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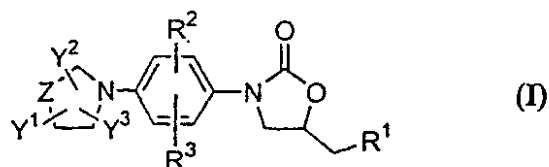
(54) 【発明の名称】 抗細菌活性を有する新規複素環式化合物、それらの調製方法、およびそれらを含む薬学的組成物

(57) 【要約】

【解決手段】

本発明は、一般式 (I) (式中、 R^1 、 R^2 、 R^3 、 Y^1 、 Y^2 、 Y^3 、およびZは、説明中の定義の通りである) を有する新規オキサゾリジノン化合物、それらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、およびそれらを含む薬学的組成物に関する。

【化1】

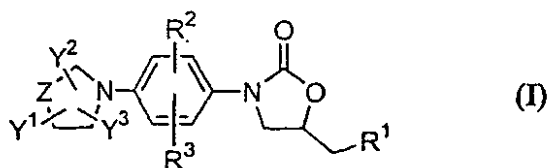


【特許請求の範囲】

【請求項 1】

下記式 (I) :

【化 1】



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(式中、

R^1 は、ハロ、アジド、イソチオシアネート、チオアルコール、 OR^4 、 NHR^4 、または $N(R^4)_2$ (ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、 $(C_1 \sim C_6)$ アルコキシカルボニル、 $(C_3 \sim C_6)$ シクロアルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシカルボニル、 $(C_2 \sim C_6)$ アルケニルカルボニル、アリールオキシカルボニル、 $(C_1 \sim C_6)$ アルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、 $-C(=O)-C(=O)-$ アルキル、 $-C(=O)-C(=O)-$ アリール、 $-C(=O)-C(=O)-$ アルコキシ、 $-C(=O)-C(=O)-$ アリールオキシ、 $-(C=S)-S-$ アルキル、 $-(C=S)-NH_2$ 、 $-(C=S)-NH-$ アルキル、 $-C(=S)-N-(アルキル)_2$ 、 $-C(=S)-NH-$ アルケニル、 $-(C=S)-(C=O)-$ アルコキシ、 $-(C=S)-(C=O)-$ アリールオキシ、 $-C(=S)-O-(C=O)-$ アルキル、 $-C(=S)-C(=S)-$ アルキル、 $-C(=S)-C(=S)-$ アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表し、

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R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

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Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形

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、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物。

【請求項 2】

R⁴ 上の置換基は、ハロゲン、ヒドロキシ、アミノ、モノアルキルアミノ、ジアルキルアミノ、シアノ、ニトロ、アルコキシ、アリール、ヒドロキシアリール、ピリジル、ヒドロキシアルキル、アルコキシアリール、またはカルボニルから選択される、請求項 1 に記載の化合物、およびその誘導体。

【請求項 3】

R^b 上の置換基は、ヒドロキシ、ハロゲン、ピロリジニルチオカルボニル、ニトロ、アミノ、アルコキシ、カルボキシ、またはシアノから選択される、請求項 1 に記載の化合物。

【請求項 4】

Y² および Y³ 上の置換基は、ヒドロキシ、ニトロ、シアノ、アミノ、*t*-ブチルジメチルシリルオキシ (TBSO)、ハロゲン、(C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルコキシ、(C₃ ~ C₆) シクロアルキル、アリール、ベンジルオキシ、アシル、カルボキシル、またはアシルオキシ基から選択される、請求項 1 に記載の化合物。

【請求項 5】

Y² および Y³ により形成される前記環構造は、置換もしくは無置換のベンゼン、ピリジン、ピロリジン、フラン、チオフエン、モルホリン、ピペラジン、またはピロールから選択される、請求項 1 に記載の化合物。

【請求項 6】

以下の：

(5R) - 3 - [3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、
(5R) - 3 - [3-フルオロ-4-(2-チオキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - [3-フルオロ-4-(2-チオキソ-1, 3-チアゾラン-3-イル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、
(5R) - 3 - [3-フルオロ-4-(3-メチル-2-チオキソ-1-イミダゾリジニル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

3 - {2-フルオロ-4-[(5R) - 5-ヒドロキシメチル-2-オキソ-1, 3-オキサゾラン-3-イル] フェニル} - 2, 3-ジヒドロベンゾ[d][1, 3]オキサゾール-2-オン、またはその塩、

3 - {2-フルオロ-4-[(5R) - 5-ヒドロキシメチル-2-オキソ-1, 3-オキサゾラン-3-イル] フェニル} - 6-メチル-2, 3-ジヒドロベンゾ[d][1, 3]オキサゾール-2-オン、またはその塩、

3 - {2-フルオロ-4-[(5R) - 5-ヒドロキシメチル-2-オキソ-1, 3-オキサゾラン-3-イル] フェニル} - 5-メチル-2, 3-ジヒドロベンゾ[d][1, 3]オキサゾール-2-オン、またはその塩、

(5R) - 5-ヒドロキシメチル-3-[4-(2-オキソ-1, 3-オキサゾラン-3-イル)-3-トリフルオロメチルフェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - [2-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - [3, 5-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-ヒドロキシメチル-3-[4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

3 - {4-[(5R) - 5-ヒドロキシメチル-2-オキソ-1, 3-オキサゾラン-3

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ーイル] フェニル} - 2, 3-ジヒドロベンゾ [d] [1, 3] オキサゾール-2-オン、またはその塩、

(5R) - 3 - [3-フルオロ-4- (3-メチル-4-オキソ-1-イミダゾリジニル) フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - {3-フルオロ-4- [3- (4-メトキシベンジル) -4-オキソ-1-イミダゾリジニル] フェニル} - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - [3-フルオロ-4- (3-メチル-2-オキソ-1-イミダゾリジニル) フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩 10

(5R) - 5-ヒドロキシメチル-3- [4- (3-メチル-2-オキソ-1-イミダゾリジニル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-ヒドロキシメチル-3- [4- (3-ベンジル-2-オキソ-1-イミダゾリジニル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - [3-フルオロ-4- (2-オキソ-3-フェニル-1-イミダゾリジニル) フェニル] - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 3 - {3-フルオロ-4- [3- (フルオロフェニル) -2-オキソ-1-イミダゾリジニル] フェニル} - 5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン 20

(5R) - アジドメチル-3- [3-フルオロ-4- [2-オキソ-1, 3-オキサゾラン-3-イル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - アジドメチル-3- [3-フルオロ-4- [3-メチル-2-チオキソ-1-イミダゾリジニル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

3- {4- [(5R) - 5-アジドメチル-2-オキソ-1, 3-オキサゾラン-3-イル] - 2-フルオロフェニル} - 6-メチル-2, 3-ジヒドロベンゾ [d] [1, 3] オキサゾール-2-オン、またはその塩、

3- {4- [(5R) - 5-アジドメチル-2-オキソ-1, 3-オキサゾラン-3-イル] - 2-フルオロフェニル} - 5-メチル-2, 3-ジヒドロベンゾ [d] [1, 3] 30

(5R) - 5-アジドメチル-3- [4- (2-オキソ-1, 3-オキサゾラン-3-イル) - 3-トリフルオロメチルフェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-アジドメチル-3- [2-フルオロ-4- (2-オキソ-1, 3-オキサゾラン-3-イル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - アジドメチル-3- [3, 5-ジフルオロ-4- (2-オキソ-1, 3-オキサゾラン-3-イル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-アジドメチル-3- [4- (2-オキソ-1, 3-オキサゾラン-3-イル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、 40

3- {4- [(5R) - 5-アジドメチル-2-オキソ-1, 3-オキサゾラン-3-イル) フェニル] - 2, 3-ジヒドロベンゾ [d] [1, 3] オキサゾール-2-オン、またはその塩、

(5R) - 5-アジドメチル-3- [3-フルオロ-4- (3-メチル-4-オキソ-1-イミダゾリジニル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-アジドメチル-3- [3-フルオロ-4- (3-フェニル-2-オキソ-1-イミダゾリジニル) フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

(5R) - 5-アジドメチル-3- {3-フルオロ-4- [3- (4-フルオロフェニル) -2-オキソ-1-イミダゾリジニル] フェニル} - 1, 3-オキサゾラン-2-オン、またはその塩、 50

(5 R) - アミノメチル - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - アミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロフェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - アミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

N - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } メタンアミド、またはその塩、

N - { (5 S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } メタンアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } プロパンアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } ブタンアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } ペンタンアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } ヘプタンアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } アクリルアミド、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } - 2, 2, 2 - トリフルオロアセトアミド、またはその塩、

エチル (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチルカルバモイルメタン酸、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - チオキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - チオキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [3 - フルオロ - 4 - (2 - チオキソ - 1, 3 - チオキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

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ド、またはその塩、

N1- { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [3 - フルオロ - 4 - (6 - メチル - 2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

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N1- { (5S) - 3 - [3 - フルオロ - 4 - (5 - メチル - 2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } プロパンアミド、またはその塩、

N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } ヘプタンアミド、またはその塩、

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N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アクリルアミド、またはその塩、

N1- { (5S) - 3 - [2 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセ

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トアミド、またはその塩、
N1- { (5S) - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } プロ

パンアミド、またはその塩、
N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその

塩、
N1- { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

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N1- { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [3 - フルオロ - 4 - (3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1- { (5S) - 3 - [4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェ

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ニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} アセトアミド、またはその塩、

N1 - { (5S) - 3 - [4 - (3 - ベンジル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} アセトアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - フェニル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} アセトアミド、またはその塩、

N1 - ((5S) - 3 - {3 - フルオロ - 4 - [3 - (4 - フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル} - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} アセトアミド、またはその塩、 10

(5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - (3, 3, 3 - トリフルオロ - 1 - チオキソプロピルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 20

3 - {2 - フルオロ - 4 - [(5S) - 2 - オキソ - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 3 - イル] フェニル} - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、

(5S) - 3 - [4 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - (1 - チオキソプロピルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 30

(5S) - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 5 - (1 - チオキソエチルアミノメチル) - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 40

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} メチルカーバメート、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1, 3 - オキサゾラン - 5 - イルメチル} メチルカーバメート、またはその塩、

N1 - { (5S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} メチルカーバメート、またはその塩、 50

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルカーバメート、またはその塩、

(5 S) - 5 - メチルチオキシ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 オン、またはその塩、

N 1 - { (5 S) - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルジチオカーバメート、またはその塩、 10

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } トリフルオ 20
ロアセトキシチオカーバメート、またはその塩、

(5 S) - 5 - シクロヘキシルオキシ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - チオキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、 30

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 1 - プロピルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 2 - プロピルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } 40
メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、 50

またはその塩、

N1 - { (5S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、
またはその塩、

N1 - { (5S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 1 - プロピルチオカーバメート、またはその塩、

(5 S) - 5 - [2 , 2 , 2 - トリフルオロエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

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(5 S) - 5 - [2 - ヒドロキシエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - [2 - メトキシエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

N1 - { (5S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アリルチオカーバメート、
またはその塩、

N1 - { (5S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 2 - プロピルチオカーバメート、またはその塩、

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N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

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N1 - { (5S) - 3 - [4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

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N1 - { (5S) - 3 - [4 - (3 - ベンジル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4 - (3 - ベンジル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - フェニル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - フェニル - 2 - オキソ - 1 - イミダ

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ゾリジニル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} エチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [(3 - (4 - フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [(3 - (4 - フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) エチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [(3 - (4 - フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) - 2 - プロピルチオカーバメート、またはその塩、 10

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - メトキシメチル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) エチルチオカーバメート、またはその塩、 20

N 1 - ((5 S) - 3 - { 4 - [4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) - (N, N - ジメチルアミノ) エチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - (4 - メトキシベンジル) - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) イソプロピルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ヒドロキシメチル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、 30

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - [3 - メチル - 4 - チオキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

(5 S) - 5 - [(2 S) - 2 - ヒドロキシメチルアゾラン - 1 - イル (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 40

(5 S) - 5 - ジエチルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - アリルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - ベンジルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 50

(5S) - 5 - [4 - メトキシベンジルアミノ (チオキソ) メチルアミノメチル] - 3 -
[4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾ
ラン - 2 - オン、またはその塩、

(5S) - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5
- [2 - ピリジリエチルアミノ (チオキソ) メチルアミノメチル] - 1, 3 - オキサゾ
ラン - 2 - オン、またはその塩、

(5S) - 5 - メチルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ
- 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、ま
たはその塩、

(5S) - 5 - [2 - ヒドロキシエチルアミノ (チオキソ) メチルアミノメチル] - 3 - 10
[4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾ
ラン - 2 - オン、またはその塩、

(5S) - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5
- [1, 4 - チアジナン - 4 - イル (チオキソ) メチルアミノメチル] - 1, 3 - オキサ
ゾラン - 2 - オン、またはその塩、

(5S) - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5
- [2 - ピリジリアミノ (チオキソ) メチルアミノメチル] - 1, 3 - オキサゾラン - 2
- オン、またはその塩、

(5S) - 5 - アミノ (チオキソ) メチルアミノメチル - 3 - [3 - フルオロ - 4 - (2
- オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - 20
オン、またはその塩、

(5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル)
フェニル] - 5 - メチルアミノ (チオキソ) メチルアミノメチル] - 1, 3 - オキサゾ
ラン - 2 - オン、またはその塩、

(5S) - 5 - アミノ (チオキソ) メチルアミノメチル - 3 - [3, 5 - ジフルオロ - 4
- (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン
- 2 - オン、またはその塩、

(5S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 -
イル) フェニル] - 5 - メチルアミノ (チオキソ) メチルアミノメチル] - 1, 3 - オキ
サゾラン - 2 - オン、またはその塩、 30

N1 - ((5S) - 3 - {4 - [4 - オキソ - 1 - イミダゾリジニル] フェニル} - 2 -
オキソ - 1, 3 - オキサゾラン - 5 - イルメチル) - (N, N - ジメチルアミノ) エチル
チオカーバメート塩酸塩

から選択される、請求項 1 に記載の式 (I) を有する化合物。

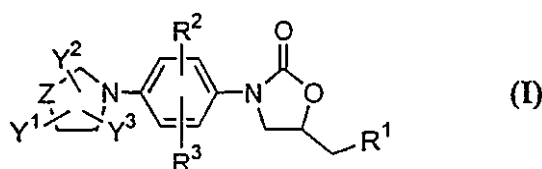
【請求項 7】

前記薬学的に許容可能な塩は、Li、Na、K、Ca、Mg、Fe、Cu、Mn、有機塩
基、キラル塩基、天然アミノ酸、非天然アミノ酸、置換アミノ酸の塩、グアニジン、置換
グアニジン塩、アンモニウム、置換アンモニウム塩、アルミニウム塩、および酸付加塩か
ら選択される、請求項 1 または 6 に記載の化合物。

【請求項 8】

下記式 (I) :

【化 2】



(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の($C_1 \sim C_6$) アルキル基、またはハロ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

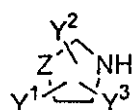
Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは($C_1 \sim C_6$) アルキル、ヒドロキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ($C_1 \sim C_6$) アルキル、アミノ($C_1 \sim C_6$) アルキル、モノ($C_1 \sim C_6$) アルキルアミノ、ジ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造と一緒に形成する)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の:

(i) 下記式 (III) :

【化3】

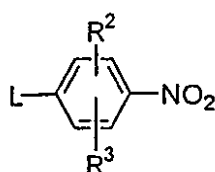


(III)

(式中、 Y^1 、 Y^2 、 Y^3 および Z は、上記定義の通りである)

を有する化合物を、下記式 (IV) :

【化4】



(IV)

(式中、 L は、脱離基を表し、 R^2 および R^3 は、上記定義の通りである)

を有する化合物と反応させて、下記式 (V) :

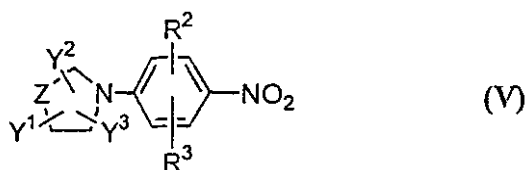
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【化 5】

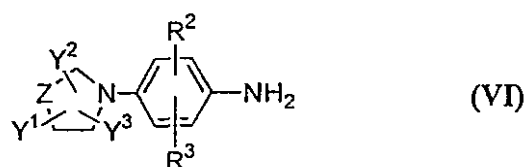


10

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと、

(i i) 式 (V) を有する化合物を還元して、下記式 (V I) :

【化 6】

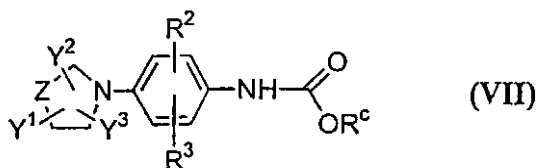


20

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと、

(i i i) 式 (V I) を有する化合物をクロロギ酸アルキルと反応させて、下記式 (V I I) :

【化 7】



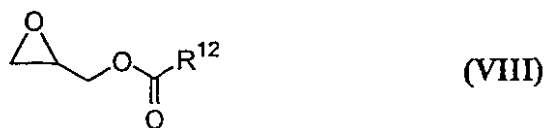
30

(式中、 R^c は、($C_1 \sim C_8$) アルキル基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(i v) 式 (V I I) を有する化合物を、下記式 (V I I I) :

【化 8】

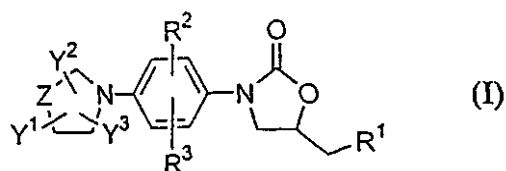


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(式中、 R^{12} は、($C_1 \sim C_3$) アルキル基を表す)

を有する化合物と、塩基の存在下で反応させて、下記式 (I) :

【化 9】



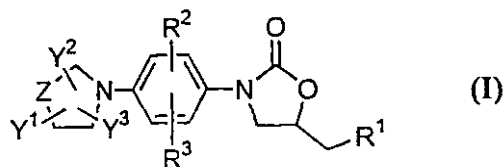
10

(式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(v) 式 (I) を有する化合物を、塩化アルキルスルホニル、または塩化アリールスルホニルと反応させて、式 (I) (式中、 R^1 は、アルキルスルホニル、またはアリールスルホニルを表す) を有する化合物を生産して、 NaN_3 と反応させて、下記式 (I) :

【化 10】



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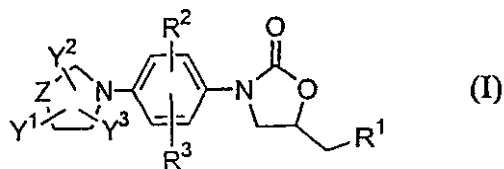
(式中、 R^1 は、アジド基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(vi) 式 (I) (式中、 R^1 は、アジド基を表す) を有する化合物を還元して、下記式 (I) :

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【化 11】



(式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

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を有する化合物を生産することと

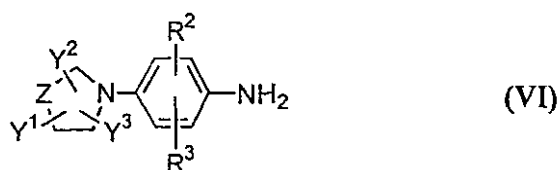
を含む方法。

【請求項 9】

下記式 (I) :

$$\begin{array}{c}
 \text{Y}^2 \\
 \diagup \quad \diagdown \\
 \text{Z} \quad \text{N} \\
 \diagdown \quad \diagup \\
 \text{Y}^1 \quad \text{Y}^3
 \end{array}
 \begin{array}{c}
 \text{R}^2 \\
 | \\
 \text{---} \\
 | \\
 \text{R}^3
 \end{array}
 \begin{array}{c}
 \text{O} \\
 || \\
 \text{N} \quad \text{O} \\
 | \quad | \\
 \text{---} \quad \text{---} \\
 | \\
 \text{R}^1
 \end{array}
 \quad (I)$$

【化 1 3】



(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)を有する化合物を、下記式 (IX) :

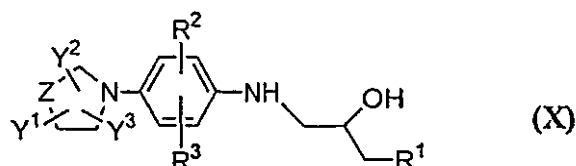
【化 1 4】



(式中、 R^1 は、ヒドロキシを表す)
を有する化合物と反応させて、下記式 (X) :

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【化 1 5】



(式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定 20
義の通りである)

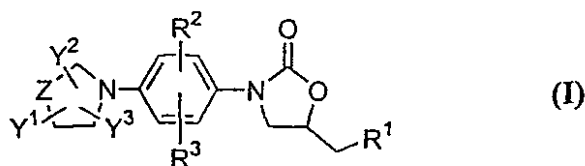
を有する化合物を生産することと、

(i i) 式 (X) を有する化合物を、カルボニル化剤を用いてカルボニル化して、式 (I)
(式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記
定義の通りである) を有する化合物を生産することと
を含む方法。

【請求項 1 0】

下記式 (I) :

【化 1 6】



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(式中、
 R^1 は、アジドを表し、
 R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 40
、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハ
ロ ($C_1 \sim C_6$) アルキルを表す) を表し、
Z は、S、O、=CH、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無
置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアル
キル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C$
6) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、
またはアリールオキシカルボニルを表す) を表し、
 Y^1 は、=O、または =S 基を表し、
 Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ 50
、アミノ、=O、=S 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$)

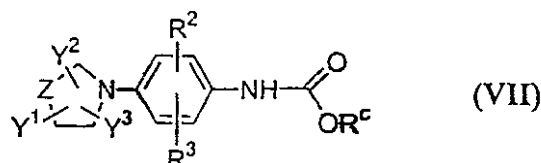
アルキル、(C₁～C₆)アルコキシ(C₁～C₆)アルキル、(C₁～C₆)アルコシカルボニル、カルボキシ(C₁～C₆)アルキル、(C₁～C₆)アルキルスルホニル、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C₆)アルキル、アミノ(C₁～C₆)アルキル、モノ(C₁～C₆)アルキルアミノ、ジ(C₁～C₆)アルキルアミノ、アリールアミノ、(C₁～C₆)アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y²およびY³はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の：

(i) 下記式(VII)：

【化17】



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(式中、R^cは、(C₁～C₈)アルキル基を表し、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)

を有する化合物を、下記式(XI)：

【化18】

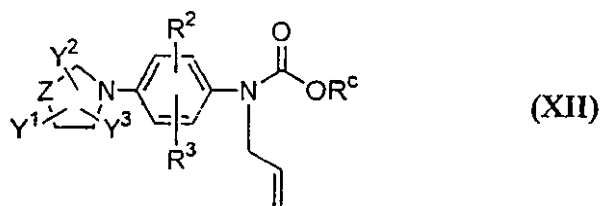


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(式中、Lは、脱離基を表す)

を有する化合物と反応させて、下記式(XII)：

【化19】



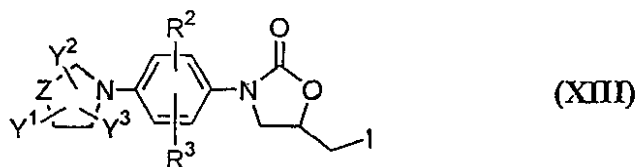
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(式中、R^c、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)
を有する化合物を生産することと、

(ii) 前記式(XII)を有する化合物を、下記式(XIII)：

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【化 2 0】



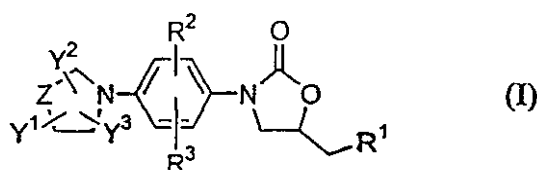
(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物に変換することと、

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(iii) 前記式 (XIII) を有する化合物を、有機または無機アジドと反応させることによって、下記式 (I) :

【化 2 1】



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(式中、 R^1 は、アジド基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

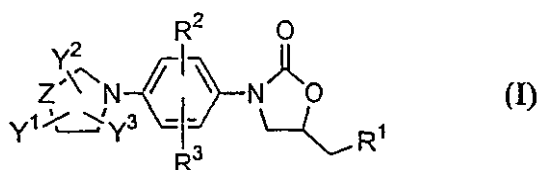
を有する化合物に変換することと

を含む方法。

【請求項 11】

下記式 (I) :

【化 2 2】



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(式中、

R^1 は、アジド基を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

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Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ

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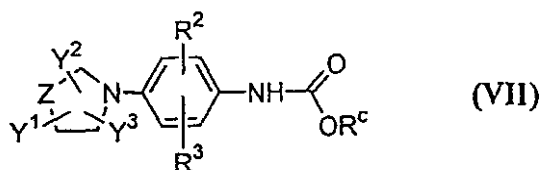
、アミノ、=O、=S基、あるいは(C₁～C₆)アルキル、ヒドロキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシカルボニル、カルボキシ(C₁～C₆)アルキル、(C₁～C₆)アルキルスルホニル、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C₆)アルキル、アミノ(C₁～C₆)アルキル、モノ(C₁～C₆)アルキルアミノ、ジ(C₁～C₆)アルキルアミノ、アリールアミノ、(C₁～C₆)アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y²およびY³はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の：

