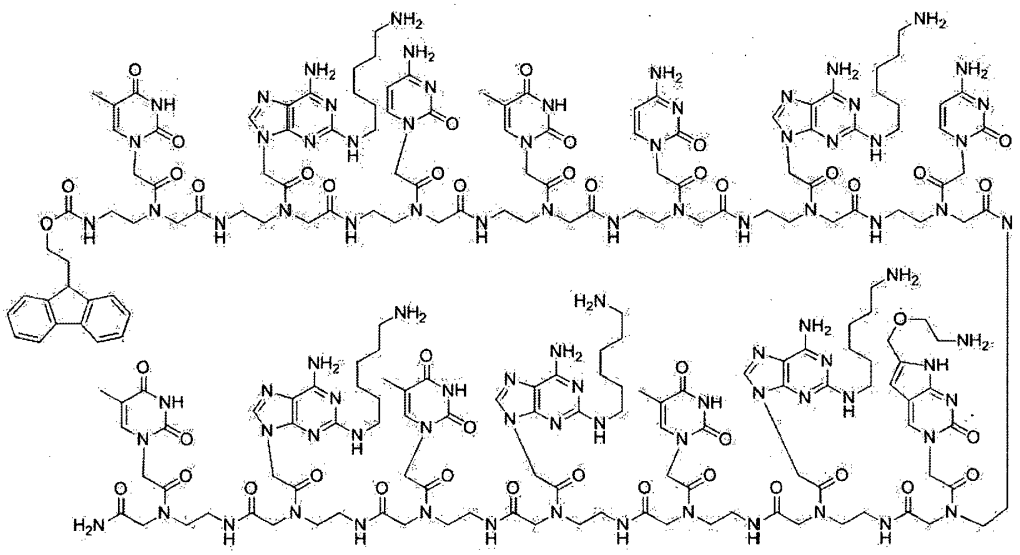
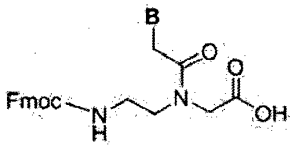
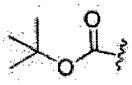


Fig. 5

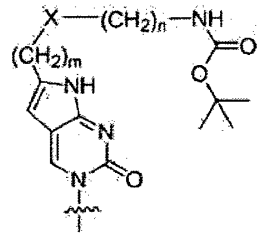
Fmoc-PNA Monomer



B : Nucleobase with protecting group(s)
X : methylene, oxygen, sulfur, or Boc-protected amino
m : Integer
n : Integer

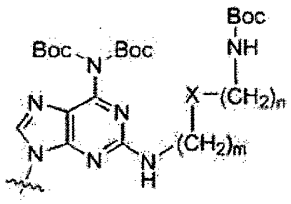
Boc- 

Modified Cytosine

C(mXn) : B = 

Modified Adenine

A(mXn) :

B = 

Modified Guanine

G(mXn) :

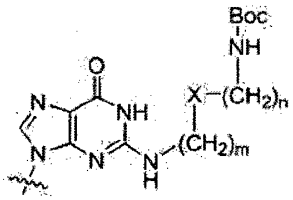
B = 

Fig. 6a

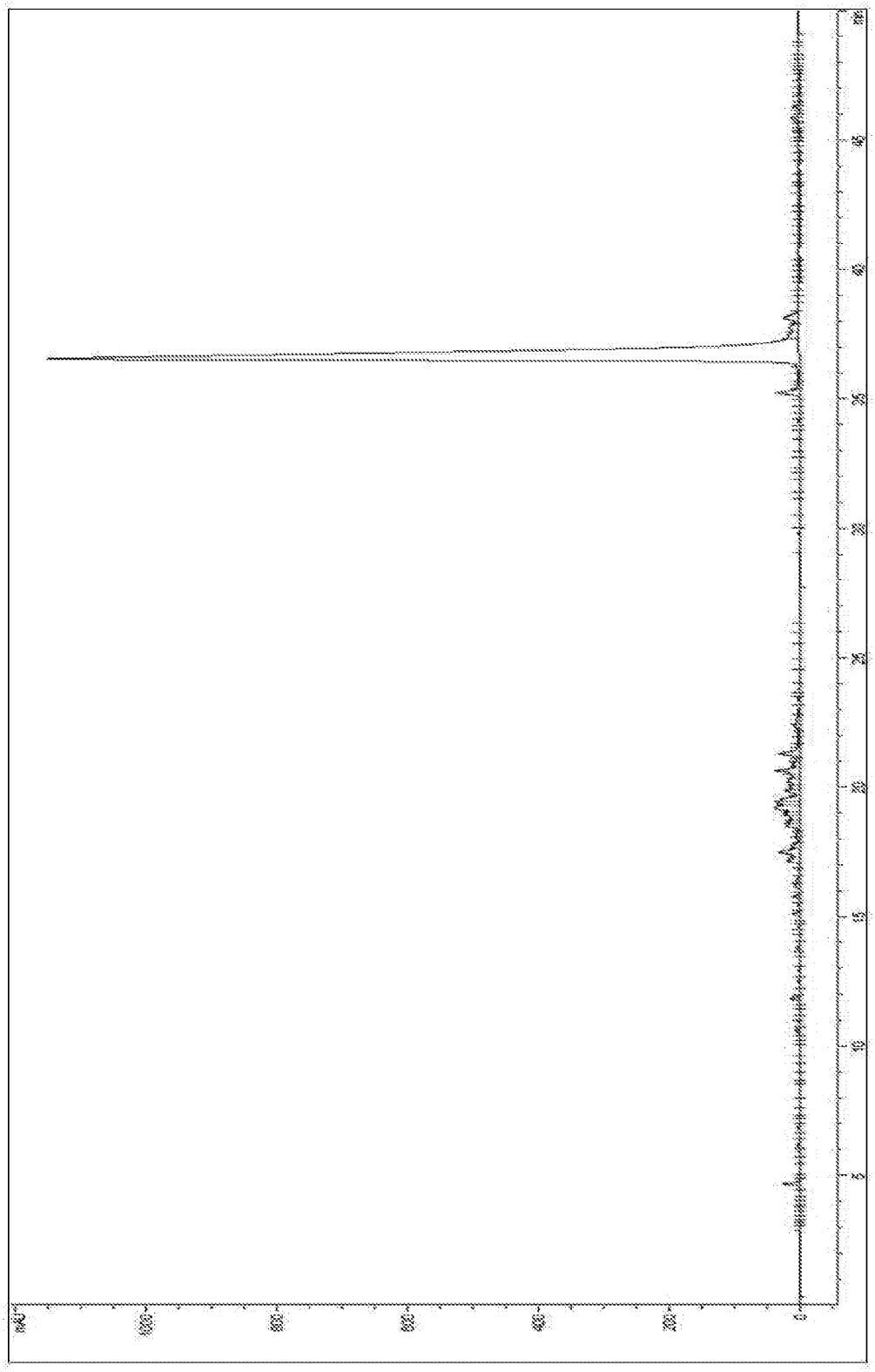


Fig. 6b

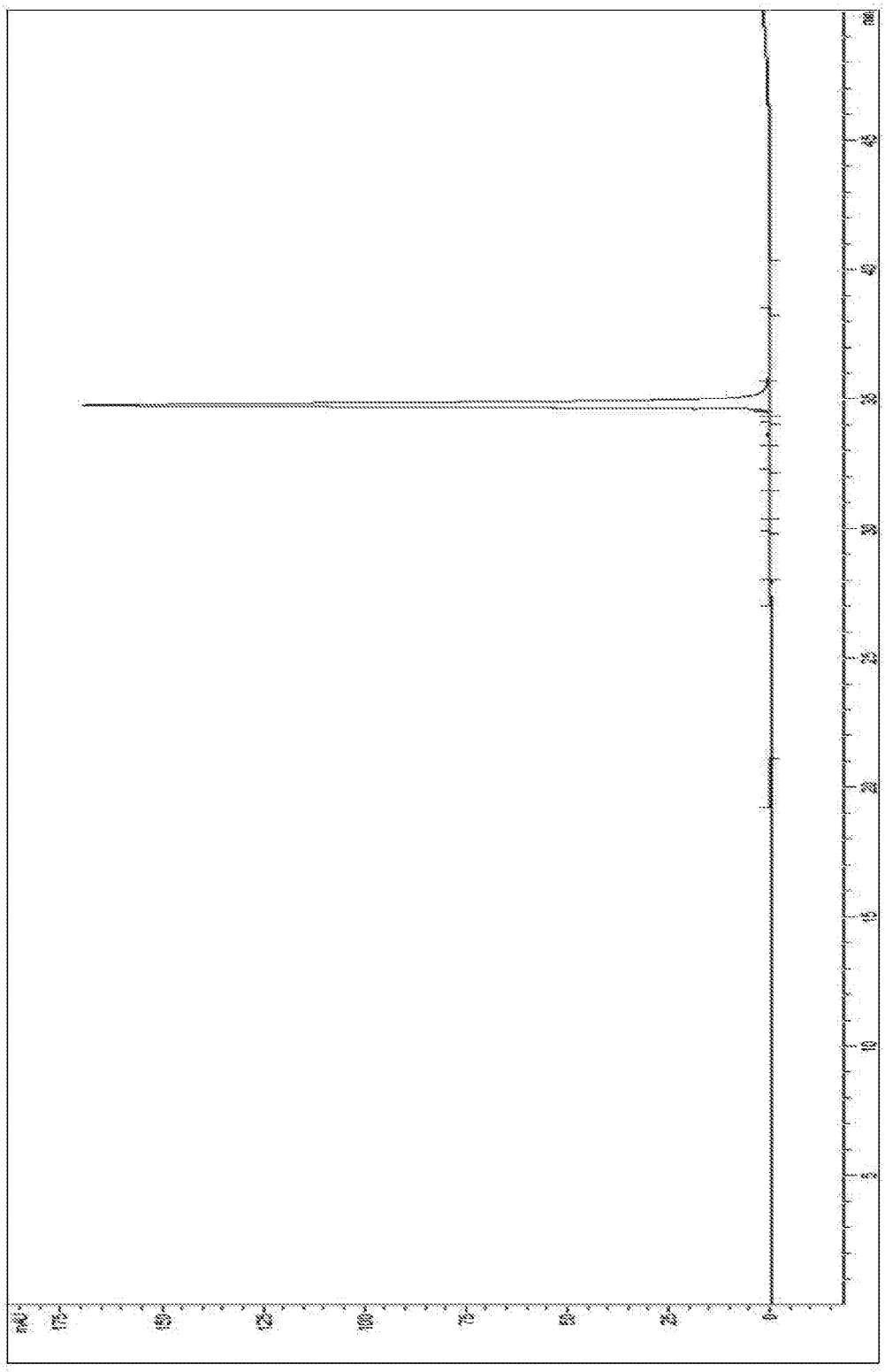


Fig. 7

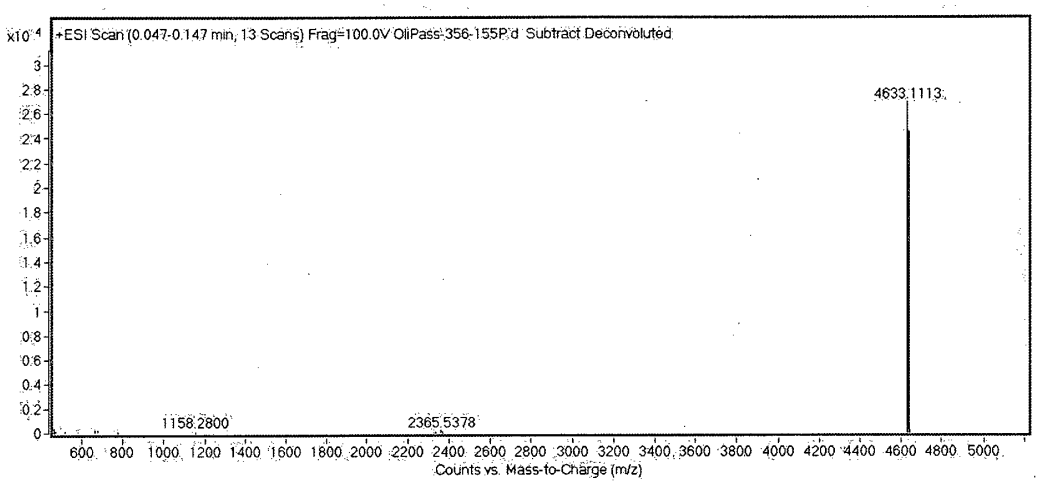