(i) 下記式(VII)：

【化23】



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(式中、R^cは、(C₁～C₈)アルキル基を表し、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)

を有する化合物を、下記式(XVII)：

【化24】



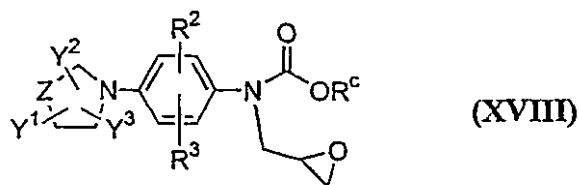
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(式中、Lは、脱離基を表す)

を有する化合物と反応させて、下記式(XVIII)：

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【化 2 5】

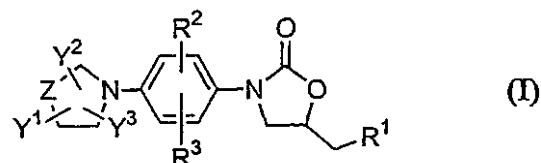


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(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと、

(ii) 前記式 (XVIII) を有する化合物を、有機または無機アジドと反応させること
によって、下記式 (I) :

【化 2 6】



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(式中、 R^1 は、アジド基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義
の通りである)

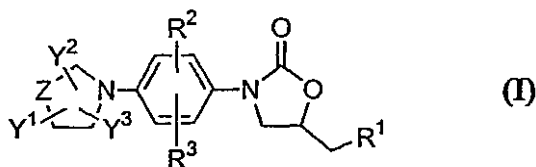
を有する化合物に変換することと

を含む方法。

【請求項 12】

下記式 (I) :

【化 2 7】



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(式中、

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R^1 は、ヒドロキシを表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の($C_1 \sim C_6$) アルキル基、またはハロ($C_1 \sim C_6$) アルキルを表す)を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

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Y^1 は、 $=O$ 、または $=S$ 基を表し、

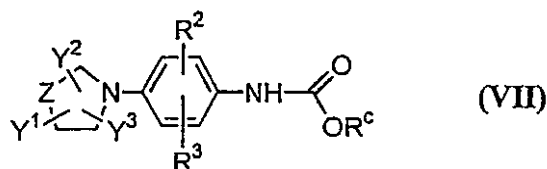
Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の：

(i) 下記式 (VI)：

【化28】



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(式中、 R^c は、 $(C_1 \sim C_8)$ アルキル基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

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を有する化合物を、下記式 (XIV)：

【化29】

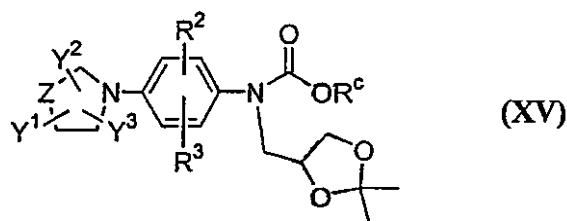


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(式中、 L は、脱離基を表す)

を有する化合物と反応させて、下記式 (XV)：

【化 3 0】



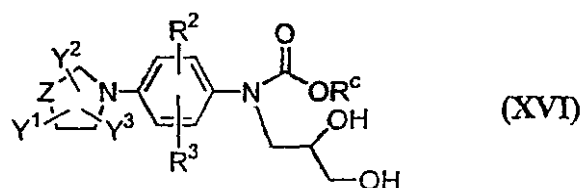
10

(式中、 R^c は、($C_1 \sim C_8$) アルキル基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(i i) 式 (XV) を有する化合物中のアセトニド部分を加水分解して、下記式 (XVI) :

【化 3 1】



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(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(i i i) 式 (XVI) を有する化合物を、塩基を用いて、または塩基を用いずに、式 (I) (式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである) を有する化合物へと環化すること

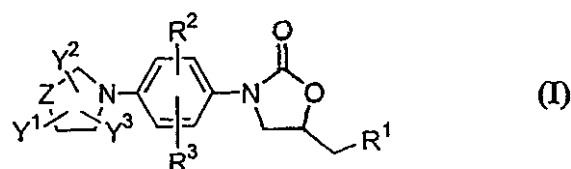
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とを含む方法。

【請求項 13】

下記式 (I) :

【化 3 2】



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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

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Zは、S、O、=CH、またはNR^b（ここで、R^bは、水素、あるいは置換もしくは無置換の(C₁～C₆)アルキル、(C₂～C₆)アルケニル、(C₁～C₆)シクロアルキル、(C₁～C₆)アルコキシ、アリール、アラルキル、アリールオキシ、(C₁～C₆)アルキルカルボニル、アリールカルボニル、(C₁～C₆)アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y¹は、=O、または=S基を表し、

Y²およびY³は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S基、あるいは(C₁～C₆)アルキル、ヒドロキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシカルボニル、カルボキシ(C₁～C₆)アルキル、(C₁～C₆)アルキルスルホニル、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C₆)アルキル、アミノ(C₁～C₆)アルキル、モノ(C₁～C₆)アルキルアミノ、ジ(C₁～C₆)アルキルアミノ、アリールアミノ、(C₁～C₆)アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y²およびY³はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

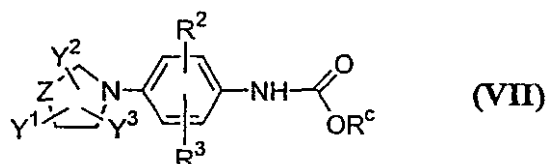
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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の：

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(i) 下記式(VII)：

【化33】



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(式中、R^cは、(C₁～C₈)アルキル基を表し、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)

を有する化合物を、下記式(XIX)：

【化34】

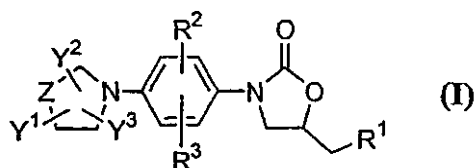


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を有する化合物と反応させて、下記式(I)：

$$\text{Chemical Structure (I)}: \begin{array}{c} \text{Y}^2 \\ | \\ \text{Z}-\text{N} \\ / \quad \backslash \\ \text{Y}^1 \quad \text{Y}^3 \end{array} - \text{C}_6\text{H}_2(\text{R}^2)(\text{R}^3) - \text{N} \begin{array}{c} \text{O} \\ || \\ \text{O} \end{array} \text{CH}_2\text{R}^1 \quad (\text{I})$$

【化 3 6】



Y² および Y³ は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S 基、あるいは (C₁ ~ C₆) アルキル、ヒドロキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルコキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルコキシカルボニル、カルボキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルキルスルホニル、(C₁ ~ C₆) アルキルカルボニルアミノ (C₁ ~ C₆) アルキル、アリールカルボニルアミノ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルキルカルボニルオキシ (C₁ ~ C₆) アルキル、アミノ (C₁ ~ C₆) アルキル、モノ (C₁ ~ C₆) アルキルアミノ、ジ (C₁ ~ C₆) アルキルアミノ、アリールアミノ、(C₁ ~ C₆) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y² および

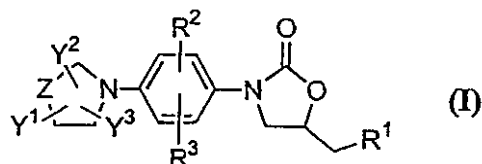
Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する化合物の調製方法であって、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素を表す) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである) を有する化合物を、ギ酸アルキルを用いてホルミル化することを含む方法。

【請求項 15】

下記式 (I) :

【化 37】



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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4a}$ (ここで、 R^{4a} は、($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ、($C_2 \sim C_6$) アルケニル、ハロ ($C_1 \sim C_6$) アルキル、アリーロキシ、($C_2 \sim C_6$) アルケニルオキシ、アリーロキシカルボニル、または ($C_1 \sim C_6$) アルコキシカルボニルを表す) を表す) を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラールキル、アリーロキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリーロキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ ($C_1 \sim C_6$) アルキル、アミノ ($C_1 \sim C_6$) アルキル、モノ ($C_1 \sim C_6$) アルキルアミノ、ジ ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリーロキシ、アラールキル、ヘテロアリール、ヘテロアラールキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

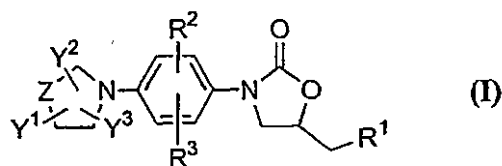
を有する化合物の調製方法であって、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素を表す) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである) を有する化合物を、ハライドを用いてアセチル化することを含む方法。

【請求項 16】

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下記式 (I) :

【化 3 8】



(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表し、
 R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

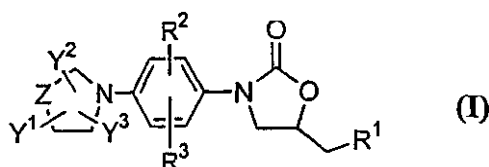
Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ ($C_1 \sim C_6$) アルキル、アミノ ($C_1 \sim C_6$) アルキル、モノ ($C_1 \sim C_6$) アルキルアミノ、ジ ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式 (I) (式中、 R^1 は、アジド基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである) を有する化合物を、チオ酢酸と反応させることとを含む方法。

【請求項 17】

下記式 (I) :

【化 3 9】



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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリールオキシ、 $-C(=S)-(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリールを表す)を表す)を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

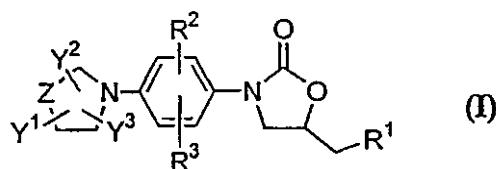
Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造と一緒に形成する)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリールオキシ、 $-C(=S)-(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリールを表す)を表す)を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)を有する化合物を、2，4-ビス(メトキシフェニル)-1，3-ジチア-2，4-ジホスフェタン-2，4-ジスルフィド (Lawesson試薬)を反応させることを含む方法。

【請求項18】

下記式(I)：

【化 4 0】



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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-R^{4c}$ (ここで、 R^{4c} は、 $(C_1 \sim C_6)$ アルキルを表す)を表す)を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

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Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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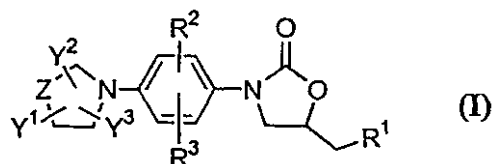
を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素を表す)を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)を有する化合物を、二硫化炭素、適切なハロゲン化アルキル、および Et_3N 、ジイソプロピルエチルアミン、 K_2CO_3 、 NaH 、または $KOt-Bu$ から選択される塩基と反応させることにより反応させることを含む方法。

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【請求項 19】

下記式 (I) :

【化 4 1】



(I)

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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-OR^{4d}$ (ここで、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C_6)$ アルキル、フッ素で置換された $-C(=O)-$ $(C_1 \sim C_6)$ アルキル基、アリール、ハロ $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、または $(C_2 \sim C_6)$ アルケニルを表す)を表す)を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

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Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラールキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラールキル、ヘテロアリール、ヘテロアラールキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、

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以下の：

(i) 式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す)を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)を有する化合物を、チオホスゲンと反応させることにより、式 I (式中、 R^1 は、イソチオシアネート基を表し、他の全ての記号は、上記定義の通りである)を有する化合物に変換することと、

(ii) 式 I (式中、 R^1 は、イソチオシアネート基を表す)を有する化合物を、アルコールと反応させることにより、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-OR^{4d}$ (ここで、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C$

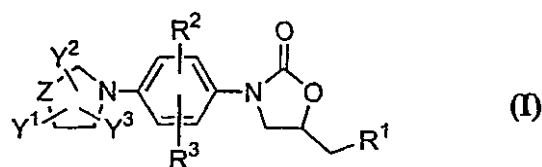
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6) アルキル、フッ素で置換された $-C(=O)-$ ($C_1 \sim C_6$) アルキル基、アリール、ハロ ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、または ($C_2 \sim C_6$) アルケニルを表す) を表す) を表し、全ての記号は、上記定義の通りである) を有する化合物に変換することを含む方法。

【請求項 20】

下記式 (I) :

【化 4 2】



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(式中、

R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-N(R'R'')$ (ここで、 R' は、水素、($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、置換もしくは無置換のアラルキル、ヘテロアラルキル、ヒドロキシ ($C_1 \sim C_6$) アルキルを表し、 R'' は、水素または ($C_1 \sim C_6$) アルキルを表すか、あるいは R' および R'' は、1 個もしくは 2 個のヘテロ原子を含有する 5 または 6 員環構造を一緒に形成する) を表す) を表し、

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R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

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Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ ($C_1 \sim C_6$) アルキル、アミノ ($C_1 \sim C_6$) アルキル、モノ ($C_1 \sim C_6$) アルキルアミノ、ジ ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

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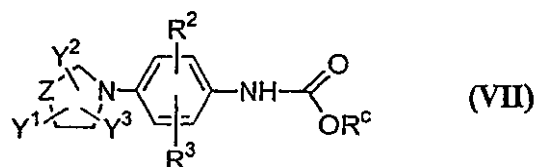
を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式 (I) (式中、 R^1 は、イソチオシアネート基を表し、他の全ての記号は、上記定義の通りである) を有する化合物を、アンモニアガスを通すことにより、あるいはアミンと反応させることにより変換することを含む方法。

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【請求項 21】

下記式 (VII) :

【化 43】



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(式中、

 R^c は、($C_1 \sim C_8$) アルキル基を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の($C_1 \sim C_6$) アルキル基、またはハロ($C_1 \sim C_6$) アルキルを表す)を表し、

Z は、S、O、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

 Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは($C_1 \sim C_6$) アルキル、ヒドロキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ($C_1 \sim C_6$) アルキル、アミノ($C_1 \sim C_6$) アルキル、モノ($C_1 \sim C_6$) アルキルアミノ、ジ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する新規中間体。

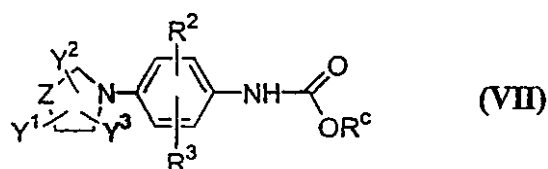
【請求項 22】

請求項 21 に記載の下記式 (VII) :

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【化 4 4】



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(式中、 Y^1 、 Y^2 、 Y^3 、 R^c 、 R^2 、 R^3 および Z は、請求項 2 1 の定義の通りである)

を有する化合物の調製方法であって、以下の：

(i) 下記式 (III)：

【化 4 5】

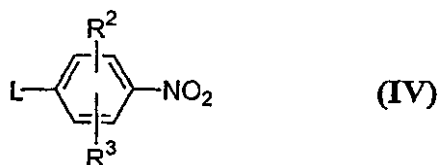


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(式中、 Y^1 、 Y^2 、 Y^3 および Z は、請求項 2 1 の定義の通りである)

を有する化合物を、下記式 (IV)：

【化 4 6】

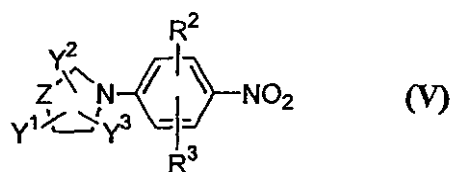


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(式中、 L は、脱離基を表し、 R^2 および R^3 は、請求項 2 1 の定義の通りである)

を有する化合物と反応させて、下記式 (V)：

【化 4 7】



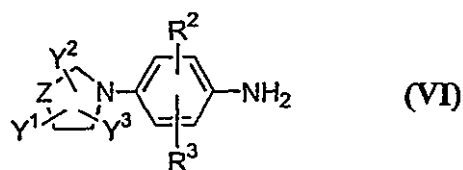
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(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 2 1 の定義の通りである)

を有する化合物を生産することと、

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(i i) 式 (V) を有する化合物を還元して、下記式 (V I) :
【化 4 8】

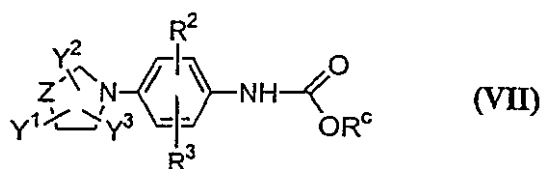


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(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 2 1 の定義の通りである)
を有する化合物を生産することと、

(i i i) 式 (V I) を有する化合物をクロロギ酸アルキルと反応させて、下記式 (V I I) :
【化 4 9】

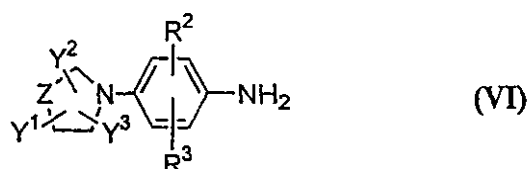
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(式中、 R^c は、($C_1 \sim C_8$) アルキル基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 2 1 の定義の通りである)
を有する化合物を生産することと
を含む方法。

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【請求項 2 3】
下記式 (V I) :
【化 5 0】



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(式中、
 R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、
 Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアル

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キル、(C₁ ~ C₆) アルコキシ、アリール、アラルキル、アリールオキシ、(C₁ ~ C₆) アルキルカルボニル、アリールカルボニル、(C₁ ~ C₆) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y¹ は、= O、または = S 基を表し、

Y² および Y³ は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、= O、= S 基、あるいは (C₁ ~ C₆) アルキル、ヒドロキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルコキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルコキシカルボニル、カルボキシ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルキルスルホニル、(C₁ ~ C₆) アルキルカルボニルアミノ (C₁ ~ C₆) アルキル、アリールカルボニルアミノ (C₁ ~ C₆) アルキル、(C₁ ~ C₆) アルキルカルボニルオキシ (C₁ ~ C₆) アルキル、アミノ (C₁ ~ C₆) アルキル、モノ (C₁ ~ C₆) アルキルアミノ、ジ (C₁ ~ C₆) アルキルアミノ、アリールアミノ、(C₁ ~ C₆) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y² および Y³ はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造と一緒に形成する)

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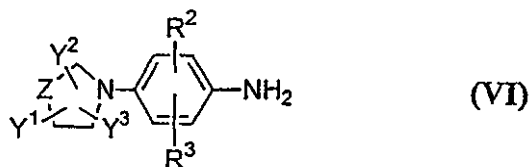
を有する新規中間体。

【請求項 24】

請求項 23 に記載の下記式 (VI) :

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【化 51】



(式中、Y¹、Y²、Y³、R²、R³ および Z は、請求項 23 の定義の通りである)

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を有する化合物の調製方法であって、以下の：

(i) 下記式 (III) :

【化 52】

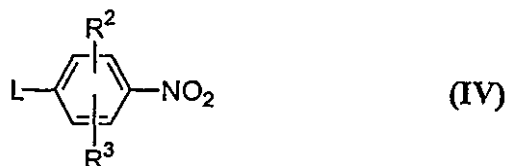


(式中、Y¹、Y²、Y³ および Z は、請求項 23 の定義の通りである)

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を有する化合物を、下記式 (IV) :

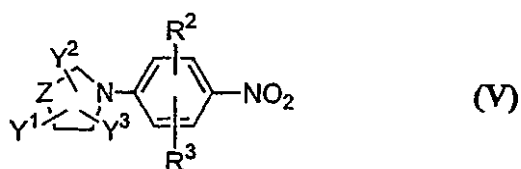
【化 5 3】



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(式中、Lは、脱離基を表し、R² および R³ は、請求項 2 3 の定義の通りである)
を有する化合物と反応させて、下記式 (V) :

【化 5 4】

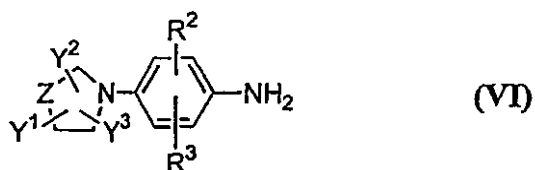


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(式中、Y¹、Y²、Y³、R²、R³ および Z は、請求項 2 3 の定義の通りである)
を有する化合物を生産することと、

(i i) 式 (V) を有する化合物を還元して、下記式 (VI) :

【化 5 5】



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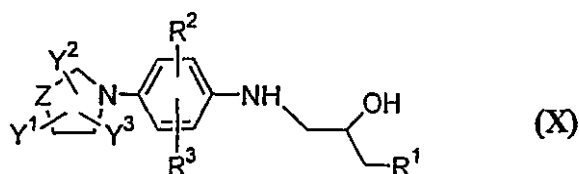
(式中、Y¹、Y²、Y³、R²、R³ および Z は、請求項 2 3 の定義の通りである)
を有する化合物を生産することと

を含む方法。

【請求項 2 5】

下記式 (X) :

【化 5 6】



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(式中、

R^1 は、ハロ、アジド、イソチオシアネート、チオアルコール、 OR^4 、 NHR^4 、または $N(R^4)_2$ (ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、 $(C_1 \sim C_6)$ アルコキシカルボニル、 $(C_3 \sim C_6)$ シクロアルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシカルボニル、 $(C_2 \sim C_6)$ アルケニルカルボニル、アリールオキシカルボニル、 $(C_1 \sim C_6)$ アルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、 $-C(=O)-C(=O)-$ アルキル、 $-C(=O)-C(=O)-$ アリール、 $-C(=O)-C(=O)-$ アルコキシ、 $-C(=O)-C(=O)-$ アリールオキシ、 $-(C=S)-S-$ アルキル、 $-(C=S)-NH_2$ 、 $-(C=S)-NH-$ アルキル、 $-C(=S)-N-(アルキル)_2$ 、 $-C(=S)-NH-$ アルケニル、 $-(C=S)-(C=O)-$ アルコキシ、 $-(C=S)-(C=O)-$ アリールオキシ、 $-C(=S)-O-(C=O)-$ アルキル、 $-C(=S)-C(=S)-$ アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表し、

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R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

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Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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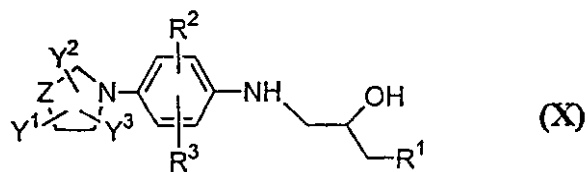
を有する新規中間体。

【請求項26】

請求項25に記載の下記式(X)：

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【化 5 7】



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(式中、 R^1 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 25 の定義の通りである)

を有する化合物の調製方法であって、以下の：

(i) 下記式 (III)：

【化 5 8】



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(式中、 Y^1 、 Y^2 、 Y^3 および Z は、請求項 25 の定義の通りである)

を有する化合物を、下記式 (IV)：

【化 5 9】

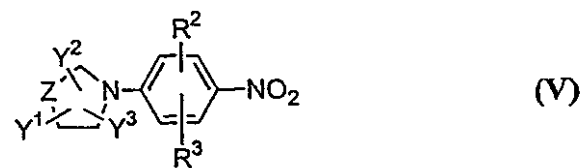


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(式中、 L は、脱離基を表し、 R^2 および R^3 は、請求項 25 の定義の通りである)

を有する化合物と反応させて、下記式 (V)：

【化 6 0】



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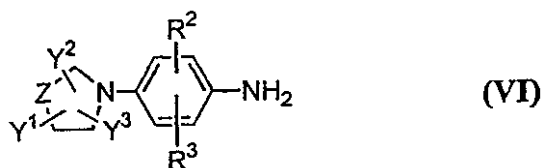
(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 25 の定義の通りである)

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を有する化合物を生産することと、

(i i) 式 (V) を有する化合物を還元して、下記式 (V I) :

【化 6 1】



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(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 25 の定義の通りである)
を有する化合物を生産することと、

(i i i) 式 (V I) を有する化合物を、下記式 (I X) :

【化 6 2】



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(式中、 R^1 は、請求項 25 の定義の通りである)

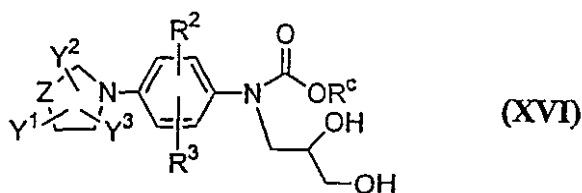
を有する化合物と反応させることと

を含む方法。

【請求項 27】

下記式 (X V I) :

【化 6 3】



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(式中、

R^c は、($C_1 \sim C_8$) アルキル基を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

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Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラールキル、ヘテロアリール、ヘテロアラールキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造と一緒に形成する)

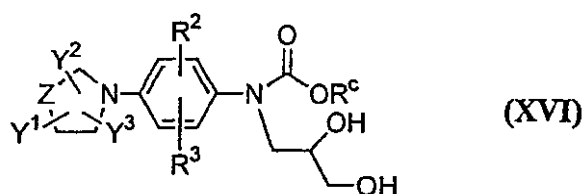
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を有する新規中間体。

【請求項 28】

請求項 27 に記載の下記式 (XVI) :

【化 64】



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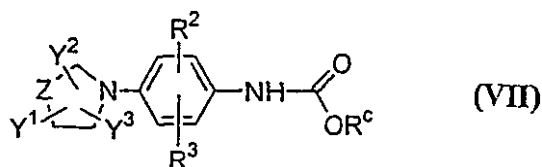
(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 27 の定義の通りである)