x10^4
+ESI Scan (0.047-0.147 min, 13 Scans) Frag=100.0V OliPass-356-155P.d Subtract Deconvoluted
4633.1113
1158.2800
2365.5378
Counts vs. Mass-to-Charge (m/z)

Fig. 8

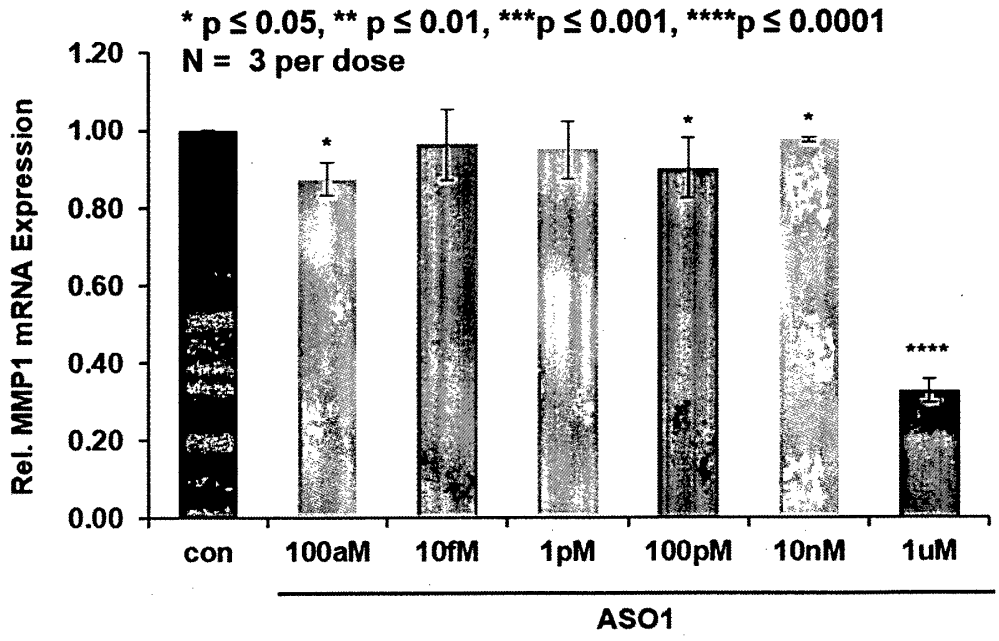

* p ≤ 0.05, ** p ≤ 0.01, ***p ≤ 0.001, ****p ≤ 0.0001
N = 3 per dose
Rel. MMP1 mRNA Expression
1.20
1.00
0.80
0.60
0.40
0.20
0.00
con
100aM
10fM
1pM
100pM
10nM
1uM
ASO1