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を有する化合物の調製方法であって、以下の：

(i) 下記式 (VII) :

【化 65】



(VII)

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(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 27 の定義の通りである)

を有する化合物を、下記式 (XIV) :

【化 6 6】

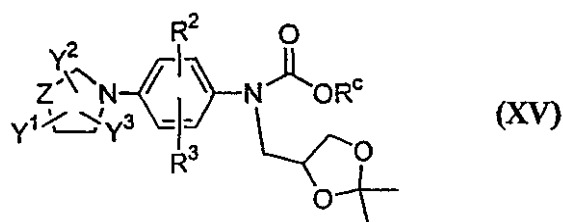


(式中、L は、脱離基を表す)

を有する化合物と反応させて、下記式 (X V) :

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【化 6 7】



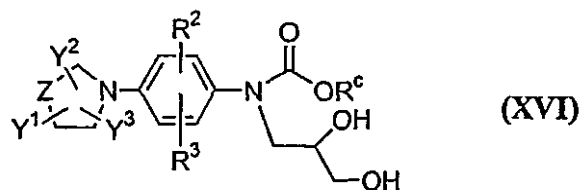
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(式中、R^c、Y¹、Y²、Y³、R²、R³ および Z は、請求項 2 7 の定義の通りである)

を有する化合物を生産することと、

(i i) 従来法を用いて式 (X V) を有する化合物中のアセトニド部分を加水分解して、下記式 (X V I) :

【化 6 8】



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(式中、R^c、Y¹、Y²、Y³、R²、R³ および Z は、請求項 2 7 の定義の通りである)

を有する化合物を生産することと

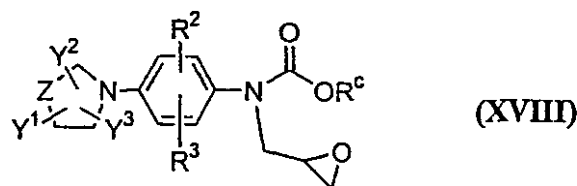
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を含む方法。

【請求項 2 9】

下記式 (X V I I I) :

【化 6 9】



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(式中、

 R^c は、($C_1 \sim C_8$) アルキル基を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の($C_1 \sim C_6$) アルキル基、またはハロ($C_1 \sim C_6$) アルキルを表す)を表し、

Z は、S、O、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

 Y^1 は、 $=O$ 、または $=S$ 基を表し、

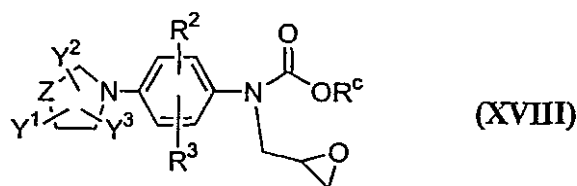
Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは($C_1 \sim C_6$) アルキル、ヒドロキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ($C_1 \sim C_6$) アルキル、アミノ($C_1 \sim C_6$) アルキル、モノ($C_1 \sim C_6$) アルキルアミノ、ジ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する新規中間体。

【請求項 30】

請求項 29 に記載の下記式 (XVIII) :

【化 7 0】



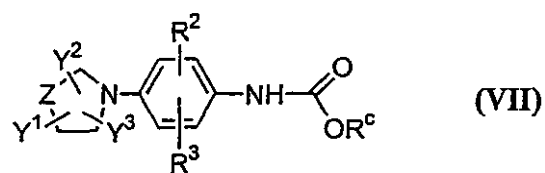
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(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 29 の定義の通りである)

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を有する化合物の調製方法であって、下記式（VII）：

【化 7 1】



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（式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 29 の定義の通りである）

を有する化合物を、下記式（XVII）：

【化 7 2】

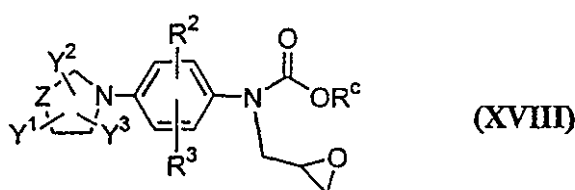


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（式中、 L は、脱離基を表す）

を有する化合物と反応させて、下記式（XVIII）：

【化 7 3】



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（式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、請求項 29 の定義の通りである）

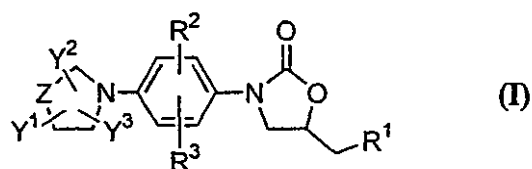
を有する化合物を生産することを含む方法。

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【請求項 31】

請求項 1 に記載の下記式（I）：

【化 7 4】



を有する化合物、および薬学的に許容可能なキャリア、希釈剤、賦形剤、または溶媒和物を含む薬学的組成物。 10

【請求項 3 2】

錠剤、カプセル、粉末、シロップ、溶液、または懸濁液の形態の、請求項 3 1 に記載の薬学的組成物。

【請求項 3 3】

細菌感染の治療方法であって、請求項 1 に記載の式 (I) を有する化合物を、該治療を必要とする患者に投与する患者に投与することを含む方法。

【請求項 3 4】

細菌感染の治療方法であって、請求項 3 1 または 3 2 に記載の薬学的組成物を、該治療を必要とする患者に投与することを含む方法。 20

【請求項 3 5】

請求項 6 に記載の化合物、および薬学的に許容可能なキャリア、希釈剤、賦形剤、または溶媒和物を含む薬学的組成物。

【請求項 3 6】

錠剤、カプセル、粉末、シロップ、溶液、または懸濁液の形態の、請求項 3 5 に記載の薬学的組成物。

【請求項 3 7】

細菌感染の治療方法であって、請求項 6 に記載の化合物を、該治療を必要とする患者に投与することを含む方法。

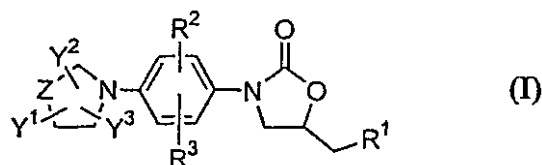
【請求項 3 8】

細菌感染の治療方法であって、請求項 3 5 または 3 6 に記載の薬学的組成物を、該治療を必要とする患者に投与することを含む方法。 30

【請求項 3 9】

下記式 (I) :

【化 7 5】



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(式中、
 Z は、 NR^b (ここで、 R^b は、水素を表す) を表し、
 Y^1 は、「=O」基を表し、
 Y^2 および Y^3 は、独立して、水素原子を表し、
 R^1 は、ハロ、アジド、イソチオシアネート、チオアルコール、 OR^4 、 NHR^4 、または $\text{N}(\text{R}^4)_2$ (ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、 $(\text{C}_1 \sim \text{C}_6)$ アルコキシカルボニル、 $(\text{C}_3 \sim \text{C}_6)$ シクロアルコキシチオカルボニル、 $(\text{C}_2 \sim$ 50

C₆) アルケニルオキシカルボニル、(C₂ ~ C₆) アルケニルカルボニル、アリールオキシカルボニル、(C₁ ~ C₆) アルコキシチオカルボニル、(C₂ ~ C₆) アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、-C(=O)-C(=O)-アルキル、-C(=O)-C(=O)-アリール、-C(=O)-C(=O)-アルコキシ、-C(=O)-C(=O)-アリールオキシ、-(C=S)-S-アルキル、-(C=S)-NH₂、-(C=S)-NH-アルキル、-C(=S)-N-(アルキル)₂、-C(=S)-NH-アルケニル、-(C=S)-(C=O)-アルコキシ、-(C=S)-(C=O)-アリールオキシ、-C(=S)-O-(C=O)-アルキル、-C(=S)-C(=S)-アルキル、-C(=S)-C(=S)-アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表し、

R² および R³ は、同じであるか、または異なり、独立して、水素、ハロゲン原子、(C₁ ~ C₆) アルキル基、ハロ (C₁ ~ C₆) アルキル、シアノ、ニトロ、SR^a、NR^a、OR^a (ここで、R^a は、置換もしくは無置換の (C₁ ~ C₆) アルキル基、またはハロ (C₁ ~ C₆) アルキルを表す) を表し、

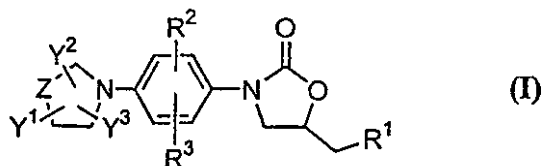
Zは、S、O、=CH、またはNR^b（ここで、R^bは、水素、あるいは置換もしくは無置換の(C₁～C₆)アルキル、(C₂～C₆)アルケニル、(C₁～C₆)シクロアルキル、(C₁～C₆)アルコキシ、アリール、アラルキル、アリールオキシ、(C₁～C₆)アルキルカルボニル、アリールカルボニル、(C₁～C₆)アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表す)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式（I）（式中、Zは、 NR^b （ここで、 R^b は、 α 位にてヒドロキシ基で置換した（ $\text{C}_1 \sim \text{C}_6$ ）アルキル基を表す）を表し、 Y^1 は、「=O」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表し、他のすべての記号は、上記定義の通りである）を、塩基と反応させることを含む方法。

【請求項 40】

下記式（Ⅰ）：

【化 7 6】



(式中、

Zは、NR^b（ここで、R^bは、置換もしくは無置換の（C₁～C₆）アルキルまたはアラルキルを表す）を表し、

Y^1 は、「=O」基を表し、

Y^2 および Y^3 は、独立して、水素原子を表し、

R¹ は、ハロ、アジド、イソチオシアネート、チオアルコール、OR⁴、NHR⁴、またはN(R⁴)₂（ここで、R⁴ は、水素原子、あるいはアシル、チオアシル、(C₁～C₆) アルコキシカルボニル、(C₃～C₆) シクロアルコキシチオカルボニル、(C₂～C₆) アルケニルオキシカルボニル、(C₂～C₆) アルケニルカルボニル、アリールオキシカルボニル、(C₁～C₆) アルコキシチオカルボニル、(C₂～C₆) アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、-C(=O)-C(=O)-ア

ルキル、 $-C(=O)-C(=O)-$ アリール、 $-C(=O)-C(=O)-$ アルコキシ、 $-C(=O)-C(=O)-$ アリールオキシ、 $-(C=S)-S-$ アルキル、 $-(C=S)-NH_2$ 、 $-(C=S)-NH-$ アルキル、 $-C(=S)-N-(\text{アルキル})_2$ 、 $-C(=S)-NH-$ アルケニル、 $-(C=S)-(C=O)-$ アルコキシ、 $-(C=S)-(C=O)-$ アリールオキシ、 $-C(=S)-O-(C=O)-$ アルキル、 $-C(=S)-C(=S)-$ アルキル、 $-C(=S)-C(=S)-$ アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

Z は、S、O、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表す)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式 (I) (式中、Z は、 NR^b (ここで、 R^b は、水素を表す)を表し、 Y^1 は、「 $=O$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表し、他のすべての記号は、上記定義の通りである)を、塩基およびハロゲン化アルキルと反応させることを含む方法。

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【請求項 4 1】

前記 R^a 上の置換基は、ヒドロキシ、ハロゲン、ニトロ、アミノ、アルコキシ、カルボキシ、またはシアノから選択される、請求項 1 に記載の化合物。

【請求項 4 2】

前記有機塩基の塩は、N, N'-ジアセチルエチレンジアミン、ベタイン、カフェイン、2-ジエチルアミノエタノール、2-ジメチルアミノエタノール、N-エチルモルホリン、N-エチルピペリジン、グルカミン、グルコサミン、ヒドラバミン、イソプロピルアミン、メチルグルカミン、ホルホリン、ピペラジン、ピペリジン、プロカイン、プリン、テオブロミン、トリエチルアミン、トリメチルアキン、トリプロピルアミン、トロメタミン、ジエタノールアミン、メグルミン、エチレンジアミン、N, N'-ジフェニルエチレンジアミン、N, N'-ジベンジルエチレンジアミン、N-ベンジルフェニルエチルアミン、コリン、水酸化コリン、ジシクロヘキシルアミン、メタホルミン、ベンジルアミン、フェニルエチルアミン、ジアルキルアミン、トリアルキルアミン、チアミン、アミノピリミジン、アミノピリジン、プリン、スペラミジンから選択される、請求項 7 に記載の薬学的に許容可能な塩。

【請求項 4 3】

前記キラル塩基の塩は、アルキルフェニルアミン、グリシノール、フェニルグリシノールから選択される、請求項 7 に記載の薬学的に許容可能な塩。

【請求項 4 4】

前記天然アミノ酸の塩は、グリシン、アラニン、バリン、ロイシン、イソロイシン、ノルロイシン、チロシン、シスチン、システイン、メチオニン、プロリン、ヒドロキシプロリン、ヒスチジン、オルチニン、リシン、アルギニン、セリン、スレオニン、フェニルアラニンから選択される、請求項 7 に記載の薬学的に許容可能な塩。

【請求項 4 5】

前記非天然アミノ酸、置換アミノ酸の塩は、D-異性体、グアニジン、置換グアニジン (ここで、置換基は、ニトロ、アミノ、アルキル (例えば、メチル、エチル、プロピル等)、アルケニル (例えば、エテニル、プロペニル、ブテニル等)、アルキニル (例えば、エ

チニル、プロピニル) から選択される) から選択される、請求項 7 に記載の薬学的に許容可能な塩。

【請求項 46】

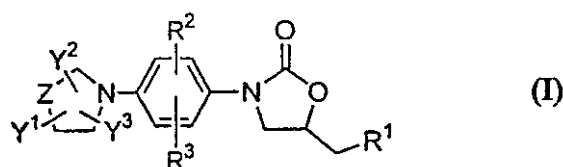
前記付加塩は、硫酸塩、硝酸塩、リン酸塩、過塩素酸塩、ホウ酸塩、ハロゲン化物、酢酸塩、酒石酸塩、マレイン酸塩、クエン酸塩、コハク酸塩、パルミチン酸塩、メタンスルホン酸塩、安息香酸塩、サリチル酸塩、ヒドロキシナフトエ酸塩、ベンゼンスルホン酸塩、アスコルビン酸塩、グリセロリン酸塩、ケトグルタル酸塩から選択される、請求項 7 に記載の薬学的に許容可能な塩。

【請求項 47】

下記式 (I) :

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【化 77】



(I)

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(式中、

R^1 は、ハロゲン原子を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、S、O、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、

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またはアリールオキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ ($C_1 \sim C_6$) アルキル、アミノ ($C_1 \sim C_6$) アルキル、モノ ($C_1 \sim C_6$) アルキルアミノ、ジ ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール

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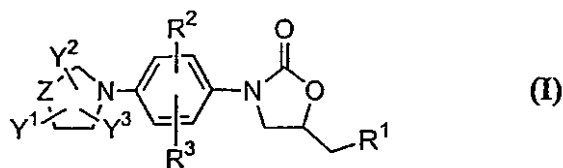
、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する) を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、式 (I) (式中、 R^1 は、ヒドロキシ基を表し、他のすべての記号は、上記定義の通りである) を、 PPH_3 または P (アルキル) $_3$ の存在下で、テトラハロメタン基と反応させることを含む方法。

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【請求項 48】

下記式 (I) :

【化 78】



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(式中、

 R^1 は、「SH」基を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

Z は、S、O、=CH、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

 Y^1 は、=O、または =S 基を表し、

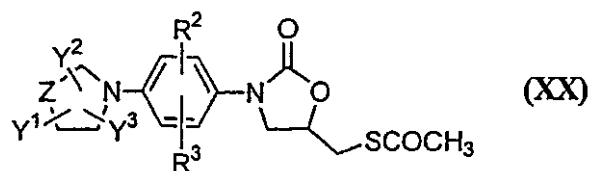
Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S 基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ ($C_1 \sim C_6$) アルキル、アミノ ($C_1 \sim C_6$) アルキル、モノ ($C_1 \sim C_6$) アルキルアミノ、ジ ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物の調製方法であって、以下の：

(i) 式 (I) (式中、 R^1 は、ハロゲン原子を表す) を有する化合物を、塩基およびチオ酢酸と反応させて、下記式 (XX) :

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【化 7 9】



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(式中、すべての記号は、上記定義の通りである)

を有する化合物を生産することと、

(i i) 式 (X X) を有する化合物を、塩基と反応させて、式 (I) (式中、 R^1 は、「SH」基を表し、他のすべての記号は、上記定義の通りである) を有する化合物を生産することと

を含む方法。

【請求項 4 9】

細菌感染を治療するための、式 (I) を有する化合物の使用であって、該治療を必要とする患者に、治療上有効な量の請求項 1 に記載の式 (I) を有する化合物を投与することを含む使用。

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【請求項 5 0】

細菌感染を治療するための、化合物の使用であって、該治療を必要とする患者に、請求項 3 1 または 3 2 に記載の薬学的組成物を投与することを含む使用。

【請求項 5 1】

細菌感染を治療するための、式 (I) を有する化合物の使用であって、該治療を必要とする患者に、治療上有効な量の請求項 6 に記載の式 (I) を有する化合物を投与することを含む使用。

【請求項 5 2】

細菌感染を治療するための、化合物の使用であって、該治療を必要とする患者に、請求項 3 5 または 3 6 に記載の薬学的組成物を投与することを含む使用。

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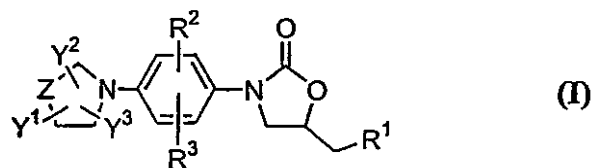
【発明の詳細な説明】

【技術分野】

【0 0 0 1】

本発明は、新規オキサゾリジノン化合物、それらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、およびそれらを含む含有する薬学的組成物に関する。より詳細には、本発明は、下記一般式 (I) :

【化 8 0】



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【0 0 0 2】

を有する新規オキサゾリジノン、それらの誘導体、それらの類縁体、それらの互変異性型

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、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、およびそれらを含む薬学的組成物に関する。

【0003】

本発明はまた、上記新規化合物、それらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、およびそれらを含む薬学的組成物の調製方法に関する。

【0004】

本発明はまた、新規中間体、それらの調製方法、および式 (I) を有する化合物の調製におけるそれらの使用に関する。

【背景技術】

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【0005】

オキサゾリジノンは、抗細菌物質 (J. Med. Chem., 1996, 39, 673)、抗ヒスタミンおよび抗アレルギー剤 (欧州特許第 291, 244 号)、抗痙攣薬 (ドイツ国特許第 3, 915, 184 号)、認知障害の治療、抗精神病薬、抗血小板凝集因子、抗うつ薬、鎮静薬、催眠薬、モノアミンオキシダーゼ阻害剤 (国際公開第 97/13768 号) として、ならびに不斉合成におけるキラル助剤 (Aldrichimica Acta, 1982, 15 23) として有用である。

【0006】

ペニシリンの発見以来、製薬会社は、広範囲の細菌感染と戦うための百を超える抗細菌剤を生産してきた。ここ数年では、これらの抗生物質の乱用により、これらの抗生物質の幾つかに対する細菌耐性が迅速に出現している。これらの病原菌中の多剤耐性はまた、より有毒な臨床分離を引き起こす突然変異に起因し得る。最も気がかりな出来事は、重症グラム陽性感染に対する最終手段の作用物質と一般にみなされている抗生物質であるバンコマイシンに対する耐性の獲得であった。この高まる多剤耐性は、近年、おそらく新規メカニズムによりこれらの細菌を阻害または死滅させる、新規構造種の抗生物質に関する研究への関心を再びかきたたせた。

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【0007】

広範囲の問題は、世界的に見出される臨床の分離株の中で、より有毒なメチシリン耐性黄色ブドウ球菌 (Staphylococcus aureus) (MRSA) の発生の増加である。バンコマイシン耐性生物と同様に、多くの MRSA 株が既知の抗生物質のほとんどに耐性であるが、MRSA 株は、依然としてバンコマイシンに対して感受性であった。しかしながら、バンコマイシン耐性臨床分離株の報告の増加、および細菌耐性の問題の増大に関して、出現段階の現在問題となっているグラム陽性生物に対して有効な新規化合物が緊急に必要である。

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【0008】

近年、幾つかのオキサゾリジノンが開発され、これは、クロラムフェニコールおよびリンコマイシンが結合する部位近傍の 50S リボソームサブユニットに結合することでタンパク質合成を阻害するが、それらの作用機序は、これら 2 つの抗生物質とは機構的に異なっている。

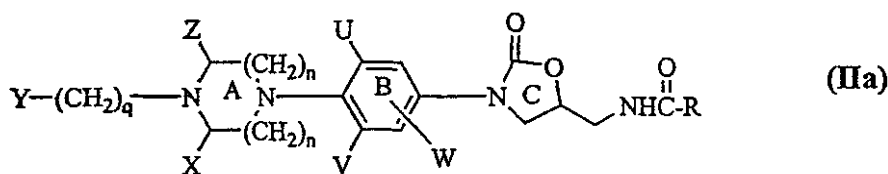
【0009】

本発明の新規種のオキサゾリジノンは、*in vitro* および *in vivo* の両方で、多数の耐性および感受性グラム陽性株の治療に有用である。従来技術に記載されるこれまで既知の化合物の幾つかを以下に概要する：

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(i) 国際特許出願第 93/23384 は、下記式 (IIa)：

【化 81】



【0010】

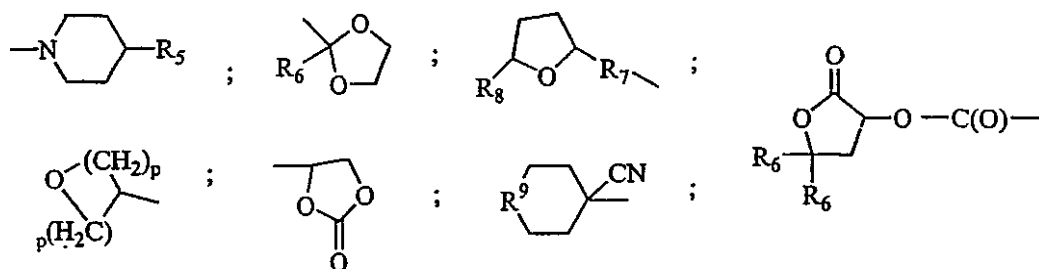
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(式中、

Yは、水素原子、(C₁～C₆)アルキルまたはアリール、OH、O(C₁～C₆)アルキル、O-ビニル、O-フェニル、O-C(=O)(C₁～C₆)アルキル、-O-C(=O)-フェニル(フェニルは、1～3個のF、Cl、OCH₃、OH、NH₂、または(C₁～C₄)アルキルで置換することができる)またはO-C(=O)-O-CH₃、S-(C₁～C₆)アルキル、SO₂-(C₁～C₆)アルキル、-SO₂-N(R³)₂(ここで、R³は、独立して、水素、(C₁～C₄)アルキルまたはフェニル(ここで、1～3個のF、Cl、OCH₃、OH、NH₂、または(C₁～C₄)アルキルで置換することができる)である)、-C(=O)-(C₁～C₆)アルキル、-C(=O)-O-(C₁～C₆)アルキル、-C(=O)-N(R³)₂、-C(=O)-CH(R⁴)N(R³)₂、-C(=O)-CH(R⁴)-NH-C(NH)-NH₂(ここで、R⁴は、アミノ酸側鎖である)、-N(R³)₂、-N(CH₂)_m(ここで、mは、2～6であり、窒素原子とともに環構造形成し、1つまたはそれより多い炭素原子をS、O、またはNR³で置換することができる)、-C(CH₃)=N-ORを表すか、あるいはYは、以下に付与する基：

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【化82】



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【0011】

(式中、

R⁵は、OH、OCH₃、CH₂OH、CH₂OCH₃、CO₂CH₃、CO₂C₂H₅であり、
 R⁶は、CH₃または水素を表し、
 R⁷は、CH₂またはC(=O)を表し、
 R⁸は、水素または=Oを表し、
 pは、1または2であり、
 R⁹は、O、S、S(O)、SO₂、CH₂、NH、NCH₃、NC₂H₅、NCHO、NCOCH₃、またはNCO₂CH₃を表す)
 のいずれかを表し(ここで、上記(C₁～C₆)アルキルの存在はそれぞれ、1つまたはそれより多いF、Cl、Br、I、OR¹、COOR¹、CN、SR¹、またはR¹(ここでR¹は、水素または(C₁～C₄)アルキルである)で置換してもよい)、

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XおよびZは、独立して、(C₁～C₆)アルキル、(C₃～C₁₂)シクロアルキル、または水素であるか、あるいはXおよびZは、(C₀～C₃)架橋基を形成し、好ましくはXおよびZは水素であり、

U、V、およびWは、独立して、(C₁～C₆)アルキル、F、Cl、Br、水素、あるいは1つもしくはそれより多いF、Cl、BrまたはIで置換された(C₁～C₆)アルキルであり、好ましくはUおよびVはFであり、Wは水素であり、

Rは、水素、(C₁～C₁₂)アルキル、(C₃～C₁₂)シクロアルキル、(C₁～C₆)アルコキシ、1つもしくはそれより多いF、Cl、Br、IまたはOHで置換された(C₁～C₆)アルキルであり、

nは、1または2であり、

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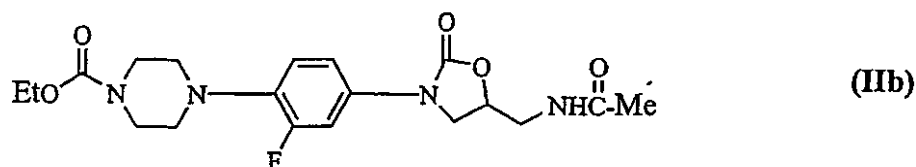
qは、0～4である)

を有する化合物を開示している。

【0012】

この種類の化合物の例は、下記式(IIb)：

【化83】



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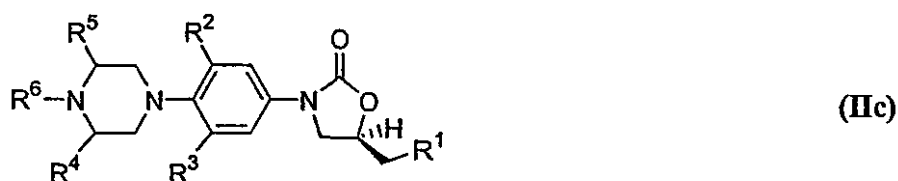
【0013】

で示される。

【0014】

(ii) 国際特許出願第98/01447号は、下記式(IIc)：

【化84】



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【0015】

(式中、

R¹は、-NHC(=O)R^a (ここで、R^aは、(C₁～C₄)アルキルを表す)を表し、

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R²およびR³は、水素およびフルオロを表し、

R⁴およびR⁵は、独立して、水素またはメチルを表し、

R⁶は、(C₁～C₄)アルキル(任意に置換された)、ハロ、トリフルオロメチル、(C₁～C₄)アルキル-S(O)_n- (ここで、nは、0、1または2である)、(C₁～C₄)アルキルSO₂アミノ、(C₁～C₄)アルカノイルアミノ、カルボキシ、ヒドロキシ、アミノ、(C₁～C₄)アルキルアミノ、ジ- (C₁～C₄)アルキルアミノ、(C₁～C₄)アルコキシカルボニル、カルバモイル、N- (C₁～C₄)アルキルカルバモイル、ジ- (N- (C₁～C₄)アルキル)カルバモイル (ここで、最後の2つの言及したカルバモイル基中の基における(C₁～C₄)アルキルは、ヒドロキシ、(C₁～

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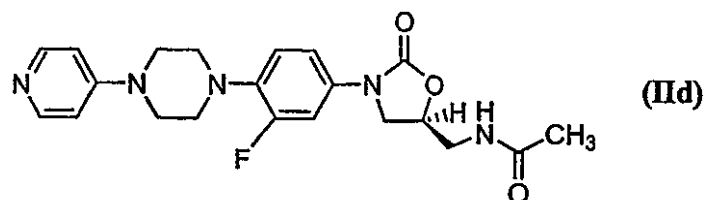
C₄) アルコキシ、または (C₁ ~ C₄) アルコシカルボニルで任意に置換される)、
(C₂ ~ C₄) アルケニル (カルボキシまたは (C₁ ~ C₄) アルコシカルボニルで任意に置換された)、(C₁ ~ C₄) アルコキシ、シアノ、またはニトロ基で任意に置換されたピリジルを表す)

を有する化合物を開示している。

【0016】

この種類の化合物の例は、下記式 (IId) :

【化85】



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【0017】

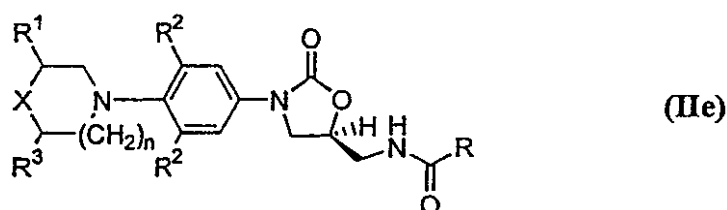
で示される。

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【0018】

(iii) 国際特許出願第 95/07271 号は、下記式 (IIe) :

【化86】



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【0019】

(式中、

Xは、O、S、SO、SO₂、SNR¹⁰、またはSONR¹⁰を表し、

Rは、水素、以下の：F、Cl、ヒドロキシ、(C₁ ~ C₈) アルコキシ、(C₁ ~ C₈) アシルオキシまたは-OCH₂Phで任意に置換された(C₁ ~ C₈) アルキルを表すか、あるいはRは、(C₃ ~ C₆) シクロアルキル、アミノ、(C₁ ~ C₈) アルキルアミノ、(C₁ ~ C₈) ジアルキルアミノ、または(C₁ ~ C₈) アルコキシを表し、

R¹は、水素(但し、XがOである場合、R¹は水素であり得ることを除く)、CH₃、シアノ、-CO₂H、CO₂R、または(CH₂)_mR¹¹(mは、1または2である)を表し、

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R²は、独立して、水素、F、またはClを表し、

R³は、水素、またはCH₃を表し、

R¹⁰は、独立して、水素、(C₁ ~ C₄) アルキル(クロロ、フルオロ、ヒドロキシ、(C₁ ~ C₈) アルコキシ、アミノ、(C₁ ~ C₈) アルキルアミノ、または(C₁ ~ C₈) ジアルキルアミノで任意に置換された)、またはp-トルエンシルホニルを表し、

R¹¹は、水素、ヒドロキシ、OR、OCOR、NH₂、NHCOR、またはN(R¹⁰)₂を表し、

nは、0、1または2である)

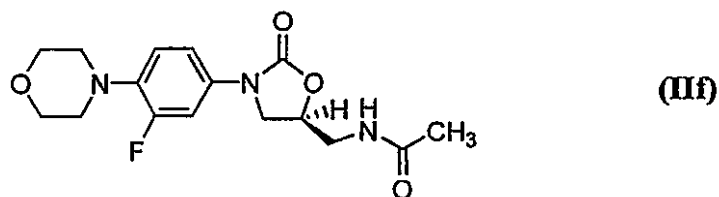
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を有する化合物を開示している。

【0020】

この種類の化合物の例は、下記式 (II f) :

【化87】



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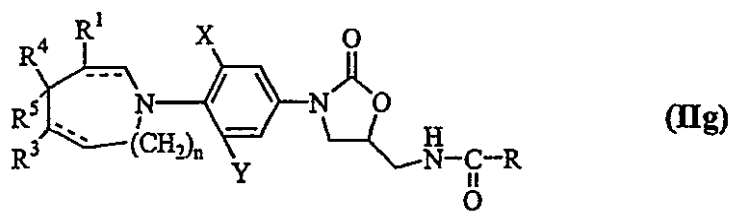
【0021】

で示される。

【0022】

(iv) 国際特許出願第95/25106号は、下記式 (II g) :

【化88】



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【0023】

(式中、

Rは、水素原子、(C₁ ~ C₈) アルキル、(C₃ ~ C₆) シクロアルキル、アミノ、(C₁ ~ C₈) アルキルアミノ、(C₁ ~ C₈) ジアルキルアミノ、(C₁ ~ C₈) アルコキシ、または(C₁ ~ C₈) ハロゲンアルキルを表し、

R¹ および R³ は、それぞれ独立して、水素原子、ハロゲン原子、(C₁ ~ C₈) アルキル、(C₃ ~ C₆) シクロアルキル、-(CH₂)_m-OR^{1 1}、または-C(=O)-R^{4 1}を表し、

XおよびYは、それぞれ独立して、水素原子、ハロゲン原子を表し、

R⁴ および R⁵ は、それぞれ独立して、水素原子、(C₁ ~ C₈) アルキル、(C₁ ~ C₈) アルコキシ、(C₁ ~ C₈) アルキルチオ、-(CH₂)_m-OR^{5 1}、-O-(CH₂)_m-OR^{5 1}、-NR^{4 2}R^{5 2}、-N=CH-NR^{4 4}R^{5 5}、-C(=O)-NR^{4 2}R^{5 2}、または-(CH₂)_m-C(=A)-R^{4 1}を表すか、あるいはそれらは一緒になって、=O、=NR^{4 3}、=S、=CR^{4 4}R^{5 4}、または窒素原子、酸素原子および硫黄原子からなる群から選択される1~3個のヘテロ原子を有する、任意に置換された不飽和もしくは飽和の5または6員の複素環を形成してもよく、

R^{1 1} および R^{1 2} は、それぞれ独立して、水素原子、(C₁ ~ C₈) アルキル、またはメトキシメチルであり、

R^{4 1} は、水素原子、-(CH₂)_m-OH、(C₁ ~ C₈) アルキル、(C₁ ~ C₈) アルコキシ、-O-CH₂-O-C(=O)-R^{1 1}、または-(CH₂)_m-C(=O)-OR^{1 1}であり、

R^{4 2} および R^{5 2} は、それぞれ独立して、水素原子、-(CH₂)_m-OR^{1 1}、(C₁ ~ C₈) アルキル、-C(=O)-R^{4 1}、-C(=O)-NR^{1 1}R^{1 2}、-(CH₂)_p-フェニル、チアゾール-2-イルであるか、あるいはそれらは一緒になって、ピ

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ロリジノ基、ピペリジノ基、ピペラジノ基、モルホリノ基、またはチオモルホリノ基（それらはそれぞれ、 $(C_1 \sim C_8)$ アルキル、または $-(CH_2)_m-OH$ で置換されてもよい）を形成してもよく、

$R^{4\ 3}$ は、水素原子、 $-OR^{5\ 1}$ 、 $(C_1 \sim C_8)$ アルキル、 $(C_1 \sim C_8)$ アルコキシ、 $-(CH_2)_p$ -フェニル、 $NR^{4\ 2}R^{5\ 2}$ 、 $-NH-C(=NH)-NH_2$ 、 $[1, 2, 4]$ トリアゾール-4-イル、またはシアノであり、

$R^{4\ 4}$ および $R^{5\ 5}$ は、それぞれ独立して、水素原子、 $(C_1 \sim C_8)$ アルキル、 $-C(=O)-R^{4\ 1}$ 、または $-(CH_2)_p$ -フェニルを表し、

$R^{5\ 1}$ は、水素原子、1つまたはそれより多いヒドロキシで置換された $(C_1 \sim C_8)$ アルキル、 $(C_2 \sim C_8)$ アルケニル、 $(C_1 \sim C_8)$ ハロゲンアルキル、 $-(CH_2)_m-OR^{1\ 1}$ 、 $-(CH_2)_m-C(=O)-R^{4\ 1}$ 、 $-C(=O)-(CH_2)_m-OR^{4\ 4}$ 、またはトシルであり、

A は、酸素原子、またはエチレンケタールであり、

--- は、二重結合または単結合であり、

m は、それぞれ独立して、0、1 または 2 であり、

n は、0 または 1 であり、

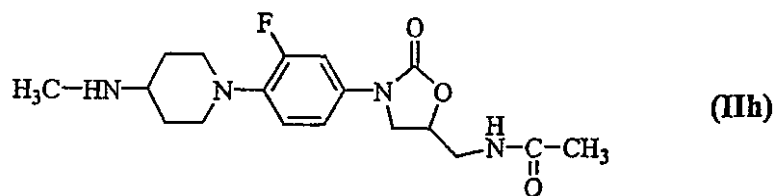
p は、それぞれ独立して、1、2、3、または 4 である）

を有する化合物を開示している。

【0024】

この種類の化合物の例は、下記式 (IIh) :

【化89】



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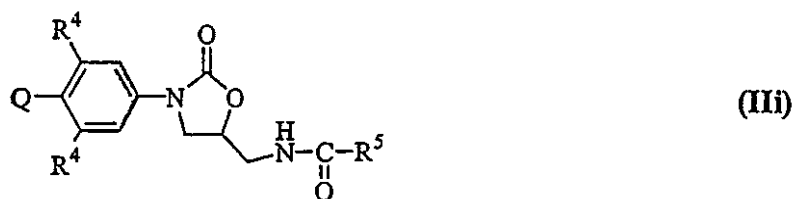
【0025】

で示される。

【0026】

(v) 国際特許出願第 96/13502 号は、下記式 (IIi) :

【化90】



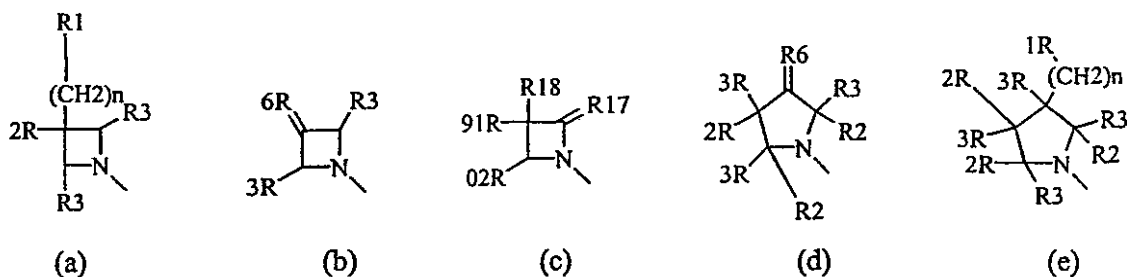
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【0027】

(式中、

Q は、下記構造 (a)、(b)、(c)、(d)、および (e) :

【化91】



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【0028】

から選択され、

R^1 は、HまたはF、 OR^7 、 SR^7 、 NR^8R^9 、CN、 $(C_1 \sim C_4)$ アルコシカルボニル、カルボキサミド、以下の：フッ素、ヒドロキシ、 $(C_1 \sim C_4)$ アルコシ、 $(C_1 \sim C_4)$ アシルオキシで任意に置換された $(C_1 \sim C_4)$ アシル、 $NHO(C_1 \sim C_6)$ アルキル、または $NHOCH_2Ph$ 、 NSO_2R （ここで、Rは、1つまたはそれより多いF、Cl、 $(C_1 \sim C_6)$ アルコシ、またはフェニルで任意に置換された $(C_1 \sim C_6)$ アルキルである）であり、

R^2 は、独立して、水素またはフッ素、ヒドロキシ、 OR （ここで、Rは、 $(C_1 \sim C_6)$ アルキルである）、 $(C_1 \sim C_4)$ アルキル、またはPhから選択され、

R^3 は、独立して、H、フェニル、ピリジル、または $(C_1 \sim C_3)$ アルキル（これは、F、Cl、ヒドロキシ、 $(C_1 \sim C_3)$ アルコシカルボニル、 $(C_1 \sim C_3)$ アシルオキシ、 $(C_1 \sim C_3)$ アルコシ、または $N(C_1 \sim C_4)$ アルキル）₂ から選択され、

R^4 は、独立して、H、 OCH_3 、F、またはClであり、

R^5 は、水素、以下の：F、Cl、ヒドロキシ、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシで任意に置換された $(C_1 \sim C_8)$ アルキル、 $(C_3 \sim C_6)$ シクロアルキル、アミノ、 $(C_1 \sim C_8)$ アルキルアミノ、 $(C_1 \sim C_8)$ ジアルキルアミノ、 $(C_1 \sim C_8)$ アルコシであり、

R^6 は、O、S、 NR^{10} 、 $CR^{11}R^{12}$ 、 $(OR)_2$ （ここで、Rは、 $(C_1 \sim C_6)$ アルキルである）、 $O(CH_2)_mO$ 、 $(SR)_2$ （ここで、Rは、 $(C_1 \sim C_6)$ アルキルである）、 $S(CH_2)_mS$ であり、

R^7 は、H、以下の：F、Cl、 $-CN$ 、OH、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシ、 $(C_1 \sim C_8)$ アルコシカルボニル、フェニルの1つまたは複数で任意に置換された $(C_1 \sim C_8)$ アルキル、以下の：ヒドロキシ、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシの1つまたは複数で任意に置換された $(C_1 \sim C_8)$ アシル、 $(C_1 \sim C_8)$ アルコシカルボニル、カルボキサミド窒素上で $(C_1 \sim C_4)$ アルキルまたはフェニルで任意に置換されたカルボキサミド、以下の：ハロゲン、CN、 $(C_1 \sim C_3)$ アルコシ、 $(C_1 \sim C_3)$ アルコシカルボニル、Fもしくは $(C_1 \sim C_3)$ アルコシの1つまたは複数で任意に置換された $(C_1 \sim C_4)$ アルキルの1つまたは複数で任意に置換されたフェニルであり、

R^8 および R^9 は、独立して、H、以下の：F、Cl、 $-CN$ 、OH、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシ、 $(C_1 \sim C_8)$ アルコシカルボニル、フェニルの1つまたは複数で任意に置換された $(C_1 \sim C_8)$ アルキル、以下の：ヒドロキシ、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシ、アミノ、 $(C_1 \sim C_4)$ アシルアミノ、アミノ $(C_1 \sim C_4)$ アシルアミノの1つまたは複数で任意に置換された $(C_1 \sim C_8)$ アシル、以下の：F、Cl、ヒドロキシ、 $(C_1 \sim C_8)$ アルコシ、 $(C_1 \sim C_8)$ アシルオキシ、アミノ、 $(C_1 \sim C_4)$ アシルアミノ、 $(C_1 \sim C_4)$ アルコシカルボニルアミノ、 $(C_1 \sim C_8)$ アルコシカルボニル、ベンジルオシカルボニル、 t -ブトキシカルボニルの1つまたは複数で任意に置換されたベンジル、カルボキサミ

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ド窒素上で ($C_1 \sim C_4$) アルキルまたはフェニルで任意に置換されたカルボキサミド、トリフルオルアセチル、CO ($(C_1 \sim C_6)$ アルキル) であり、 R^{10} は、H、OR⁷、NHR⁷、フェニルで任意に置換された ($C_1 \sim C_8$) アルキルであり、

R^{11} および R^{12} は、独立して、H、F、ハロゲン、ヒドロキシ、($C_1 \sim C_4$) アルコキシ、($C_1 \sim C_4$) アルコキシカルボニル、フェニルで任意に置換された ($C_1 \sim C_4$) アルキル、($C_1 \sim C_8$) アシル、($C_1 \sim C_4$) アルコキシカルボニル、CN から選択され、

R^{17} は、O または S であり、

R^{18} および R^{19} が、独立して、H、ハロゲン、ヒドロキシ、($C_1 \sim C_4$) アルコキシで任意に置換された ($C_1 \sim C_4$) アルキル、OH、ヒドロキシまたは ($C_1 \sim C_4$) アルコキシで任意に置換された ($C_1 \sim C_4$) アルコキシ、NR⁸R⁹、-OC(O) ($C_1 \sim C_4$) アルキルから選択され、

R^{20} は、H、CH₃ であり、

n は、0 または 1 であり、

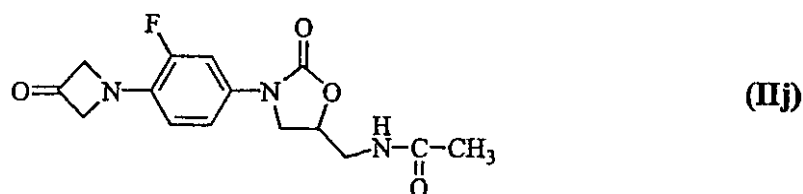
m は、2 または 3 である

を有する化合物を開示している。

【0029】

この種類の化合物の例は、下記式 (IIj) :

【化92】



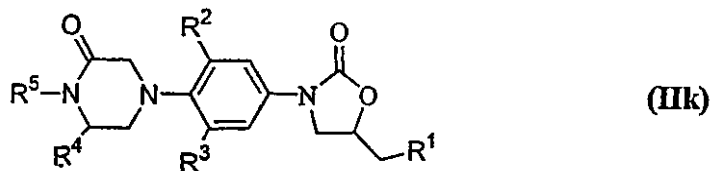
【0030】

で示される。

【0031】

(vi) 国際特許出願第 97/27188 号は、下記式 (IIk) :

【化93】



【0032】

(式中、

R^1 は、式 -NHC(=O) ($C_1 \sim C_4$) アルキル、-NHS(O)_n ($C_1 \sim C_4$) アルキル (ここで、n は、0、1、または 2 である) であるか、あるいは R^1 は、ヒドロキシであり、

R^2 および R^3 は、独立して、水素またはフルオロであり、

R^4 は、水素、メチル、エチル、またはオキソであり、

R^5 は、水素、($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_2 \sim C_6$) ア

ルキニルであるか、あるいは式 $R^6 (CH_2)_m$ (ここで、 m は、1～4であり、 R^6 は、トリフルオロメチル、ジフルオロメチル、フルオロメチル、 $(C_1 \sim C_4)$ アルコキシ、 $(C_1 \sim C_4)$ アルキル、 $S(O)_p$ (ここで、 p は、0、1、または2である)、 $(C_1 \sim C_6)$ アルカノイルオキシ、ジ- $(N-(C_1 \sim C_4)$ アルキル)アミノ、 $N-(C_1 \sim C_4)$ アルキル $(C_1 \sim C_4)$ アルカノイルアミノ、シアノ、カルボキシ、 $(C_1 \sim C_4)$ アルコキシカルボニル、カルバモイル、-ジ- $(N-(C_1 \sim C_4)$ アルキル)カルバモイル、 $N-(C_1 \sim C_4)$ アルキル $(C_1 \sim C_4)$ アルカンスルホンアミド、 $N^1-(C_1 \sim C_4)$ アルキル-ジ- $(N^3-(C_1 \sim C_4)$ アルキル)ウレイドであるか、または式 $-OC(=O)NR(R^8)$ または $N(R^9)SO_2NR^7(R^8)$ (ここで、 R^7 および R^8 は、独立して、水素または $(C_1 \sim C_4)$ アルキルであり、 R^9 は、 $(C_1 \sim C_4)$ アルキルである) を有するものであるか、あるいは m は、2～4であり、 R^6 は、ヒドロキシ、 $(C_1 \sim C_4)$ アルカノイルアミノ、アミノ、 $(C_1 \sim C_4)$ アルキルアミノ、 $(C_1 \sim C_4)$ アルカンスルホンアミド、ウレイド、ジ- $(N^3-(C_1 \sim C_4)$ アルキル)ウレイドであるか、または式 $NHSO_2NR^7(R^8)$ を有するものである) を有する化合物を開示している。

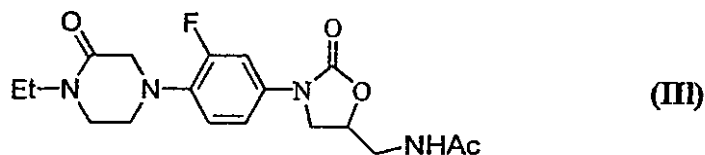
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【0033】

この化合物の例は、下記図 (III) :

【化94】

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【0034】

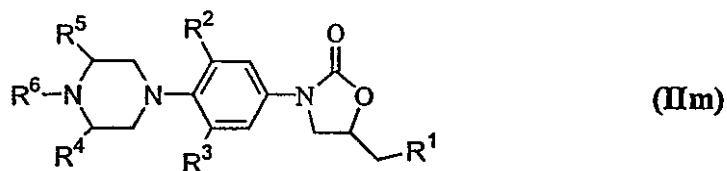
で示される。

【0035】

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(vii) 国際特許出願第98/01446号は、下記式 (IIIm) :

【化95】



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【0036】

(式中、

 R^1 は、式 $-NHC(=O)R^a$ (ここで、 R^a は、 $(C_1 \sim C_4)$ アルキルである) を有するものであり、 R^2 および R^3 は、独立して、水素またはフルオロであり、 R^4 および R^5 は、独立して、水素またはメチルであり、 R^6 は、単環ヘテロ原子として2個または3個の環窒素原子を含有し、かつ $(C_1 \sim C_4)$ アルキル (任意に置換された)、ハロ、トリフルオロメチル、 $(C_1 \sim C_4)$ アルキル $S(O)_n$ (ここで、 n は、0、1、または2である)、 $(C_1 \sim C_4)$ アルキル $S(O)_2$ アミノ、 $(C_1 \sim C_4)$ アルキルアミノ、カルボキシ、ヒドロキシ、アミノ、 $(C_1$

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～C₄) アルキルアミノ、ジ(C₁～C₄) アルキルアミノ、(C₁～C₄) アルコキシカルボニル、カルバモイル、N-(C₁～C₄) アルキルカルバモイル、-ジー(N-(C₁～C₄) アルキル)カルバモイル(ここで、最後の2つの言及したカルバモイル置換基中の(C₁～C₄) アルキル基(単数または複数)は、ヒドロキシ、(C₁～C₄) アルコキシ、または(C₁～C₄) アルコキシカルボニルで任意に置換される)、(C₂～C₄) アルケニル(カルボキシまたは(C₁～C₄) アルコキシカルボニルで任意に置換された)、(C₁～C₄) アルコキシ、シアノ、またはニトロで任意に置換された6員のヘテロアリール環である)