Fig. 9a

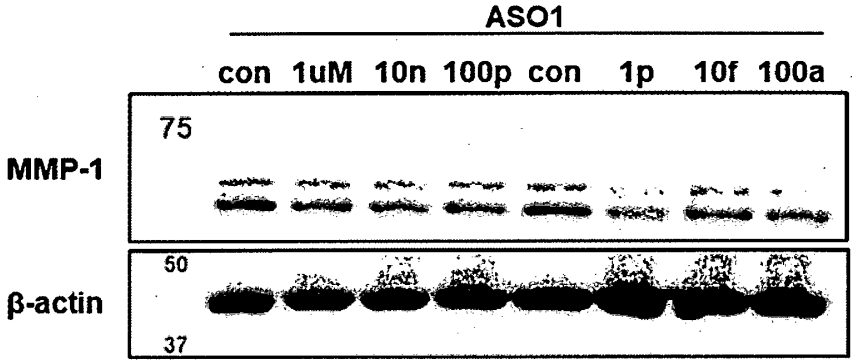

ASO1
con 1uM 10n 100p con 1p 10f 100a
75
MMP-1
50
β-actin
37

Fig. 9b

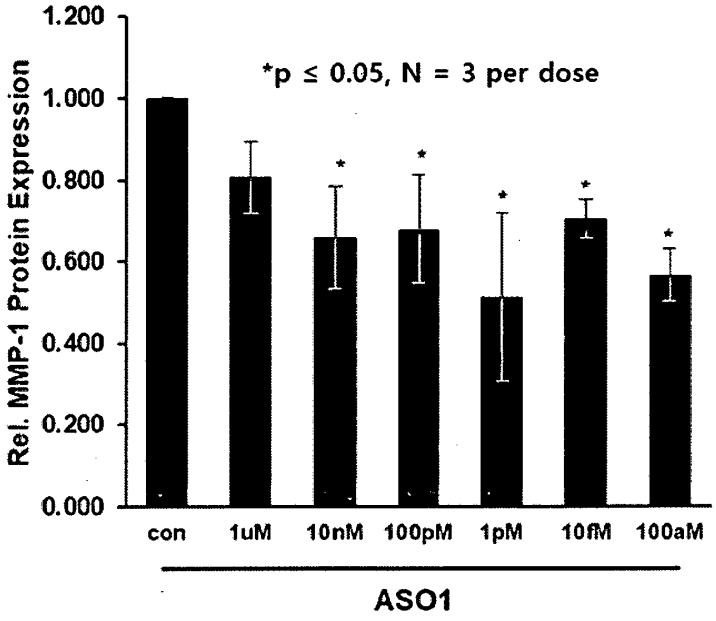

*p ≤ 0.05, N = 3 per dose
Rel. MMP-1 Protein Expression
1.200
1.000
0.800
0.600
0.400
0.200
0.000
con
1uM
10nM
100pM
1pM
10fM
100aM
ASO1