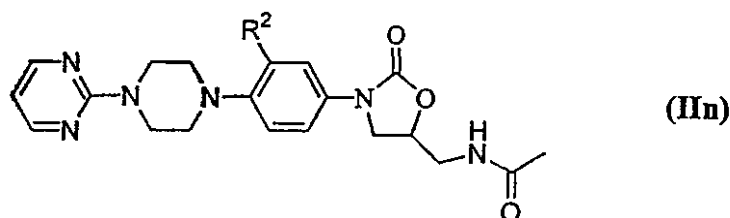
を有する化合物を開示している。

【0037】

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この化合物の例は、下記図(II n)：

【化96】



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【0038】

で示される。

【発明の開示】

【発明が解決しようとする課題】

【0039】

MRSA、連鎖球菌(streptococci)、および腸球菌(enterococci)のようなグラム陽性好気細菌、ならびにバクテロイデス(Bacteroides)種、クロストリジウム(Clostridia)種のような嫌気生物、およびヒト型結核菌(Mycobacterium tuberculosis)、鳥型結核菌(Mycobacterium avium)およびミコバクテリウム(Mycobacterium)種のような抗酸性細菌を含む、多数のヒトおよび獣医学的病原体に対して有効な新規化合物を開発する目的で、本発明者等は、上記生物に対して有効な新規化合物を開発することに本発明者等の研究の焦点を当てた。この方向での努力により、上記に定義するように一般式(I)を有する化合物の調製をもたらした。

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【課題を解決するための手段】

【0040】

本発明は、毒作用がないか、あるいは毒作用が減少された、上記に定義するような一般式(I)を有する新規オキサゾリジノン、およびそれらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、ならびにそれらを含む薬学的組成物、または増大した活性を有するそれらの混合物を提供する。

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【0041】

上記に定義するような一般式(I)を有する新規オキサゾリジノン、ならびにそれらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、およびそれらの薬学的に許容可能な溶媒和物の調製方法についても記載する。

【0042】

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本発明の態様は、適切なキャリア、溶媒、希釈剤およびかかる組成物を調製する際に通常使用される他の媒体と組み合わせた、一般式（I）を有する化合物、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、それらの薬学的に許容可能な溶媒和物、またはそれらの混合物を含有する薬学的組成物を提供することである。

【0043】

式（VI）、（VII）、（X）、（XVI）、（XVII）を有する新規中間体、ならびにそれらの調製方法、および式（I）を有する化合物の調製におけるそれらの使用も提供する。

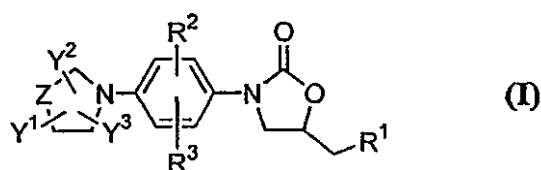
【発明を実施するための最良の形態】

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【0044】

本発明は、下記式（I）：

【化97】



(I)

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【0045】

（式中、

R^1 は、ハロ、アジド、チオアルコール、イソチオシアネート、 OR^4 、 NHR^4 、または $N(R^4)_2$ （ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、 $(C_1 \sim C_6)$ アルコキシカルボニル、シクロ $(C_3 \sim C_6)$ アルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシカルボニル、 $(C_2 \sim C_6)$ アルケニルカルボニル、アリールオキシカルボニル、 $(C_1 \sim C_6)$ アルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、 $-C(=O)-C(=O)-$ 、 $(C_1 \sim C_6)$ アルキル、 $-C(=O)-C(=O)-$ アリール、 $-C(=O)-C(=O)-$ $(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-C(=O)-$ アリールオキシ、 $-(C=S)-S-(C_1 \sim C_6)$ アルキル、 $-(C=S)-NH_2$ 、 $-(C=S)-NH-(C_1 \sim C_6)$ アルキル、 $-C(=S)-N-(C_1 \sim C_6)$ （アルキル） $_2$ 、 $-C(=S)-NH-(C_2 \sim C_6)$ アルケニル、 $-(C=S)-(C=O)-(C_1 \sim C_6)$ アルコキシ、 $-(C=S)-(C=O)-$ アリールオキシ、 $-C(=S)-O-(C=O)-(C_1 \sim C_6)$ アルキル、 $C(=S)-C(=S)-(C_1 \sim C_6)$ アルキル、 $-C(=S)-C(=S)-$ アリール、チオモルホリニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す）を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a （ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す）を表し、

Z は、S、O、 $=CH$ 、または NR^b （ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す）を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ

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、アミノ、=O、=S基、あるいは(C₁～C₆)アルキル、ヒドロキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシカルボニル、カルボキシ(C₁～C₆)アルキル、(C₁～C₆)アルキルスルホニル、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C₆)アルキル、アミノ(C₁～C₆)アルキル、モノ(C₁～C₆)アルキルアミノ、ジ(C₁～C₆)アルキルアミノ、アリールアミノ、(C₁～C₆)アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y²およびY³はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する化合物、その誘導体、その類縁体、その互変異性型、その立体異性体、その多形、その薬学的に許容可能な塩、またはその薬学的に許容可能な溶媒和物に関する。

【0046】

R⁴で表される適切な基は、水素原子、(C₁～C₇)アシル基(例えば、-C(=O)H、-C(=O)CH₃、-C(=O)CH₂CH₃、-C(=O)(CH₂)₂CH₃、-C(=O)(CH₂)₃CH₃、-C(=O)(CH₂)₄CH₃、-C(=O)(CH₂)₅CH₃、-C(=O)Ph等)(アシル基は、置換されてもよい)、チオ(C₁～C₇)アシル基(例えば、-C(=S)H、-C(=S)CH₃、-C(=S)CH₂CH₃、-C(=S)Ph等)(チオアシル基は、置換されてもよい)、線状もしくは分岐状であり得る(C₁～C₆)アルキル基を含有する(C₁～C₆)アルコキシカルボニル基(例えば、メトキシカルボニル、エトキシカルボニル、プロポキシカルボニル、イソプロポキシカルボニル等)((C₁～C₆)アルコキシカルボニル基は、置換されてもよい)、シクロ(C₃～C₆)アルコキシチオカルボニル基(例えば、シクロプロポキシチオカルボニル、シクロブトキシチオカルボニル等(シクロ(C₃～C₆)アルコキシチオカルボニルは、置換されてもよい)、(C₂～C₆)アルケニルカルボニル(例えば、エテニルカルボニル、プロペニルカルボニル、ブテニルカルボニル等)((C₂～C₆)アルケニルカルボニルは、置換されてもよい)、(C₂～C₄)アルケニルオキシカルボニル基(例えば、エテニルオキシカルボニル、プロペニルオキシカルボニル、ブテニルオキシカルボニル等)((C₂～C₆)アルケニルオキシカルボニルは、置換されてもよい)、アリールオキシカルボニル基(例えば、フェノキシカルボニル、ベンジルオキシカルボニル基等)(アリールオキシカルボニル基は、置換されてもよい)、(C₁～C₆)アルコキシチオカルボニル基(例えば、CH₃O-C(=S)-、C₂H₅O-C(=S)-、C₃H₇O-C(=S)-等(これは、置換されてもよい)、(C₂～C₆)アルケニルオキシチオカルボニル基(例えば、エテニルオキシチオカルボニル、プロペニルオキシチオカルボニル、ブテニルオキシチオカルボニル等)((C₂～C₆)アルケニルオキシチオカルボニル基は、置換されてもよい)、アリールオキシチオカルボニル基(例えば、フェニルO-C(=S)-、ベンジルO-(=S)-等(これは、置換されてもよい)、-C(=O)-C(=O)-(C₁～C₆)アルキル基(例えば、-C(=O)-C(=O)メチル、-C(=O)-C(=O)エチル、-C(=O)-C(=O)プロピル等)(これは、置換されてもよい)、-C(=O)-C(=O)-アリール基(例えば、-C(=O)-C(=O)フェニル、-C(=O)-C(=O)ナフチル等)(これは、置換されてもよい)、-C(=O)-C(=O)-(C₁～C₆)アルコキシ基(例えば、-C(=O)-C(=O)メトキシ、-C(=O)-C(=O)エトキシ、-C(=O)-C(=O)プロポキシ等)(これは、置換されてもよい)、-C(=O)-C(=O)-アリールオキシ基(例えば、-C(=O)-C(=O)フェニルオキシ、-C(=O)-C(=O)ベンジルオキシ)(これは、置換されてもよい)、-(C=S)-S-(C₁～C₆)アルキル(例えば、-(C=S)-S-メチル、-(C=S)-S-エチル、-(C=S)-S-プロピル等(これは、置換されてもよい)、-(C=S)-NH₂、

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$-(C=S)-NH-(C_1 \sim C_6)$ アルキル (例えば、 $-(C=S)-NH$ -メチル、 $-(C=S)-S-NH$ -エチル、 $-(C=S)-NH$ -プロピル等) (これは、置換されてもよい)、 $-C(=S)-N-(C_1 \sim C_6)$ アルキル)₂ (例えば、 $-C(=S)-N$ -(メチル)₂、 $-C(=S)-N$ -(エチル)₂、 $-C(=S)-N$ -(プロピル)₂ 等) (これは、置換されてもよい)、 $-C(=S)-NH-(C_2 \sim C_6)$ アルケニル (例えば、 $-C(=S)-NH$ -エテニル、 $-C(=S)-NH$ -プロペニル、 $-C(=S)-NH$ -ブテニル等 (これは、置換されてもよい)、 $-(C=S)-(C=O)-(C_1 \sim C_6)$ アルコキシ (例えば、 $-(C=S)-(C=O)$ -メトキシ、 $-(C=S)-(C=O)$ -エトキシ、 $-(C=S)-(C=O)$ -プロポキシ等) (これは、置換されてもよい)、 $-(C=S)-(C=O)$ -アリールオキシ (例えば、 $-(C=S)-(C=O)$ -フェニルオキシ、 $-(C=S)-(C=O)$ -ナフチルオキシ等) (これは、置換されてもよい)、 $-C(=S)-O-(C=O)-(C_1 \sim C_6)$ アルキル (例えば、 $-C(=S)-O-(C=O)$ -メチル、 $-C(=S)-O-(C=O)$ -エチル、 $-C(=S)-O-(C=O)$ -プロピル等) (これは、置換されてもよい)、 $-C(=S)-C(=S)-(C_1 \sim C_6)$ アルキル基 (例えば、 $-C(=S)-C(=S)$ -メチル、 $-C(=S)-C(=S)$ -エチル、 $-C(=S)-C(=S)$ -プロピル等) (これは、置換されてもよい)、 $-C(=S)-C(=S)$ アリール基 (例えば、 $-C(=S)-C(=S)$ -フェニル、 $-C(=S)-C(=S)$ -ナフチル等) (これは、置換されてもよい)、チオモルホリニルチオカルボニル、またはピロリジニルチオカルボニルから選択され得る。

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【0047】

R^4 で表される基が置換される場合、置換基は、ハロゲン原子 (例えば、塩素、フッ素、臭素、およびヨウ素)、ヒドロキシ、アミノ、モノ($C_1 \sim C_6$) アルキルアミノ (例えば、メチルアミノ、エチルアミノ、プロピルアミノ等)、ジ($C_1 \sim C_6$) アルキルアミノ (例えば、ジメチルアミノ、ジエチルアミノ、メチルエチルアミノ、ジプロピルアミノ、エチルプロピルアミノ等)、シアノ、ニトロ、アルコキシ、アリール、ヒドロキシアリール、ピリジル、ヒドロキシアルキル、アルコキシアリール、またはカルボキシル、およびそれらの誘導体から選択され得る。

【0048】

R^2 および R^3 で表される適切な基は、水素、ハロゲン原子 (例えば、フッ素、塩素、または臭素)、($C_1 \sim C_6$) アルキル基 (例えば、メチル、エチル、 n -プロピル、イソプロピル、 n -ブチル、イソブチル、 t -ブチル、 n -ペンチル、イソペンチル、 n -ヘキシル等)、ハロ($C_1 \sim C_6$) アルキル基 (例えば、ハロメチル、ハロエチル、ハロプロピル、トリハロメチル等) (ここで、ハロ基は、フッ素、塩素、臭素、またはヨウ素から選択される)、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで R^a は、置換または無置換の($C_1 \sim C_6$) アルキル基 (例えば、メチル、エチル、プロピル、イソプロピル等)、ハロ($C_1 \sim C_6$) アルキル (例えば、ハロメチル、ハロエチル、ハロプロピル、ハロイソプロピル等) (ここで、ハロ基は、フルオロ、クロロ、ブロモ、またはヨードから選択される) を表す) から選択され得る。

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【0049】

R^3 上の置換基は、ヒドロキシ、ハロゲン、ニトロ、アミノ、アルコキシ、カルボキシル、またはシアノから選択される。

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【0050】

Z で表される適切な基は、 S 、 O 、 $=CH$ または NR^b (ここで、 R^b は、水素、あるいは置換または無置換の($C_1 \sim C_6$) アルキル (例えば、メチル、エチル、プロピル等) (これは、置換されてもよい)、($C_2 \sim C_6$) アルケニル (例えば、エテニル、プロペニル、ブテニル等) (これは、置換されてもよい)、($C_1 \sim C_6$) シクロアルキル (例えば、シクロプロピル、シクロブチル等) (これは、置換されてもよい)、($C_1 \sim C_6$) アルコキシ (例えば、メトキシ、プロポキシ、イソプロポキシ等) (これは、置換されてもよい)、アリール基 (例えば、フェニル、ナフチル等) (これは、置換されてもよい)

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)、アラルキル(例えば、ベンジル、フェネチル等)(これは、置換されてもよい)、アリールオキシ(例えば、フェニルオキシ、ナフチルオキシ等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルキルカルボニル(例えば、メチルカルボニル、エチルカルボニル、プロピルカルボニル等)(これは、置換されてもよい)、アリールカルボニル(例えば、フェニルカルボニル、ナフチルカルボニル等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルコキシカルボニル(例えば、メトキシカルボニル、エトキシカルボニル、プロポキシカルボニル等)(これは、置換されてもよい)、またはアリールオキシカルボニル(例えば、フェニルオキシカルボニル、ナフチルオキシカルボニル等)(これは、置換されてもよい)から選択され得る。

【0051】

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R^b 上の置換基は、ヒドロキシ、ハロゲン、ピロリジニルチオカルボニル、ニトロ、アミノ、アルコキシ、カルボキシ、またはシアノから選択される。

【0052】

Y^1 は、 $=O$ または $=S$ 基を表し、 Y^2 および Y^3 は、水素、ハロゲン(例えば、フッ素、塩素、臭素、またはヨウ素)、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、置換もしくは無置換の($C_1 \sim C_6$)アルキル(例えば、メチル、エチル、 n -プロピル、イソプロピル、 n -ブチル、イソブチル、 t -ブチル等)、ヒドロキシ($C_1 \sim C_6$)アルキル(例えば、ヒドロキシメチル、ヒドロキシエチル、ヒドロキシプロピル等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルコキシ($C_1 \sim C_6$)アルキル基(例えば、メトキシメチル、メトキシエチル、エトキシエチル、エトキシメチル、メトキシプロピル、プロポキシメチル、プロポキシエチル等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルコキシカルボニル基(例えば、メトキシカルボニル、エトキシカルボニル等)(これは、置換されてもよい)、カルボキシ($C_1 \sim C_6$)アルキル(例えば、 CH_3-COOH 、 CH_3-CH_2-COOH 等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルキルスルホニル基(例えば、メチルスルホニル、エチルスルホニル等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルキルカルボニルアミノ($C_1 \sim C_6$)アルキル基(例えば、メチルカルボニルアミノメチル、エチルカルボニルアミノメチル、メチルカルボニルアミノエチル、エチルカルボニルアミノエチル等)(これは、置換されてもよい)、アリールカルボニルアミノ($C_1 \sim C_6$)アルキル(例えば、フェニルカルボニルアミノメチル、フェニルカルボニルアミノエチル、ナフチルカルボニルアミノメチル、ナフチルカルボニルアミノエチル等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルキルカルボニルオキシ($C_1 \sim C_6$)アルキル基(例えば、メチルカルボニルオキシメチル、エチルカルボニルオキシメチル、メチルカルボニルオキシエチル、プロピルカルボニルオキシメチル、プロピルカルボニルオキシエチル、プロピルカルボニルオキシプロピル等)(これは、置換されてもよい)、アミノ($C_1 \sim C_6$)アルキル(例えば、アミノメチル、アミノエチル、アミノプロピル等)(これは、置換されてもよい)、モノ($C_1 \sim C_6$)アルキルアミノ(例えば、メチルアミノ、エチルアミノ、プロピルアミノ等)(これは、置換されてもよい)、ジ($C_1 \sim C_6$)アルキルアミノ(例えば、ジメチルアミノ、ジエチルアミノ、メチルエチルアミノ、ジプロピルアミノ、エチルプロピルアミノ等)(これは、置換されてもよい)、アリールアミノ(例えば、フェニルアミノ、ベンジルアミノ等)(これは、置換されてもよい)、($C_1 \sim C_6$)アルコキシ基(例えば、メトキシ、エトキシ、プロポキシ、イソプロポキシ等)(これは、置換されてもよい)、アリール基(例えば、フェニル、ナフチル等)(これは、置換されてもよい)、アリールオキシ基(例えば、フェノキシ、ナフチルオキシ等)(アリールオキシ基は、置換されてもよい)、アラルキル(例えば、ベンジル、フェネチル、 $C_6H_5CH_2CH_2CH_2$ 、ナフチルメチル等)(アラルキル基は、置換されてもよい)、ヘテロアリール基(例えば、ピリジル、チエニル、フリル、プロリル、オキサゾリル、チアゾリル、ピラゾリル、イミダゾリル、オキサジアゾリル、テトラゾリル、ベンゾピラニル、ベンゾフラニル等)(これは、置換されてもよい)、ヘテロアラルキル(例えば、イミダゾールメチル、イミダゾールエチル、ピリジルメチル、フリルメチル、オキサゾールメチル、イミダゾリル

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等) (これは、置換されてもよい)、ヘテロシクリル基 (例えば、ピロリジニル、ピペリジニル、モルホリニル、ピペラジニル等)、ヘテロシクロアルキル基 (例えば、ピロリジンメチル、ピペリジンメチル、モルホリンメチル、ピペラジンメチル等) (これは、置換されてもよい) から選択される。

【0053】

Y^2 および Y^3 で表される基が置換される場合、置換基は、ヒドロキシ、ニトロ、シアノ、アミノ、(t-ブチルジメチルシリルオキシ) TBSO、ハロゲン原子、($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ、($C_3 \sim C_6$) シクロアルキル、アリール基 (例えば、フェニル、ナフチル等)、ベンジルオキシ、アシル基 (例えば、ホルミル、アセチル等)、カルボキシルまたはアシルオキシ基 (例えば、ホルミルオキシ、アセチルオキシ等) から選択され得る。 10

【0054】

Y^2 および Y^3 が結合される隣接炭素原子上に存在する場合に Y^2 および Y^3 により形成される適切な環構造は、置換または無置換のベンゼン、ピリジン、ピロリジン、フラン、チオフェン、モルホリン、ピペラジン、ピロール等から選択され得る。

【0055】

本発明の一部を形成する薬学的に許容可能な塩としては、Li、Na、K、Ca、Mg、Fe、Cu、Mnのような無機塩基に由来する塩、例えば、N, N'-ジエチルエチレンジアミン、ベタイン、カフェイン、2-ジエチルアミノエタノール、2-ジメチルアミノエタノール、N-エチルモルホリン、N-エチルピペリジン、グルカミン、グルコサミン、ヒドラバミン、イソプロピルアミン、メチルグルカミン、モルホリン、ピペラジン、ピペリジン、プロカイン、プリン、テオブロミン、トリエチルアミン、トリメチルアミン、トリプロピルアミン、トロメタミン、ジエタノールアミン、メグルミン、エチレンジアミン、N, N'-ジフェニルエチレンジアミン、N, N'-ジベンジルエチレンジアミン、N-ベンジルフェニルエチルアミン、コリン、水酸化コリン、ジシクロヘキシルアミン、メトホルミン、ベンジルアミン、フェニルエチルアミン、ジアルキルアミン、トリアルキルアミン、チアミン、アミノピリミジン、アミノピリジン、プリン、スペラミジン等のような有機塩基の塩、アルキルフェニルアミン、グリシノール、フェニルグリシノール等のようなキラル塩基、グリシン、アラニン、バリン、ロイシン、イソロイシン、ノルロイシン、チロシン、シスチン、システイン、メチオニン、プロリン、ヒドロキシプロリン、ヒスチジン、オルチニン、リシン、アルギニン、セリン、スレオニン、フェニルアラニンのような天然アミノ酸の塩、D-異性体または置換アミノ酸のような非天然アミノ酸、グアニジン、置換グアニジン (ここで、置換基は、ニトロ、アミノ、アルキル (例えば、メチル、エチル、プロピル等)、アルケニル (例えば、エテニル、プロペニル、ブテニル等)、アルキニル (例えば、エチニル、プロピニル) 等から選択される)、またはアンモニウム、置換アンモニウム塩、およびアルミニウム塩が挙げられる。塩は、適切である場合に酸付加塩を包含してもよく、それは、硫酸塩、硝酸塩、リン酸塩、過塩素酸塩、ホウ酸塩、ハロゲン化物、酢酸塩、酒石酸塩、マレイン酸塩、クエン酸塩、コハク酸塩、パルミチン酸塩、メタンスルホン酸塩、安息香酸塩、サリチル酸塩、ヒドロキシナフトエ酸塩、ベンゼンスルホン酸塩、アスコルビン酸塩、グリセロリン酸塩、ケトグルタル酸塩等である。薬学的に許容可能な溶媒和物は、水和物であってもよく、あるいはアルコールのような結晶化の他の溶媒を含んでいてもよい。 20 30 40

【0056】

本発明による特に有用な化合物としては、以下の：

(5R)-3-[3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル]-5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、
(5R)-3-[3-フルオロ-4-(2-チオキソ-1, 3-オキサゾラン-3-イル)フェニル]-5-ヒドロキシメチル-1, 3-オキサゾラン-2-オン、またはその塩、
(5R)-3-[3-フルオロ-4-(2-チオキソ-1, 3-チアゾラン-3-イル) 50

フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
 (5 R) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

3 - {2 - フルオロ - 4 - [(5 R) - 5 - ヒドロキシメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] フェニル} - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、

3 - {2 - フルオロ - 4 - [(5 R) - 5 - ヒドロキシメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] フェニル} - 6 - メチル - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、

3 - {2 - フルオロ - 4 - [(5 R) - 5 - ヒドロキシメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] フェニル} - 5 - メチル - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、

(5 R) - 5 - ヒドロキシメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルメチルフェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - [2 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - [3, 5 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - ヒドロキシメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

3 - {4 - [(5 R) - 5 - ヒドロキシメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] フェニル} - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、

(5 R) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - {3 - フルオロ - 4 - [3 - (4 - メトキシベンジル) - 4 - オキソ - 1 - イミダゾリジニル] フェニル} - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - ヒドロキシメチル - 3 - [4 - (3 - メチル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 5 - ヒドロキシメチル - 3 - [4 - (3 - ベンジル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 3 - フェニル - 1 - イミダゾリジニル) フェニル] - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - 3 - {3 - フルオロ - 4 - [3 - (フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル} - 5 - ヒドロキシメチル - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - アジドメチル - 3 - [3 - フルオロ - 4 - [2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

(5 R) - アジドメチル - 3 - [3 - フルオロ - 4 - [3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、

3 - {4 - [(5 R) - 5 - アジドメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イ

- ル] - 2 - フルオロフェニル} - 6 - メチル - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、
- 3 - { 4 - [(5 R) - 5 - アジドメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル] - 2 - フルオロフェニル} - 5 - メチル - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、
- (5 R) - 5 - アジドメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アジドメチル - 3 - [2 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 10
- (5 R) - アジドメチル - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アジドメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- 3 - { 4 - [(5 R) - 5 - アジドメチル - 2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2, 3 - ジヒドロベンゾ [d] [1, 3] オキサゾール - 2 - オン、またはその塩、
- (5 R) - 5 - アジドメチル - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アジドメチル - 3 - [3 - フルオロ - 4 - (3 - フェニル - 2 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 20
- (5 R) - 5 - アジドメチル - 3 - { 3 - フルオロ - 4 - [3 - (4 - フルオロフェニル) - 2 - オキソ - 1 - イミダゾリジニル] フェニル} - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - アミノメチル - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロフェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、 30
- (5 R) - 5 - アミノメチル - 3 - [4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- (5 R) - 5 - アミノメチル - 3 - [3 - フルオロ - 4 - (3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル) フェニル] - 1, 3 - オキサゾラン - 2 - オン、またはその塩、
- N - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} メタンアミド、またはその塩、
- N - { (5 S) - 3 - [3, 5 - ジフルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} メタンアミド、またはその塩、 40
- N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} アセトアミド、またはその塩、
- N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} プロパンアミド、またはその塩、
- N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1, 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1, 3 - オキサゾラン - 5 - イルメチル} ブタンアミ 50

ド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } ペンタンアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } ヘプタンアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アクリルアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 2 , 2 ,

2 - トリフルオロアセトアミド、またはその塩、

エチル (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチルカルバモイルメタン酸、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - チオキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - チオキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [3 - フルオロ - 4 - (2 - チオキソ - 1 , 3 - チアゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (6 - メチル - 2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 3 - [3 - フルオロ - 4 - (5 - メチル - 2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アセトアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } プロパンアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } ヘプタンアミド、またはその塩、