Fig. 10a

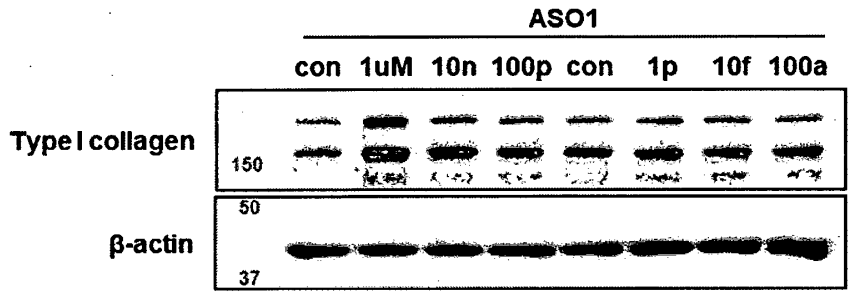


Fig. 10b

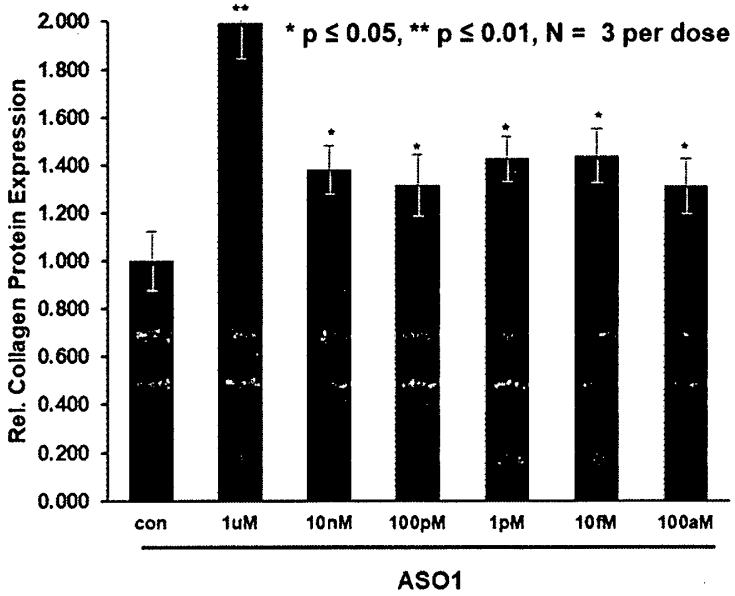


Fig. 11a

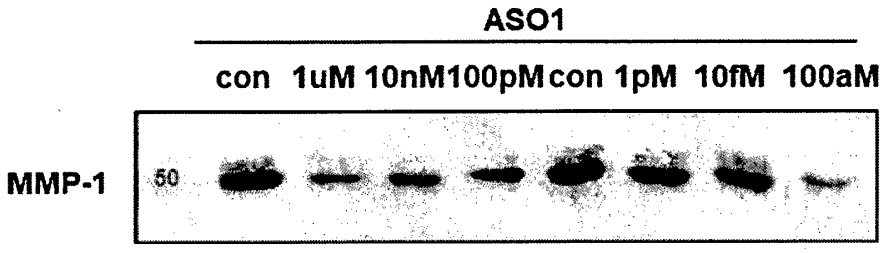


Fig. 11b

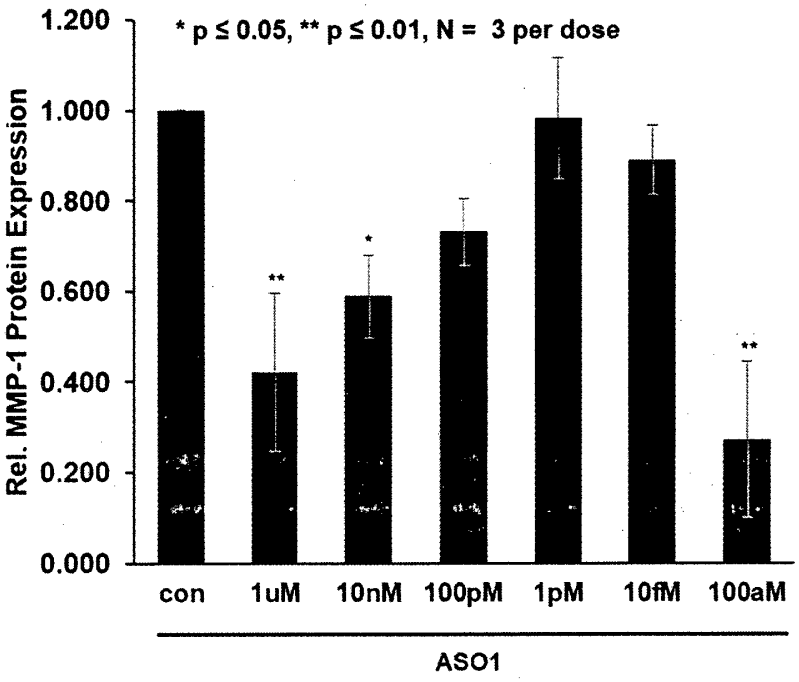


Fig. 12a

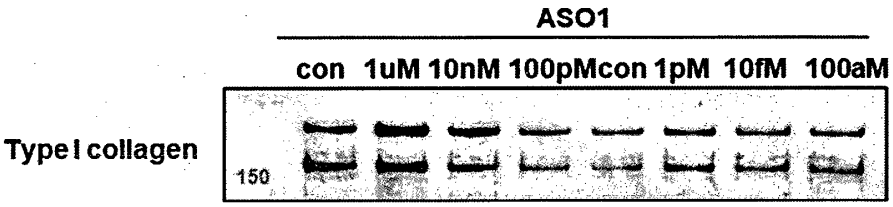