N1 - { (5S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } アクリルアミド、またはその塩、

N1 - { (5S) - 3 - [2 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3

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－イル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[3, 5－ジフルオロ－4－(2－オキソ－1, 3－オキサゾラン－3－イル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[3, 5－ジフルオロ－4－(2－オキソ－1, 3－オキサゾラン－3－イル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} プロパンアミド、またはその塩、

N1－{(5S)－2－オキソ－3－[4－(2－オキソ－1, 3－オキサゾラン－3－イル) フェニル]－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、 10

N1－{(5S)－2－オキソ－3－[4－(2－オキソ－2, 3－ジヒドロベンゾ[d][1, 3]オキサゾール－3－イル) フェニル]－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[3－フルオロ－4－(3－メチル－4－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[3－フルオロ－4－(3－ベンジル－4－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、 20

N1－{(5S)－3－[3－フルオロ－4－(3－メチル－2－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[4－(3－メチル－2－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[4－(3－ベンジル－2－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

N1－{(5S)－3－[3－フルオロ－4－(3－フェニル－2－オキソ－1－イミダゾリジニル) フェニル]－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、 30

N1－{(5S)－3－{3－フルオロ－4－[3－(4－フルオロフェニル)－2－オキソ－1－イミダゾリジニル] フェニル}－2－オキソ－1, 3－オキサゾラン－5－イルメチル} アセトアミド、またはその塩、

(5S)－3－[3－フルオロ－4－(2－オキソ－1, 3－オキサゾラン－3－イル) フェニル]－5－(1－チオキソエチルアミノメチル)－1, 3－オキサゾラン－2－オン、またはその塩、

(5S)－3－[3－フルオロ－4－(2－オキソ－1, 3－オキサゾラン－3－イル) フェニル]－5－(3, 3, 3－トリフルオロ－1－チオキソプロピルアミノメチル)－1, 3－オキサゾラン－2－オン、またはその塩、 40

(5S)－3－[3－フルオロ－4－(3－メチル－2－チオキソ－1－イミダゾリジニル) フェニル]－5－(1－チオキソエチルアミノメチル)－1, 3－オキサゾラン－2－オン、またはその塩、

3－{2－フルオロ－4－[(5S)－2－オキソ－5－(1－チオキソエチルアミノメチル)－1, 3－オキサゾラン－3－イル] フェニル}－2, 3－ジヒドロベンゾ[d][1, 3]オキサゾール－2－オン、またはその塩、

(5S)－3－[4－(2－オキソ－1, 3－オキサゾラン－3－イル)－3－トリフルオロメチルフェニル]－5－(1－チオキソエチルアミノメチル)－1, 3－オキサゾラン－2－オン、またはその塩、 50

(5S) - 3 - [3, 5-ジフルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5 - (1-チオキソエチルアミノメチル) - 1, 3-オキサゾラン-2-オン、またはその塩、

(5S) - 3 - [3, 5-ジフルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5 - (1-チオキソプロピルアミノメチル) - 1, 3-オキサゾラン-2-オン、またはその塩、

(5S) - 3 - [4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 5 - (1-チオキソエチルアミノメチル) - 1, 3-オキサゾラン-2-オン、またはその塩、

(5S) - 3 - [3-フルオロ-4-(3-メチル-4-オキソ-1-イミダゾリジニル)フェニル] - 5 - (1-チオキソエチルアミノメチル) - 1, 3-オキサゾラン-2-オン、またはその塩、 10

(5S) - 3 - [3-フルオロ-4-(3-フェニル-2-オキソ-1-イミダゾリジニル)フェニル] - 5 - (1-チオキソエチルアミノメチル) - 1, 3-オキサゾラン-2-オン、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルカーバメート、またはその塩、

N1 - { (5S) - 2-オキソ-3 - [4-(2-オキソ-1, 3-オキサゾラン-3-イル) - 3-トリフルオロメチルフェニル] - 1, 3-オキサゾラン-5-イルメチル } 20
メチルカーバメート、またはその塩、

N1 - { (5S) - 3 - [3, 5-ジフルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルカーバメート、またはその塩、

N1 - { (5S) - 3 - [4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルカーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(3-メチル-4-オキソ-1-イミダゾリジニル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルカーバメート、またはその塩、 30

(5S) - 5-メチルチオキシ(チオキソ)メチルアミノメチル-3 - [4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 1, 3-オキサゾラン-2-オン、またはその塩、

N1 - { (5S) - 3 - [3, 5-ジフルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } エチルチオ 40
カーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } トリフルオロアセトキシチオカーバメート、またはその塩、

(5S) - 5-シクロヘキシルオキシ(チオキソ)メチルアミノメチル-3 - [4-(2-オキソ-1, 3-オキサゾラン-3-イル)フェニル] 1, 3-オキサゾラン-2-オン、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4-(2-チオキソ-1, 3-オキサゾラン-3-イル)フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル } メチルチ 50

オカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 1 - プロピルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 2 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 2 - プロピルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) - 3 - トリフルオロメチルフェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } エチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 1 - プロピルチオカーバメート、またはその塩、

(5 S) - 5 - [2 , 2 , 2 - トリフルオロエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - [2 - ヒドロキシエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - [2 - メトキシエチルオキシ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } アリルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } - 2 - プロピルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d] [1 , 3] オキサゾール - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 2 - オキソ - 3 - [4 - (2 - オキソ - 2 , 3 - ジヒドロベンゾ [d]

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] [1, 3] オキサゾール-3-イル) フェニル] - 1, 3-オキサゾラン-5-イルメチル} エチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4- (3-メチル-4-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4- (3-メチル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4- (3-メチル-4-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、 10

N1 - { (5S) - 3 - [3-フルオロ-4- (3-メチル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4- (3-ベンジル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [4- (3-ベンジル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} エチルチオカーバメート、またはその塩、 20

N1 - { (5S) - 3 - [3-フルオロ-4- (3-フェニル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} メチルチオカーバメート、またはその塩、

N1 - { (5S) - 3 - [3-フルオロ-4- (3-フェニル-2-オキソ-1-イミダゾリジニル) フェニル] - 2-オキソ-1, 3-オキサゾラン-5-イルメチル} エチルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {3-フルオロ-4- [3- (4-フルオロフェニル) - 2-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) メチルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {3-フルオロ-4- [3- (4-フルオロフェニル) - 2-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) エチルチオカーバメート、またはその塩、 30

N1 - ((5S) - 3 - {3-フルオロ-4- [3- (4-フルオロフェニル) - 2-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) - 2-プロピルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {3-フルオロ-4- [3-メトキシメチル-4-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) メチルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {3-フルオロ-4- [3-ベンジル-4-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) メチルチオカーバメート、またはその塩、 40

N1 - ((5S) - 3 - {3-フルオロ-4- [3-ベンジル-4-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) エチルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {4- [4-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) - (N, N-ジメチルアミノ) エチルチオカーバメート、またはその塩、

N1 - ((5S) - 3 - {3-フルオロ-4- [3- (4-メトキシベンジル) - 4-オキソ-1-イミダゾリジニル] フェニル} - 2-オキソ-1, 3-オキサゾラン-5-イルメチル) メチルチオカーバメート、またはその塩、 50

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ベンジル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル) イソプロピルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [3 - ヒドロキシメチル - 4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - ((5 S) - 3 - { 3 - フルオロ - 4 - [4 - オキソ - 1 - イミダゾリジニル] フェニル } - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル) メチルチオカーバメート、またはその塩、

N 1 - { (5 S) - 3 - [3 - フルオロ - 4 - (3 - メチル - 4 - チオキソ - 1 - イミダゾリジニル) フェニル] - 2 - オキソ - 1 , 3 - オキサゾラン - 5 - イルメチル } メチルチオカーバメート、またはその塩、

(5 S) - 5 - [(2 S) - 2 - ヒドロキシメチルアゾラン - 1 - イル (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - ジエチルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - アリルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - ベンジルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - [4 - メトキシベンジルアミノ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 5 - [2 - ピリジルエチルアミノ (チオキソ) メチルアミノメチル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - メチルアミノ (チオキソ) メチルアミノメチル - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - [2 - ヒドロキシエチルアミノ (チオキソ) メチルアミノメチル] - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 5 - [1 , 4 - チアジナン - 4 - イル (チオキソ) メチルアミノメチル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 3 - [4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 5 - [2 - ピリジル (チオキソ) メチルアミノメチル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - アミノ (チオキソ) メチルアミノメチル - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 3 - [3 - フルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 5 - メチルアミノ (チオキソ) メチルアミノメチル - 1 , 3 - オキサゾラン - 2 - オン、またはその塩、

(5 S) - 5 - アミノ (チオキソ) メチルアミノメチル - 3 - [3 , 5 - ジフルオロ - 4 - (2 - オキソ - 1 , 3 - オキサゾラン - 3 - イル) フェニル] - 1 , 3 - オキサゾラン

－２－オン、またはその塩、

(５Ｓ)－３－〔３，５－ジフルオロ－４－(２－オキソ－１，３－オキサゾラン－３－イル)フェニル〕－５－メチルアミノ(チオキソ)メチルアミノメチル〕－１，３－オキサゾラン－２－オン、またはその塩、および

N１－((５Ｓ)－３－{４－〔４－オキソ－１－イミダゾリジニル〕フェニル}－２－オキソ－１，３－オキサゾラン－５－イルメチル)－(N，N－ジメチルアミノ)エチルチオカーバメート塩酸塩が挙げられる。

【００５７】

本発明はまた、式(Ⅰ)(式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す)を表し、他の全ての記号は、上記定義の通りである)を有する化合物の調製方法であって 10

(i)下記式(ⅠⅠⅠ)：

【化９８】

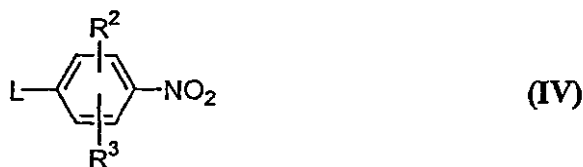


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【００５８】

(式中、全ての記号は、上記定義の通りである)を有する化合物を、下記式(ⅠⅤ)：

【化９９】

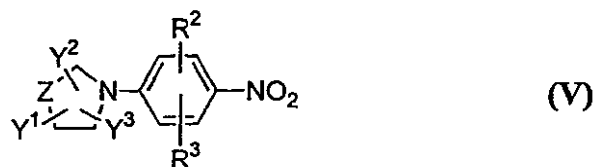


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【００５９】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表し、 R^2 および R^3 は、上記定義の通りである)を有する化合物と反応させて、下記式(V)：

【化１００】



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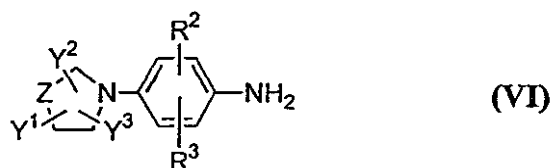
【0060】

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(ii) 式(V)を有する化合物を還元して、下記式(VI)：

【化101】



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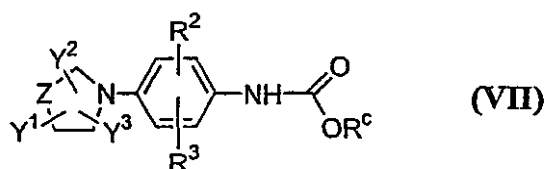
【0061】

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(iii) 式(VI)を有する化合物をクロロギ酸アルキルと反応させて、下記式(VII)：

【化102】



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【0062】

(式中、 R^c は、($C_1 \sim C_8$) アルキル基 (例えば、メチル、エチル、プロピル、ベンジル、アリル基等) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(iv) 式(VII)を有する化合物を、下記式(VIII)：

【化103】



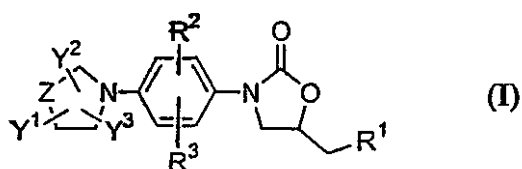
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【0063】

(式中、 R^{12} は、($C_1 \sim C_3$) アルキル基 (例えば、メチル、エチル、またはプロピル) を表す)

を有する化合物と、塩基の存在下で反応させて、下記式(I)：

【化104】



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【0064】

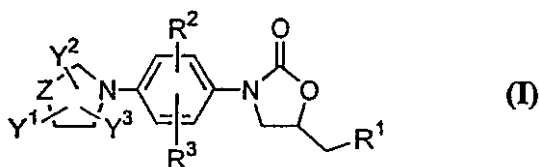
(式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(v) 式 (I) を有する化合物を、塩化アルキルスルホニル、または塩化アリールスルホニルと反応させて、式 (I) (式中、 R^1 は、アルキルスルホニル、またはアリールスルホニルを表す) を有する化合物を生産して、 NaN_3 と反応させて、下記式 (I) :

【化105】

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【0065】

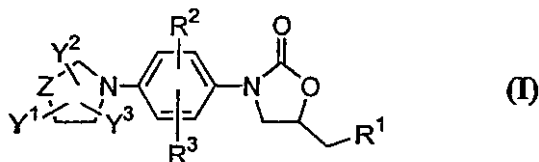
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(式中、 R^1 は、アジドを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(vi) 式 (I) (式中、 R^1 は、アジド基を表す) を有する化合物を還元して、下記式 (I) :

【化106】



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【0066】

(式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと

を含む方法に関する。

【0067】

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式(V)を有する化合物を生産するための、式(III)を有する化合物と式(IV)を有する化合物との反応は、KOH、NaOH、 K_2CO_3 、 Na_2CO_3 、NaH、KH、トリエチルアミン、ジイソプロピルエチルアミン等のような塩基を用いて実施され得る。反応は、DMSO、DMF、THF、アセトニトリル、クロロホルム等、またはそれらの混合物を用いて実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、 N_2 またはArのような不活性ガスを用いて維持され得る。反応は、 $20^\circ C \sim 100^\circ C$ の範囲の温度で、好ましくは外気温 $\sim 80^\circ C$ の範囲の温度で実施され得る。反応は、1~15時間、好ましくは6~12時間の範囲であり得る。

【0068】

式(VI)を有する化合物を生産するための、式(V)を有する化合物の還元は、気体水素、および炭、アルミナ、アスベスト等のような固体ビーズ上のRu、Pd、Rh、Pt、Niのような触媒の存在下で実施され得る。還元は、ジオキサン、酢酸、酢酸エチル、THF、アルコール（例えば、メタノール、エタノール等）、またはそれらの混合物のような溶媒の存在下で行われ得る。大気圧 ~ 60 psiの圧力を使用してもよい。反応は、 $25 \sim 60^\circ C$ の範囲の温度で、好ましくは室温で実施され得る。反応時間は、2~48時間の範囲である。還元はまた、Sn/HCl、Fe/HCl、Zn/HCl、Zn/ CH_3CO_2H 等のような鉱酸中の金属を用いて実施してもよい。

【0069】

式(VI)を有する化合物の、式(VII)を有する化合物への変換は、クロロギ酸メチル、クロロギ酸エチル、クロロギ酸プロピル、クロロギ酸ベンジル等のようなクロロギ酸アルキルを用いて実施され得る。反応溶媒は、水、アセトン、テトラヒドロフラン(THF)、アセトニトリル、ジクロロメタン(DCM)等、またはそれらの混合物から選択され得る。反応は、 K_2CO_3 、 Na_2CO_3 、NaH、KOH、トリエチルアミン等のような塩基の存在下で実施され得る。反応温度は、 $0 \sim 60^\circ C$ の存在下で、好ましくは $0^\circ C \sim$ 室温で実施され得る。反応時間は、1~12時間の範囲、好ましくは1~4時間の範囲に維持される。

【0070】

上記に定義した式(I)（式中、 R^1 は、ヒドロキシ基を表す）を有する化合物を生産するための、式(VII)を有する化合物と、式(VIII)を有する化合物との反応は、NaHもしくはKHのような水素化アルカリ金属、または CH_3Li 、 $BuLi$ 、LDA等のような有機リチウム、またはNaOMe、NaOEt、 $t-BuOK$ のようなアルコキシドのような塩基の存在下で実施され得る。反応は、THF、ジオキサン、DMF、DMSO、DME等、またはそれらの混合物のような溶媒の存在下で実施され得る。ヘキサメチルホスファミド(HMPA)を補助溶媒として使用してもよい。反応温度は、 $-78 \sim 150^\circ C$ の範囲、好ましくは $-78 \sim 30^\circ C$ の範囲の温度であり得る。反応期間は、3~12時間の範囲であり得る。

【0071】

式(I)（式中、 R^1 は、OHを表す）を有する化合物は、塩化アルキルスルホニル、または塩化アリールスルホニル（例えば、塩化メタンスルホニル、塩化p-トルエンスルホニル等）で処理することにより、式(I)（式中、 R^1 は、アルキルスルホニル、またはアリールスルホニルを表す）を有する化合物に変換される。反応は、クロロホルム、ジクロロメタン、THF、ジオキサン等、またはそれらの混合物の存在下で実施され得る。反応で使用される塩基は、 Bt_3N 、ジイソプロピルエチルアミン、 Na_2CO_3 、 K_2CO_3 等から選択され得る。反応温度は、 $0 \sim 50^\circ C$ の範囲、好ましくは $0 \sim$ 室温の範囲で維持される。反応時間は、1~12時間の範囲、好ましくは1~4時間の範囲に維持されるべきである。式(I)（式中、 R^1 は、アルキルスルホニル、またはアリールスルホニルを表す）を有する化合物は、 NaN_3 で処理することにより、式(I)（式中、 R^1 は、アジド基を表す）を有する化合物に変換される。反応に使用される溶媒は、ジメチルホルムアミド(DMF)、ジメチルスルホキシド(DMSO)、シアン化メチル等から選択され得る。反応温度は、室温 $\sim 120^\circ C$ の範囲、好ましくは室温 $\sim 80^\circ C$ の範囲に維持さ

れる。反応時間は、1～12時間、好ましくは1～4時間の範囲に維持される。

【0072】

式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を有する化合物を生成するための、式(I) (式中、 R^1 は、アジド基を表す) を有する化合物の還元は、気体水素、および炭、アルミナ、アスベスト等のような固体ビーズ上のRu、Pd、Rh、Pt、Niのような触媒の存在下で実施され得る。還元は、ジオキサン、酢酸、酢酸エチル、THF、アルコール(例えば、メタノール、エタノール等)、またはそれらの混合物のような溶媒の存在下で行われ得る。大気圧～60psiの圧力を使用してもよい。反応は、25～60℃の範囲の温度で、好ましくは室温で実施され得る。反応時間は、2～48時間の範囲である。還元はまた、水中で PPH_3 を用いることで実施してもよい。

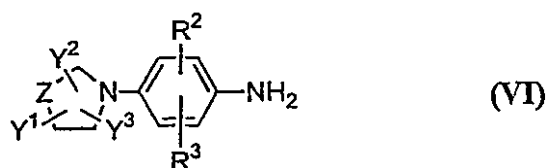
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【0073】

本発明のさらに別の実施形態では、式(I) (式中、 R^1 は、ヒドロキシを表し、他の全ての記号は、上記定義の通りである) を有する化合物の別の調製方法であって、以下の：

(i) 下記式(VI)：

【化107】



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【0074】

(式中、全ての記号は、上記定義の通りである)

を有する化合物を、下記式(IX)：

【化108】



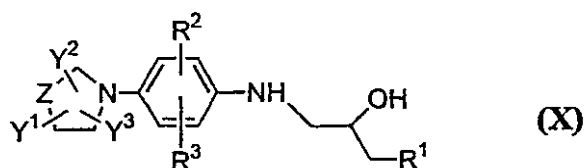
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【0075】

(式中、 R^1 は、ヒドロキシを表す)

を有する化合物と反応させて、下記式(X)：

【化109】



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【0076】

(式中、 R^1 は、ヒドロキシを表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 およびZは、上記定義の通りである)

を有する化合物を生成することと、

(ii) 式(X)を有する化合物を、適切なカルボニル化剤を用いてカルボニル化して、

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式 (I) (式中、 R^1 は、ヒドロキシを表し、他の全ての記号は、上記定義の通りである) を有する化合物を生産すること
とを含む方法が提供される。

【0077】

式 (X) を有する化合物を生産するための、上記に定義した式 (VI) を有する化合物と、上記に定義した式 (IX) を有する化合物との反応は、 K_2CO_3 、 NaH 、 $t-BuOK$ 等、またはそれらの混合物のような塩基の存在下あるいは非存在下で実施され得る。反応は、DMF、トルエン、THF、 CH_3CN 等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応はまた、 $BF_3 \cdot OEt_2$ 、 $ZnCl_2$ 、 $Ti(OiPr)_4$ 、ランタニド金属錯体等のようなルイス酸の存在下で、かつ DCE、DMF、THF 等、またはそれらの混合物の存在下で実施され得る。反応温度は、 $0 \sim 120^\circ C$ の範囲で、好ましくは $0 \sim 100^\circ C$ の範囲の温度で実施され得る。反応時間は、 $3 \sim 24$ 時間、好ましくは $4 \sim 12$ 時間の範囲であり得る。

【0078】

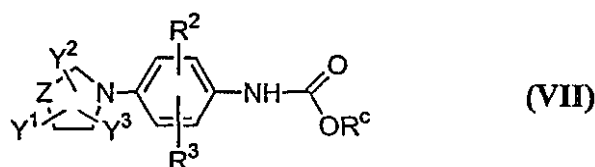
式 (X) を有する化合物の、式 (I) を有する化合物への変換は、炭酸ジアルキル、ジハロカルボニル、 $1, 1'$ -カルボニルイミダゾール等のようなカルボニル化剤を用いて、塩基の存在下または非存在下で実施され得る。塩基は、トリエチルアミン、トリブチルアミン、ジイソプロピルエチルアミン、 $1, 4$ -ジアザビシクロ[2.2.2]オクタン(DABCO)、 $1, 8$ -ジアザビシクロ[5.4.0]ウンデカー-7-エン(DBU)、 $1, 1, 5$ -ジアザビシクロ[4.3.0]ノナー-5-エン(DBN)、 $NaOMe$ 、 $NaOEt$ 等のようなアルコキシド、または $NaOH$ 、 KOH 等のような無機塩基から選択され得る。反応は、ジクロロメタン、THF、DMF、酢酸エチル等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応温度は、 $-20 \sim 135^\circ C$ の範囲で、好ましくは $15 \sim 80^\circ C$ の範囲の温度であり得る。反応時間は、 $2 \sim 72$ 時間、好ましくは $2 \sim 50$ 時間の範囲であり得る。

【0079】

本発明のさらに別の実施形態では、式 (I) (式中、 R^1 は、アジドを表し、他の全ての記号は、上記定義の通りである) を有する化合物のさらに別の調製方法であって、以下の：

(i) 下記式 (VII) :

【化110】



【0080】

(式中、 R^c は、($C_1 \sim C_8$) アルキル基 (例えば、メチル、エチル、プロピル、ベンジル、アリル基等) を表し、他の全ての記号は、上記定義の通りである) を有する化合物を、下記式 (XI) :

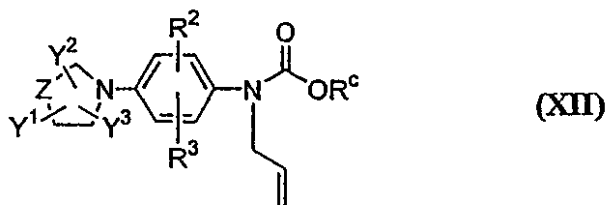
【化111】



【0081】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表す)を有する化合物と反応させて、下記式(XII)：

【化112】



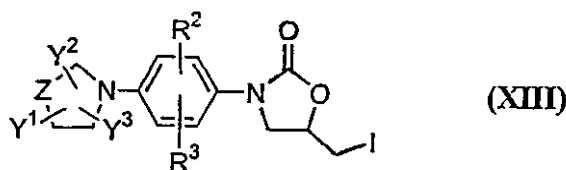
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【0082】

(式中、R^c、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)を有する化合物を生産することと、

(ii)上記式(XII)を有する化合物を、下記式(XIII)：

【化113】



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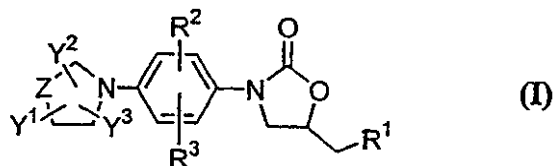
【0083】

(式中、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)を有する化合物に変換することと、

(iii)上記式(XIII)を有する化合物を、有機または無機アジドと反応させることによって、下記式(I)：

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【化114】



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【0084】

(式中、R¹は、アジド基を表し、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)

を有する化合物に変換することと

を含む方法を提供する。

【0085】

式(VII)を有する化合物と、式(XI)を有する化合物との反応は、NaH、KH、K₂CO₃、t-BuOK、LDA、NaOMeのような塩基の存在下で、塩化テトラブチルアンモニウム等のような相間移動触媒を用いて、または用いずに実施され得る。反応は、THF、DMF、DMSO、ベンゼン等、またはそれらの混合物のような適切な溶媒の存在下で実施され得る。反応は、-78~120℃、好ましくは-78~60℃の範囲

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の温度で実施され得る。反応時間は、2～20時間、好ましくは4～10時間の範囲であり得る。

【0086】

式(XII)を有する化合物の、上記に定義した式(XIII)を有する化合物への変換は、 I_2 、KI、またはNaIのような試薬の存在下で実施され得る。反応は、 $CHCl_3$ 、 CH_2Cl_2 、THF、DMF、DMSO、アセトニトリル等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応温度は、0～100℃の範囲で、好ましくは外気温であり得る。反応時間は、2～24時間、好ましくは2～12時間であり得る。

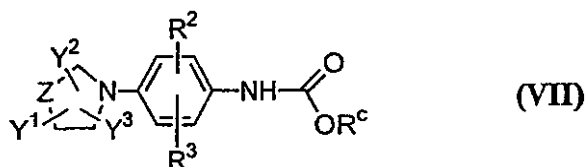
【0087】

式(XIII)を有する化合物の、式(I) (式中、 R^1 は、アジド基を表す)を有する化合物への変換は、1当量以上の金属アジド (例えば、 LiN_3 、 NaN_3 、またはトリアルキルシリルアジド) の存在下で実施され得る。反応は、THF、アセトン、DMF、DMSO等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、 N_2 またはArを用いて維持され得る。反応は、外気温～溶媒の還流温度の範囲の温度で、好ましくは50～80℃の範囲の温度で実施され得る。反応は、0.5～18時間、好ましくは1～4時間の範囲であり得る。

【0088】

本発明のさらなる別の実施形態では、式(I) (式中、 R^1 は、ヒドロキシ基を表し、他の全ての記号は、上記定義の通りである) を有する化合物の調製方法であって、以下の：
(i) 下記式(VI)：

【化115】



【0089】

(式中、全ての記号は、上記定義の通りである)
を有する化合物を、下記式(XIV)：

【化116】



【0090】

(式中、Lは、脱離基 (例えば、ハロゲン原子、アルコキシ、スルホニル基等) を表す)
を有する化合物と反応させて、下記式(XV)：

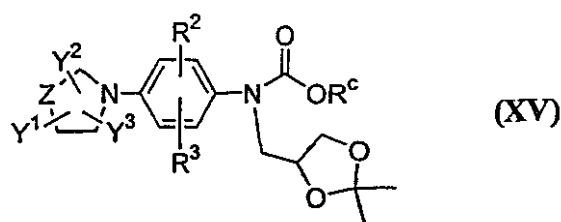
【化117】

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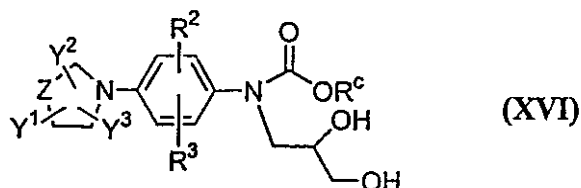
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【0091】

(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと、

(ii) 従来法を用いて式 (XV) を有する化合物中のアセトニド部分を加水分解して、
下記式 (XVI) :

【化118】



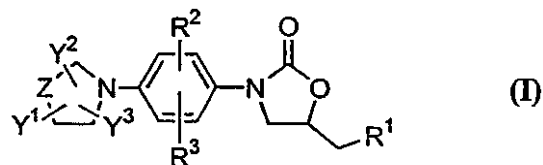
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【0092】

(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと、

(iii) 式 (XVI) を有する化合物を、塩基を用いて、または塩基を用いずに、下記
式 (I) :

【化119】



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【0093】

(式中、 R^1 は、ヒドロキシ基を表し、他の全ての記号は、上記定義の通りである) を有
する化合物へと環化することと
を含む方法を提供する。

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【0094】

式 (XV) を有する化合物を生産するための、式 (VII) を有する化合物と、式 (XV)
を有する化合物との反応は、塩基の存在下で実施され得る。使用される塩基は、 K_2CO_3 、 NaH 、 $t-BuOK$ 、 LDA 等から選択され得る。反応は、 DMF 、 THF 、 $DMSO$ 、 $EtOH$ 等のような溶媒の存在下で実施され得る。反応は、 -78 から 120 $^{\circ}C$ の範囲の温度で、好ましくは $-78^{\circ}C \sim 100^{\circ}C$ の範囲の温度で実施され得る。反応時間は、 $2 \sim 24$ 時間、好ましくは $2 \sim 20$ 時間の範囲であり得る。

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【0095】

式(XVI)を有する化合物を生産するための、式(XV)を有する化合物の加水分解は、HCl、H₂SO₄等のような希鉱酸、酢酸水、p-トルエンスルホン酸、カンファスルホン酸、トリフルオロ酢酸等のような有機酸を用いて実施され得る。反応は、水、メタノール、THF、ジオキサン等、またはそれらの混合物のような適切な溶媒の存在下で実施され得る。反応は、30～100℃の範囲の温度で、好ましくは30～60℃の範囲の温度で実施され得る。反応時間は、10分～5時間、好ましくは30分～2.5時間の範囲であり得る。

【0096】

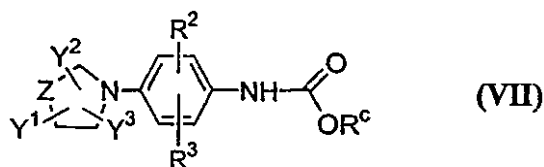
式(XVI)を有する化合物の、式(I) (式中、R¹は、ヒドロキシ基を表す)を有する化合物への変換は、NaOMe、K₂CO₃、NaH等のような塩基を、MeOH、DMF、THF等のような溶媒の存在下で用いることによって実施され得る。反応の期間および温度はそれぞれ、2～4時間、および室温～150℃の範囲に維持される。

【0097】

本発明のさらに別の実施形態では、式(I) (式中、R¹は、アジド基を表し、他の全ての記号は、上記定義の通りである)を有する化合物の調製方法であって、以下の：

(i) 下記式(VII)：

【化120】



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【0098】

(式中、全ての記号は、上記定義の通りである)

を有する化合物を、下記式(XVII)：

【化121】

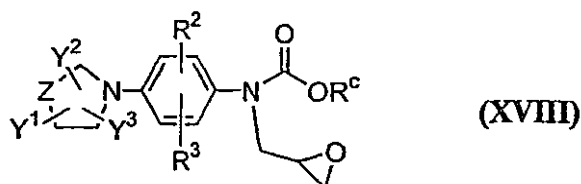


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【0099】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表す)を有する化合物と反応させて、下記式(XVIII)：

【化122】



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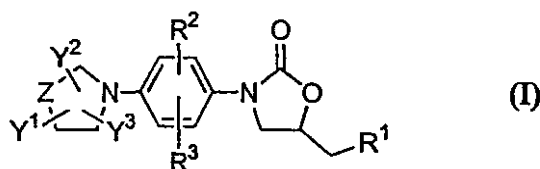
【0100】

(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(ii) 上記式 (XVII) を有する化合物を、有機または無機アジドと反応させることによって、下記式 (I) :

【化123】



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【0101】

(式中、 R^1 は、アジド基を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物に変換することと

を含む方法を提供する。

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【0102】

上記に定義した式 (VII) を有する化合物と、上記に定義した式 (XVII) を有する化合物との反応は、 NaH 、 $NaOMe$ 、 K_2CO_3 、 $n-BuLi$ 、 LDA 等のような塩基の存在下で実施され得る。反応は、 DMF 、 THF 、 $DMSO$ 、ベンゼン等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、 $-78 \sim 70^\circ C$ の範囲の温度で、好ましくは $-78 \sim 50^\circ C$ の範囲の温度で実施され得る。反応時間は、 $1 \sim 15$ 時間、好ましくは $1 \sim 10$ 時間の範囲であり得る。

【0103】

式 (XVII) を有する化合物の、式 (I) (式中、 R^1 は、アジド基を表す) を有する化合物への変換は、1 当量以上の金属アジド (例えば、 LiN_3 、 NaN_3 、またはトリアルキルシリルアジド) の存在下で実施され得る。反応は、 THF 、アセトン、 DMF 、 $DMSO$ 等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、 N_2 または Ar を用いて維持され得る。反応は、外気温～溶媒の還流温度の範囲の温度で、好ましくは $50 \sim 80^\circ C$ の範囲の温度で実施され得る。反応時間は、 $0.5 \sim 18$ 時間、好ましくは $1 \sim 4$ 時間の範囲であり得る。

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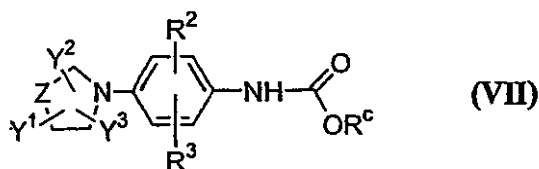
【0104】

本発明のさらに別の実施形態では、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表し、他の全ての記号は、上記定義の通りである) を有する化合物のさらなる別の調製方法であって、以下の：

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(i) 下記式 (VII) :

【化124】



【0105】

(式中、全ての記号は、上記定義の通りである)

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を有する化合物を、下記式 (X I X) :

【化 1 2 5】

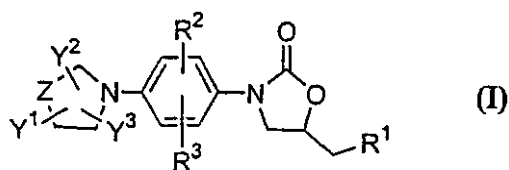


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【0 1 0 6】

を有する化合物と反応させて、下記式 (I) :

【化 1 2 6】



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【0 1 0 7】

(式中、 R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表し、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと

を含む方法を提供する。

【0 1 0 8】

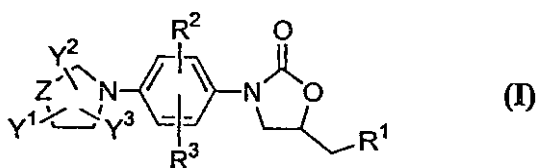
上記に定義した式 (V I I) を有する化合物は、 NaH 、 LDA 、 $BuLi$ 等のような塩基の存在下で、式 (X I X) を有する化合物と反応させることによって、上記に定義した式 (I) を有する化合物に変換される。反応は、 $-78 \sim 100^\circ C$ の範囲の温度で、好ましくは $-78^\circ C \sim 80^\circ C$ の範囲の温度で実施され得る。反応時間は、 $3 \sim 10$ 時間であり得る。

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【0 1 0 9】

本発明のさらなる別の実施形態では、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物からの、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、ホルミル基を表す) を表す) を有する化合物の調製方法を提供する：

【化 1 2 7】



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【0 1 1 0】

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(式中、他の全ての記号は、上記定義の通りである)。

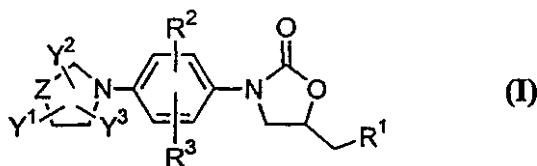
【0111】

式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、ホルミル基を表す) を表す) を有する化合物を生産するための、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物の反応は、ギ酸メチル、ギ酸エチル等のようなギ酸アルキルの存在下で実施され得る。反応期間は、4～48時間、好ましくは12～24時間の範囲であり得る。反応は、60～120℃の範囲の温度で、好ましくは還流温度で実施され得る。

【0112】

本発明の別の実施形態では、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物からの、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4a}$ (ここで、 R^{4a} は、 $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ、 $(C_2 \sim C_6)$ アルケニル、ハロ $(C_1 \sim C_6)$ アルキル、アリールオキシ、 $(C_2 \sim C_6)$ アルケニルオキシ、アリールオキシカルボニル、または $(C_1 \sim C_6)$ アルコキシカルボニルを表す) を表す) を有する化合物の調製方法を提供する：
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【化128】



【0113】

(式中、他の全ての記号は、上記定義の通りである)。

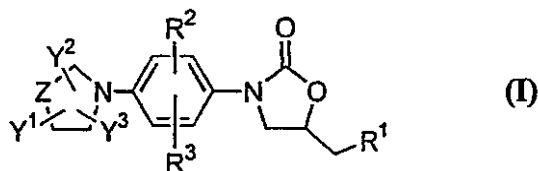
【0114】

式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物からの、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4a}$ (ここで、 R^{4a} は、 $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ、 $(C_2 \sim C_6)$ アルケニル、ハロ $(C_1 \sim C_6)$ アルキル、アリールオキシ、 $(C_2 \sim C_6)$ アルケニルオキシ、アリールオキシカルボニル、または $(C_1 \sim C_6)$ アルコキシカルボニルを表す) を表す) は、塩化アセチル、塩化プロピオニル等のような適切なハロゲン化合物、クロロギ酸メチル、クロロギ酸エチル等のようなクロロギ酸アルキル、クロロギ酸ベンジルのようなクロロギ酸アルキルで処理することによって、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物から調製され得る。反応は、 CH_2Cl_2 、 $CHCl_3$ 、トルエン、THF等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、 Et_3N 、ジイソプロピルエチルアミン、
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 K_2CO_3 、 NaH 、 $KOt-Bu$ 等のような塩基の存在下で実施され得る。反応は、 $-20 \sim 60^\circ C$ の範囲の温度で、好ましくは $0 \sim$ 室温の範囲の温度で実施され得る。反応時間は、1～12時間、好ましくは1～4時間の範囲であり得る。

【0115】

あるいは、式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表す) を有する化合物は、チオ酢酸で処理することによって、式(I) (式中、 R^1 は、アジド基を表す) を有する化合物を反応させることで調製され得る：

【化129】



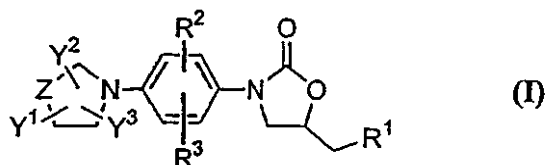
【 0 1 1 6 】

式 (I) (式中、 R^1 は、アジド基を表す) を有する化合物は、THF、DMF、トルエン等の溶媒を用いて、または用いずに、チオ酢酸を用いることで、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、アセチル基を表す) を表す) を有する化合物に変換され得る。反応は、 $25 \sim 40^\circ C$ の範囲の温度で、好ましくは室温で実施され得る。反応は、 $3 \sim 24$ 時間、好ましくは $4 \sim 12$ 時間の範囲であり得る。

【 0 1 1 7 】

本発明の別の実施形態では、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリアルオキシ、 $-C(=S)-(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリアルを表す)を表す)を有する化合物からの、式 (I) (式中 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリアルオキシ、 $-C(=S)-(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリアルを表す)を表す)を有する化合物の調製方法を提供する：

【化 1 3 0】



【 0 1 1 8 】

(式中、全ての記号は、上記定義の通りである)。

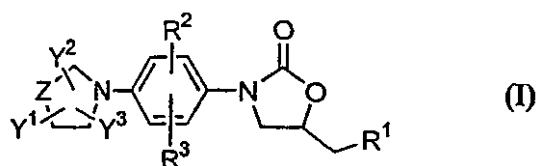
【 0 1 1 9 】

式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=O)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-$ $(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリールオキシ、 $-C(=S)-$ $(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリールを表す)を表す)を有する化合物の、式 (I) (式中 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-R^{4b}$ (ここで、 R^{4b} は、 $(C_1 \sim C_6)$ アルキル、ハロ $(C_1 \sim C_6)$ アルキル、 $-C(=O)-$ $(C_1 \sim C_6)$ アルコキシ、 $-C(=O)-$ アリールオキシ、 $-C(=S)-$ $(C_1 \sim C_6)$ アルキル、または $-C(=S)-$ アリールを表す)を表す)を表す)を有する化合物への変換は、乾燥ジオキサソ、トルエン、THF、DMF等中の、アミドおよびLawesson試薬(2, 4-ビス(メトキシフェニル)-1, 3-ジチア-2, 4-ジホスフェタン-2, 4-ジスルフィド)の溶液をを入れることで実施され得る。反応は、室温 $\sim 130^\circ\text{C}$ の範囲の温度で、好ましくは $55\sim 90^\circ\text{C}$ の範囲の温度で実施され得る。反応時間は、 $3\sim 24$ 時間、好ましくは $3\sim 10$ 時間の範囲であり得る。

【 0 1 2 0 】

本発明の別の実施形態では、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物からの、式 (I) (式中 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-R^{4c}$ (ここで、 R^{4c} は、 $(C_1 \sim C_6)$ アルキル基を表す) を表す) を有する化合物の調製方法を提供する：

【化 1 3 1】



【 0 1 2 1 】

(式中、他の全ての記号は、上記定義の通りである)。

【 0 1 2 2 】

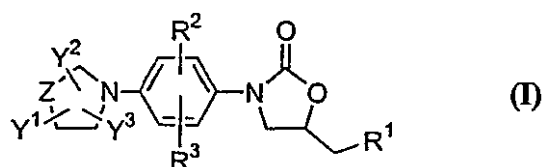
式（I）（式中 R^1 は、 NHR^4 （ここで、 R^4 は、 $-C(=S)-SR^{4c}$ （ここで、 R^{4c} は、 $(C_1 \sim C_6)$ アルキル基を表す）を表す）を有する化合物は、 Et_3N 、ジイソプロピルエチルアミン、 K_2CO_3 、 NaH 、または $KOt-Bu$ 等のような塩基の存在下で CS_2 、続いてヨウ化メチル、臭化エチル、臭化プロピル等のような適切なハロゲン化アルキルを用いることで、式（I）（式中、 R^1 は、 NHR^4 （ここで、 R^4 は、水素原子を表す）を表す）を有する化合物から調製され得る。反応は、水、エタノール、メタノール、イソプロパノール、 CH_3CN 等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、室温～ $60^\circ C$ の範囲の温度で、好ましくは室温で実施され得る。反応時間は、6～24 時間の範囲であり得る。

【 0 1 2 3 】

本発明の別の実施形態では、式（Ⅰ）（式中、 R^1 は、 NHR^4 （ここで、 R^4 は、 $-C(=S)-OR^{4d}$ （ここで、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C_6)$ アルキル、フッ素で置換された $-C(=O)-(C_1 \sim C_6)$ アルキル基、アリール、ハロ $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、または $(C_2 \sim C_6)$ アルケニルを表す）を表す）を有する化合物の調製方法であって、以下の：

(i) 式(I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物を、式 I (式中、 R^1 は、イソチオシアネート基を表し、他の全ての記号は、上記定義の通りである) を有する化合物:

【化 1 3 2】



【 0 1 2 4 】

に変換することと、

(i i) 式 (I) (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物を、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-OR^{4d}$ (ここで、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C_6)$ アルキル、フッ素で置換された $-C(=O)-(C_1 \sim C_6)$ アルキル基、アリール、ハロ $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、または $(C_2 \sim C_6)$ アルケニル基を表す) を表す) を表し、他の全ての記号は、上記定義の通りである) を有する化合物に変換することとを含む方法を提供する。

【0125】

式 I (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物は、 Et_3N 、 K_2CO_3 、 $NaOH$ 等のような塩基の存在下で、チオホスゲンを用いることによって、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、水素原子を表す) を表す) を有する化合物から調製され得る。反応は、エタノール、メタノール、イソプロパノール、 CH_2Cl_2 、 CH_3CN 等のような溶媒の存在下で実施され得る。反応は、 $0 \sim 60^\circ C$ の範囲の温度で、好ましくは $0^\circ C$ で実施され得る。反応は、アルゴンまたは任意の他の不活性ガスを用いて、不活性雰囲気中で実施され得る。反応時間は、 $3 \sim 24$ 時間の範囲であり得る。

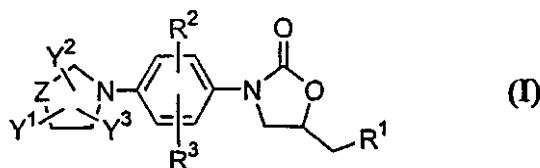
【0126】

式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-OR^{4d}$ (ここで、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C_6)$ アルキル、フッ素で置換された $-C(=O)-(C_1 \sim C_6)$ アルキル基、アリール、ハロ $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、または $(C_2 \sim C_6)$ アルケニルを表す) を表す) を有する化合物は、 NaH 、 KH 等のような塩基の存在下で、メタノール、エタノール、プロパノール、シクロヘキサノール等のようなそれぞれのアルコールを用いることで、式 I (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物から調製される。反応は、THF、トルエン、DMF 等のような溶媒の存在下で実施され得る。反応は、室温 $\sim 130^\circ C$ の範囲の温度で、好ましくは使用される溶媒の還流温度で実施され得る。反応時間は、 $6 \sim 24$ 時間の範囲であり得る。

【0127】

本発明の別の実施形態では、式 (I) (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物からの、式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-N(R'R'')$ (ここで、 R' は、水素、 $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、置換もしくは無置換のアラルキル、ヘテロアラルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキルを表し、 R'' は、水素または $(C_1 \sim C_6)$ アルキルを表すか、あるいは R' および R'' 基は、1 個もしくは 2 個のヘテロ原子を含有する 5 または 6 員環構造を一緒に形成する) を表す) を表す) を有する化合物の調製方法を提供する：

【化133】



【0128】

(式中、他の全ての記号は、上記定義の通りである)。

【0129】

式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-N(R'R'')$ (ここで、 R' および R'' は、独立して、水素を表す) を表す) を有する化合物は、THF、トルエン等のような溶媒を用いることで、式 (I) (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物の溶液にアンモニアガスを通すことにより調製される。反応は、 -10°C ~ 室温の範囲の温度で、好ましくは -10°C で実施され得る。反応時間は、20分 ~ 4時間、好ましくは30分の範囲であり得る。

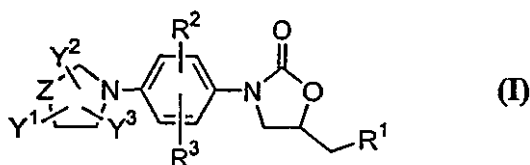
【0130】

式 (I) (式中、 R^1 は、 NHR^4 (ここで、 R^4 は、 $-C(=S)-N(R'R'')$ (ここで、 R' は、水素、 $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、置換もしくは無置換のアラルキル、ヘテロアラルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキルを表し、 R'' は、水素または $(C_1 \sim C_6)$ アルキルを表すか、あるいは R' および R'' 基は、1個もしくは2個のヘテロ原子を含有する5または6員環構造と一緒に形成する) を表す) を有する化合物は、THF、DFM、トルエン等のような溶媒の存在下で、メチルアミン、エチルアミン、ジメチルアミン、ジエチルアミン、ベンジルアミン、アニリン、プロリン、モルホリン、チオモルホリン、ピリジルメチルアミン等のような適切なアミンを用いることで、式 (I) (式中、 R^1 は、イソチオシアネート基を表す) を有する化合物を処理することで調製される。反応は、室温 ~ 140°C の範囲の温度で、好ましくは $60 \sim 100^\circ\text{C}$ で実施され得る。反応時間は、1 ~ 24時間、好ましくは4 ~ 12時間の範囲であり得る。

【0131】

本発明のさらなる別の実施形態では、式 (I) (式中、 Z は、 NR^b (ここで、 R^b は、ヒドロキシ基で置換した $(C_1 \sim C_6)$ アルキル基を表す) を表し、 Y^1 は、「 $=O$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す) を有する化合物からの、式 (I) (式中、 Z は、 NR^b (ここで、 R^b は、水素表す) を表し、 Y^1 は、「 $=O$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す) を有する化合物の調製方法を提供する：

【化134】



【0132】

(式中、他の全ての記号は、上記定義の通りである)。

【0133】

式 (I) (式中、 Z は、 NR^b (ここで、 R^b は、 α 位にてヒドロキシ基で置換した $(C_1 \sim C_6)$ アルキル基を表す) を表し、 Y^1 は、「 $=O$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す) を有する化合物から、式 (I) (式中、 Z は、 NR^b (ここで、 R^b は、水素表す) を表し、 Y^1 は、「 $=O$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す) を有する化合物は、トリエチルアミン、ジイソプロピルアミン、ジイソプロピルエチルアミン、ピリジン、ピペリジン、4-ジメチルアミノピリジン (DMA P)、1,8-ジアザビシクロ[5.4.0]ウンデカ-7-エン (DBU)、リチウムジイソプロピルアミド (LDA)、カリウムビス(トリメチルシリル)アミド、BuLi、 Na_2CO_3 、 K_2CO_3 、NaOH、KOH、NaOMe、NaOEt、NaOiPr、 $t-BuOK$ 、NaH、KH等のような塩基で処理することによって調製され得る。反応に使用される溶媒は、THF、エーテル、ジオキサン、トルエン、ベンゼン、DMF、DMSO、シアン化メチル等から選択され得る。反応温度は、 $-20 \sim 150^\circ\text{C}$ の範囲

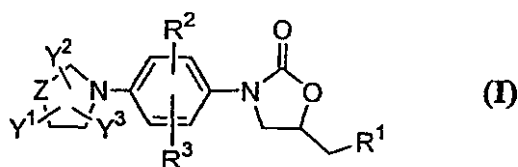
、好ましくは $-10 \sim 100^{\circ}\text{C}$ の範囲に維持され得る。反応期間は、 $0.2 \sim 64$ 時間、好ましくは $1 \sim 48$ 時間の範囲であり得る。