Fig. 12b

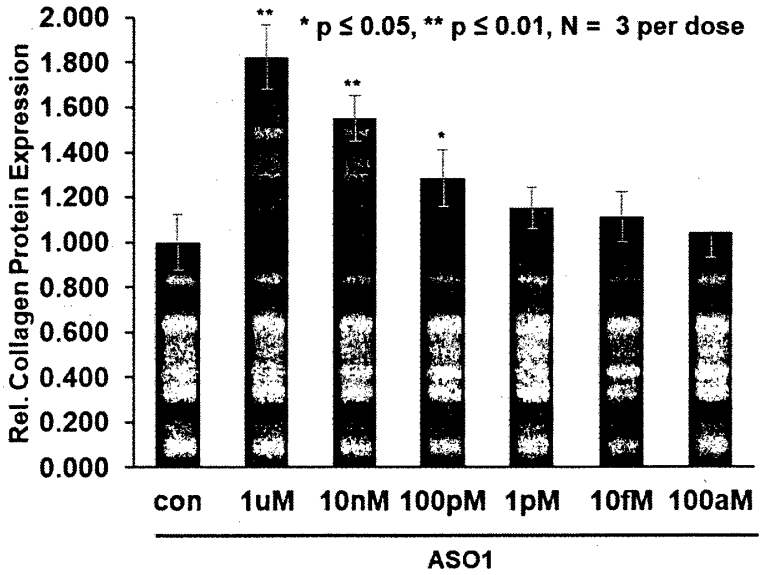
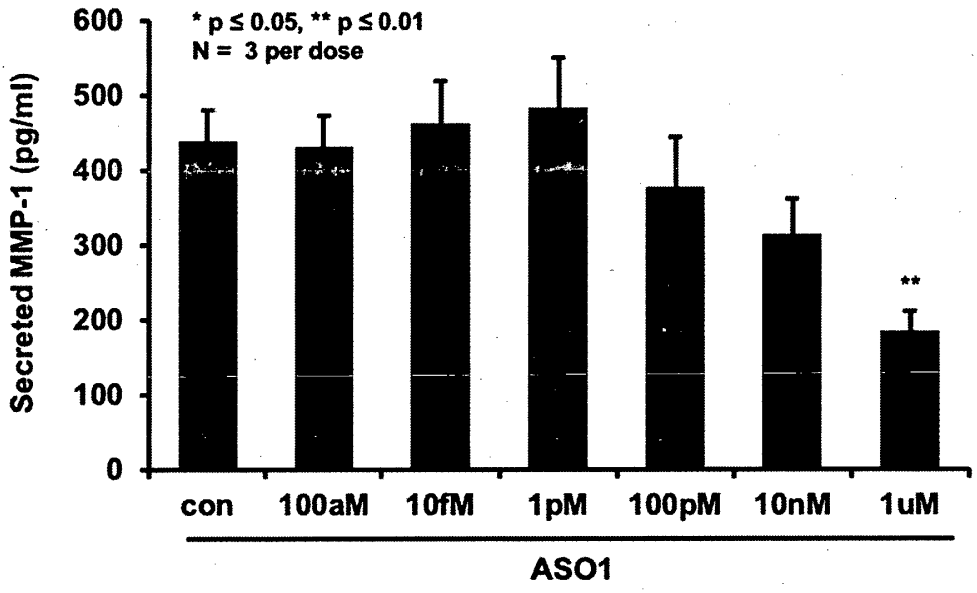


Fig. 13


* p ≤ 0.05, ** p ≤ 0.01
N = 3 per dose
Secreted MMP-1 (pg/ml)
600
500
400
300
200
100
0
**
con
100aM
10fM
1pM
100pM
10nM
1uM
ASO1