【0134】

本発明のさらに別の実施形態では、式(I) (式中、Zは、 NR^b (ここで、 R^b は、水素を表す)を表し、 Y^1 は、「 $=\text{O}$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す)を有する化合物からの、式(I) (式中、Zは、 NR^b (ここで、 R^b は、置換もしくは無置換の $(\text{C}_1 \sim \text{C}_6)$ アルキルまたはアラルキルを表す)を表し、 Y^1 は、「 $=\text{O}$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す)を有する化合物の調製方法を提供する：

【化135】

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【0135】

(式中、他の全ての記号は、上記定義の通りである)。

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【0136】

式(I) (式中、Zは、 NR^b (ここで、 R^b は、水素を表す)を表し、 Y^1 は、「 $=\text{O}$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す)を有する化合物からの、式(I) (式中、Zは、 NR^b (ここで、 R^b は、置換もしくは無置換の $(\text{C}_1 \sim \text{C}_6)$ アルキルまたはアラルキルを表す)を表し、 Y^1 は、「 $=\text{O}$ 」基を表し、 Y^2 および Y^3 は、独立して、水素原子を表す)を有する化合物は、トリエチルアミン、ジイソプロピルアミン、ジイソプロピルエチルアミン、ピリジン、ピペリジン、DMAP、1,8-ジアザビシクロ[5.4.0]ウンデカ-7-エン(DBU)、リチウムジイソプロピルアミド(LDA)、カリウムビス(トリメチルシリル)アミド、 BuLi 、 Na_2CO_3 、 K_2CO_3 、 NaOH 、 KOH 、 NaOMe 、 NaOEt 、 NaOiPr 、 $t\text{-BuOK}$ 、 NaH 、 KH 等のような塩基の存在下で実施され得て、続いてヨウ化メチル、塩化メトキシメチル、臭化アリル、臭化ベンジル等のようなハロゲン化アルキルと反応させ得る。反応で使用される溶媒は、DMF、DMSO、THF、ジオキサン、ベンゼン、トルエン等から選択され得る。反応温度は、 $-5 \sim 150^{\circ}\text{C}$ の範囲、好ましくは $0^{\circ}\text{C} \sim$ 溶媒の還流温度の範囲で維持され得る。反応期間は、 $0.2 \sim 48$ 時間の範囲、好ましくは $0.5 \sim 24$ 時間の範囲であり得る。

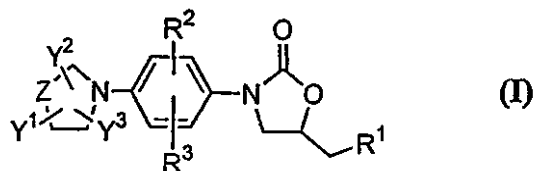
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【0137】

本発明の別の実施形態では、式(I) (式中、 R^1 は、ヒドロキシ基を表す)を有する化合物からの、式(I) (式中、 R^1 は、ハロゲンを表す)を有する化合物の調製方法を提供する：

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【化136】



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【0138】

(式中、他の全ての記号は、上記定義の通りである)。

【0139】

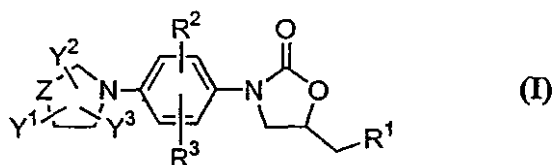
式(I) (式中、 R^1 は、ハロゲンを表す) を有する化合物は、 PPh_3 または P (アルキル)₃ 等の存在下で、 CBr_4 、 CCl_4 等のようなテトラハロメタン基で処理することにより、式(I) (式中、 R^1 は、ヒドロキシ基を表す) を有する化合物から調製される。反応は、乾燥ジクロロメタン、クロロホルム、テトラクロロメタン、ベンゼン、DMF、DMSO、THF等のような溶媒の存在下で実施され得る。反応温度は、0～60℃の範囲で、好ましくは室温で維持され得る。反応期間は、2～24時間、好ましくは8～13時間の範囲であり得る。

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【0140】

本発明の別の実施形態では、式(I) (式中、 R^1 は、ハロゲン原子を表す) を有する化合物からの、式(I) (式中、 R^1 は、「SH」基を表す) を有する化合物：

【化137】



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【0141】

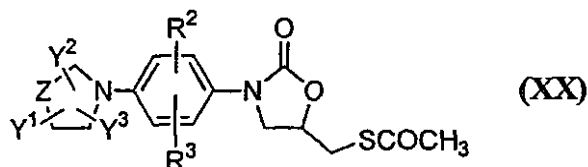
(式中、他の全ての記号は、上記定義の通りである)

の調製方法であって、以下の：

(i) 式(I) (式中、 R^1 は、ハロゲン原子基を表す) を有する化合物を、塩基およびチオ酢酸と反応させて、下記式(XX)：

【化138】

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【0142】

(式中、他のすべての記号は、上記定義の通りである)

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を有する化合物を生産することと、

(i i) 式 (X X) を有する化合物を、塩基と反応させて、式 (I) (式中、 R^1 は、「SH」基を表し、他のすべての記号は、上記定義の通りである) を有する化合物を生産することと

を含む方法を提供する。

【0143】

式 (X X) を有する化合物は、トリエチルアミン、ジイソプロピルアミン、ジイソプロピルエチルアミン、ピリジン、ピペリジン、DMA P、1, 8-ジアザビシクロ [5. 4. 0] ウンデカ-7-エン (DBU)、リチウムジイソプロピルアミド (LDA)、カリウムビス (トリメチルシリル) アミド、BuLi、 Na_2CO_3 、 K_2CO_3 、NaOH、KOH、NaOMe、NaOEt、NaOiPr、t-BuOK、NaH、KH等のような塩基の存在下で、チオ酢酸を用いることで、式 (I) (式中、 R^1 は、ヒドロキシ基を表す) を有する化合物から調製される。反応に用いる溶媒は、THF、ベンゼン、ジオキサン等から選択され得る。反応温度は、室温～還流温度の範囲、好ましくは還流温度で維持される。反応期間は、2～24時間の範囲、好ましくは6時間で維持される。

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【0144】

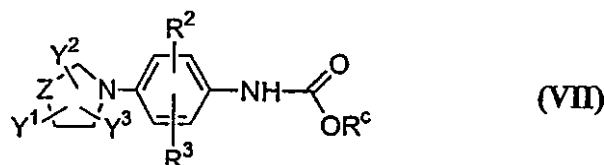
式 (I) (式中、 R^1 は、「SH」基を表す) を有する化合物は、 K_2CO_3 、NaOH、KOH、BuLi等のような塩基と反応させることで、式 (X X) を有する化合物から調製される。反応は、室温～還流温度の範囲の温度で実施され得る。反応期間は、1～24時間の範囲であり得る。

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【0145】

本発明のさらに別の実施形態では、下記式 (VII) :

【化139】



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【0146】

(式中、

R^c は、($C_1 \sim C_8$) アルキル基 (例えば、メチル、エチル、プロピル、ベンジル、アリル基等) を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の ($C_1 \sim C_6$) アルキル基、またはハロ ($C_1 \sim C_6$) アルキルを表す) を表し、

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Z は、S、O、=CH、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の ($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y^1 は、=O、または=S基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S基、あるいは ($C_1 \sim C_6$) アルキル、ヒドロキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル

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、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C₆)アルキル、アミノ(C₁～C₆)アルキル、モノ(C₁～C₆)アルキルアミノ、ジ(C₁～C₆)アルキルアミノ、アリールアミノ、(C₁～C₆)アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y²およびY³はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する新規中間体を提供する。

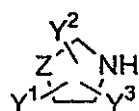
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【0147】

式(VII)を有する新規中間体は、以下の：

(i) 下記式(III)：

【化140】



(III)

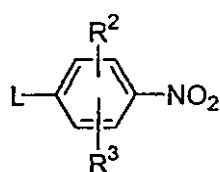
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【0148】

(式中、他のすべての記号は、上記定義の通りである)

を有する化合物を、下記式(IV)：

【化141】



(IV)

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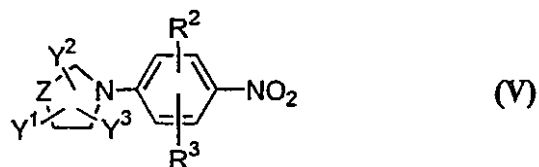
【0149】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表し、R²およびR³は、上記定義の通りである)

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を有する化合物と反応させて、下記式(V)：

【化142】



【0150】

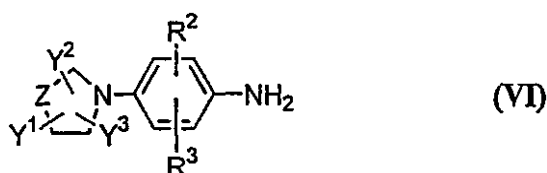
(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

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を有する化合物を生産することと、

(ii) 式 (V) を有する化合物を還元して、下記式 (VI) :

【化143】



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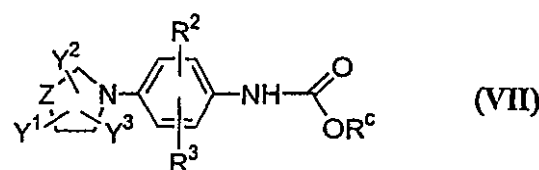
【0151】

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(iii) 式 (VI) を有する化合物をクロロギ酸アルキルと反応させて、下記式 (VII) :

【化144】



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【0152】

(式中、 R^c 、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

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を有する化合物を生産することと

を含む方法によって調製され得る。

【0153】

式 (V) を有する化合物を生産するための、式 (III) を有する化合物と式 (IV) を有する化合物との反応は、 KOH 、 $NaOH$ 、 K_2CO_3 、 Na_2CO_3 、 NaH 、 KH 、トリエチルアミン、ジイソプロピルエチルアミン等のような塩基を用いて実施され得る。反応は、 $DMSO$ 、 DMF 、 THF 、アセトニトリル、クロロホルム等、またはそれらの混合物のような溶媒を用いて実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、 N_2 または Ar のような不活性ガスを用いて維持され得る。反応は、

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20℃～100℃の範囲の温度で、好ましくは外気温～80℃の範囲の温度で実施され得る。反応は、1～15時間、好ましくは6～12時間の範囲であり得る。

【0154】

式(VI)を有する化合物を生産するための、式(V)を有する化合物の還元は、気体水素、および炭、アルミナ、アスベスト等のような固体ビーズ上のRu、Pd、Rh、Pt、Niのような触媒の存在下で実施され得る。還元は、ジオキサン、酢酸、酢酸エチル、THF、アルコール（例えば、メタノール、エタノール等）、またはそれらの混合物のような溶媒の存在下で行われ得る。大気圧～60psiの圧力を使用してもよい。反応は、25～60℃の範囲の温度で、好ましくは室温で実施され得る。反応時間は、2～48時間の範囲である。還元はまた、Sn/HCl、Fe/HCl、Zn/HCl、Zn/CH₃CO₂H等のような鉱酸中の金属を用いて実施してもよい。

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【0155】

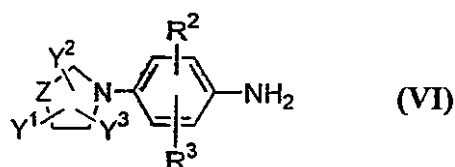
式(VI)を有する化合物の、式(VII)を有する化合物への変換は、クロロギ酸メチル、クロロギ酸エチル、クロロギ酸プロピル、クロロギ酸ベンジル等のようなクロロギ酸アルキルを用いて実施され得る。反応溶媒は、水、アセトン、テトラヒドロフラン（THF）、アセトニトリル、ジクロロメタン（DCM）等、またはそれらの混合物から選択され得る。反応は、K₂CO₃、Na₂CO₃、NaH、KOH、トリエチルアミン等のような塩基の存在下で実施され得る。反応温度は、0～60℃の存在下で、好ましくは0℃～室温で実施され得る。反応時間は、1～12時間の範囲、好ましくは1～4時間の範囲に維持される。

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【0156】

本発明のさらに別の実施形態では、下記式(VI)：

【化145】



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【0157】

(式中、

R² および R³ は、同じであるか、または異なり、独立して、水素、ハロゲン原子、(C₁～C₆)アルキル基、ハロ(C₁～C₆)アルキル、シアノ、ニトロ、SR^a、NR^a、OR^a（ここで、R^a は、置換もしくは無置換の(C₁～C₆)アルキル基、またはハロ(C₁～C₆)アルキルを表す)を表し、

Zは、S、O、=CH、またはNR^b（ここで、R^b は、水素、あるいは置換もしくは無置換の(C₁～C₆)アルキル、(C₂～C₆)アルケニル、(C₁～C₆)シクロアルキル、(C₁～C₆)アルコキシ、アリール、アラルキル、アリールオキシ、(C₁～C₆)アルキルカルボニル、アリールカルボニル、(C₁～C₆)アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

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Y¹ は、=O、または=S基を表し、

Y² および Y³ は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S基、あるいは(C₁～C₆)アルキル、ヒドロキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシ(C₁～C₆)アルキル、(C₁～C₆)アルコキシカルボニル、カルボキシ(C₁～C₆)アルキル、(C₁～C₆)アルキルスルホニル、(C₁～C₆)アルキルカルボニルアミノ(C₁～C₆)アルキル、アリールカルボニルアミノ(C₁～C₆)アルキル、(C₁～C₆)アルキルカルボニルオキシ(C₁～C

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6) アルキル、アミノ (C₁ ~ C₆) アルキル、モノ (C₁ ~ C₆) アルキルアミノ、ジ (C₁ ~ C₆) アルキルアミノ、アリールアミノ、(C₁ ~ C₆) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y² および Y³ はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

を有する新規中間体を提供する。

【0158】

式 (VI) を有する新規中間体は、以下の：

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(i) 下記式 (III)：

【化146】



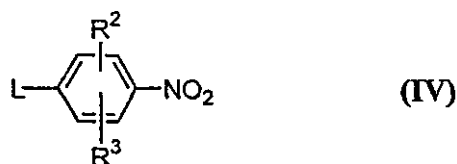
【0159】

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(式中、すべての記号は、上記定義の通りである)

を有する化合物を、下記式 (IV)：

【化147】



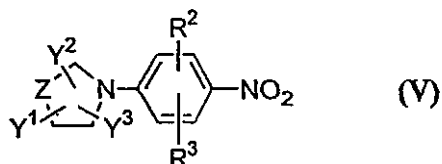
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【0160】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表し、R² および R³ は、上記定義の通りである)

を有する化合物と反応させて、下記式 (V)：

【化148】



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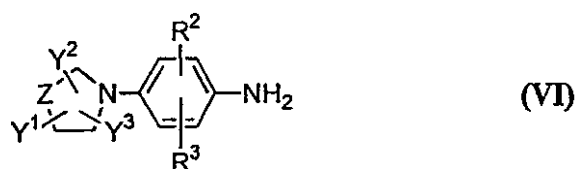
【0161】

(式中、Y¹、Y²、Y³、R²、R³ および Z は、上記定義の通りである)

を有する化合物を生産することと、

(ii) 式 (V) を有する化合物を還元して、下記式 (VI)：

【化149】



【0162】

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(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)
を有する化合物を生産することと
を含む方法によって調製され得る。

【0163】

式(V)を有する化合物を生産するための、式(III)を有する化合物と式(IV)を有する化合物との反応は、 KOH 、 $NaOH$ 、 K_2CO_3 、 Na_2CO_3 、 NaH 、 KH 、トリエチルアミン、ジイソプロピルエチルアミン等のような塩基を用いて実施され得る。反応は、 $DMSO$ 、 DMF 、 THF 、アセトニトリル、クロロホルム等、またはそれらの混合物のような溶媒を用いて実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、 N_2 または Ar のような不活性ガスを用いて維持され得る。反応は、 $20^\circ C \sim 100^\circ C$ の範囲の温度で、好ましくは外気温 $\sim 80^\circ C$ の範囲の温度で実施され得る。反応時間は、1 $\sim$ 15 時間、好ましくは 6 $\sim$ 12 時間の範囲であり得る。

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【0164】

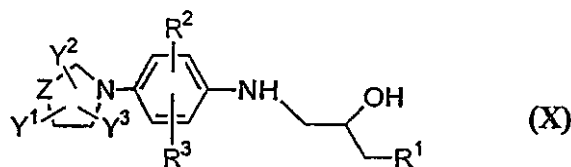
式(VI)を有する化合物を生産するための、式(V)を有する化合物の還元は、気体水素、および炭、アルミナ、アスベスト等のような固体ビーズ上の Ru 、 Pd 、 Rh 、 Pt 、 Ni のような触媒の存在下で実施され得る。還元は、ジオキサン、酢酸、酢酸エチル、 THF 、アルコール(例えば、メタノール、エタノール等)、またはそれらの混合物のような溶媒の存在下で行われ得る。大気圧 $\sim 60\text{ psi}$ の圧力を使用してもよい。反応は、 $25 \sim 60^\circ C$ の範囲の温度で、好ましくは室温で実施され得る。反応時間は、2 $\sim$ 48 時間の範囲である。還元はまた、 Sn/HCl 、 Fe/HCl 、 Zn/HCl 、 Zn/CH_3CO_2H 等のような鉱酸中の金属を用いて実施してもよい。

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【0165】

本発明のさらなる別の実施形態では、下記式(X)：

【化150】



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【0166】

(式中、
 R^1 は、ハロ、アジド、チオアルコール、イソチオシアネート、 OR^4 、 NHR^4 、または $N(R^4)_2$ (ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、 $(C_1 \sim C_6)$ アルコキシカルボニル、 $(C_3 \sim C_6)$ シクロアルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシカルボニル、 $(C_2 \sim C_6)$ アルケニルカルボニル、アリールオキシカルボニル、 $(C_1 \sim C_6)$ アルコキシチオカルボニル、 $(C_2 \sim C_6)$ アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、 $-C(=O)-C(=O)-$ ア

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ルキル、 $-C(=O)-C(=O)-$ アリール、 $-C(=O)-C(=O)-$ アルコキシ、 $-C(=O)-C(=O)-$ アリールオキシ、 $-(C=S)-S-$ アルキル、 $-(C=S)-NH_2$ 、 $-(C=S)-NH-$ アルキル、 $-C(=S)-N-(\text{アルキル})_2$ 、 $-C(=S)-NH-$ アルケニル、 $-(C=S)-(C=O)-$ アルコキシ、 $-(C=S)-(C=O)-$ アリールオキシ、 $-C(=S)-O-(C=O)-$ アルキル、 $-C(=S)-C(=S)-$ アルキル、 $-C(=S)-C(=S)-$ アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、 $(C_1 \sim C_6)$ アルキル基、ハロ $(C_1 \sim C_6)$ アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の $(C_1 \sim C_6)$ アルキル基、またはハロ $(C_1 \sim C_6)$ アルキルを表す)を表し、

Z は、S、O、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の $(C_1 \sim C_6)$ アルキル、 $(C_2 \sim C_6)$ アルケニル、 $(C_1 \sim C_6)$ シクロアルキル、 $(C_1 \sim C_6)$ アルコキシ、アリール、アラルキル、アリールオキシ、 $(C_1 \sim C_6)$ アルキルカルボニル、アリールカルボニル、 $(C_1 \sim C_6)$ アルコキシカルボニル、またはアリールオキシカルボニルを表す)を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシカルボニル、カルボキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルスルホニル、 $(C_1 \sim C_6)$ アルキルカルボニルアミノ $(C_1 \sim C_6)$ アルキル、アリールカルボニルアミノ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルキルカルボニルオキシ $(C_1 \sim C_6)$ アルキル、アミノ $(C_1 \sim C_6)$ アルキル、モノ $(C_1 \sim C_6)$ アルキルアミノ、ジ $(C_1 \sim C_6)$ アルキルアミノ、アリールアミノ、 $(C_1 \sim C_6)$ アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に 1 個または 2 個のヘテロ原子を含有する、置換もしくは無置換の 5 または 6 員の芳香環あるいは非芳香環構造を一緒に形成する)

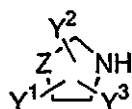
を有する新規中間体を提供する。

【0167】

式 (X) を有する新規中間体は、以下の：

(i) 下記式 (III)：

【化151】



(III)

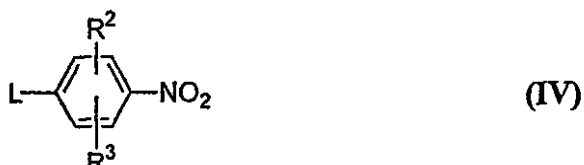
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【0168】

(式中、すべての記号は、上記定義の通りである)

を有する化合物を、下記式 (IV)：

【化152】



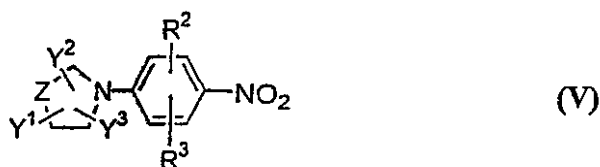
【0169】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表し、 R^2 および R^3 は、上記定義の通りである)

を有する化合物と反応させて、下記式(V)：

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【化153】



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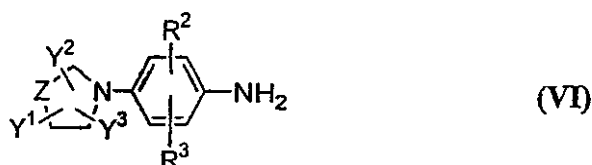
【0170】

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(ii) 式(V)を有する化合物を還元して、下記式(VI)：

【化154】



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【0171】

(式中、 Y^1 、 Y^2 、 Y^3 、 R^2 、 R^3 および Z は、上記定義の通りである)

を有する化合物を生産することと、

(iii) 式(VI)を有する化合物を、下記式(IX)：

【化155】



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【0172】

(式中、 R^1 は、 NHR^4 、または $N(R^4)_2$ (ここで、 R^4 は、水素原子、あるいはアシル、チオアシル、($C_1 \sim C_6$) アルコシカルボニル、($C_3 \sim C_6$) シクロアルコシチオカルボニル、($C_2 \sim C_6$) アルケニルオシカルボニル、($C_2 \sim C_6$) アルケニルカルボニル、アリールオシカルボニル、($C_1 \sim C_6$) アルコシチオカルボ

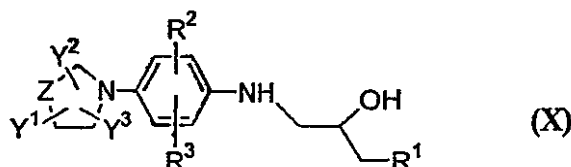
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ニル、(C₂ ~ C₆) アルケニルオキシチオカルボニル、アリールオキシチオカルボニル、-C(=O)-C(=O)-アルキル、-C(=O)-C(=O)-アリール、-C(=O)-C(=O)-アルコキシ、-C(=O)-C(=O)-アリールオキシ、-(C(=S)-S-アルキル、-(C(=S)-NH₂、-(C(=S)-NH-アルキル、-C(=S)-N-(アルキル)₂、-C(=S)-NH-アルケニル、-(C(=S)-C(=O)-アルコキシ、-(C(=S)-C(=O)-アリールオキシ、-C(=S)-O-(C(=O)-アルキル、-C(=S)-C(=S)-アルキル、-C(=S)-C(=S)-アリール、チオモルホニルチオカルボニル、もしくはピロリジニルチオカルボニルから選択される置換または無置換の基を表す)を表す)

を有する化合物と反応させて、下記式(X)：

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【化156】



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【0173】

(式中、Y¹、Y²、Y³、R²、R³ および Z は、上記定義の通りである)

を有する化合物を生産することと

を含む方法によって調製され得る。

【0174】

式(V)を有する化合物を生産するための、式(III)を有する化合物と式(IV)を有する化合物との反応は、KOH、NaOH、K₂CO₃、Na₂CO₃、NaH、KH、トリエチルアミン、ジイソプロピルエチルアミン等のような塩基を用いて実施され得る。反応は、DMSO、DMF、THF、アセトニトリル、クロロホルム等、またはそれらの混合物を用いて実施され得る。反応は、不活性雰囲気下で実施してもよく、不活性雰囲気は、N₂ または Ar のような不活性ガスを用いて維持され得る。反応は、20℃~100℃の範囲の温度で、好ましくは外気温~80℃の範囲の温度で実施され得る。反応は、1~15時間、好ましくは6~12時間の範囲であり得る。

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【0175】

式(VI)を有する化合物を生産するための、式(V)を有する化合物の還元は、気体水素、および炭、アルミナ、アスベスト等のような固体ビーズ上のRu、Pd、Rh、Pt、Niのような触媒の存在下で実施され得る。還元は、ジオキサン、酢酸、酢酸エチル、THF、アルコール(例えば、メタノール、エタノール等)、またはそれらの混合物のような溶媒の存在下で行われ得る。大気圧~60psiの圧力を使用してもよい。反応は、25~60℃の範囲の温度で、好ましくは室温で実施され得る。反応時間は、2~48時間の範囲である。還元はまた、Sn/HCl、Fe/HCl、Zn/HCl、Zn/CH₃CO₂H等のような鉱酸中の金属を用いて実施してもよい。

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【0176】

式(X)を有する化合物を生産するための、上記に定義した式(VI)を有する化合物と、上記に定義した式(IX)を有する化合物との反応は、K₂CO₃、NaH、t-BuOK等、またはそれらの混合物のような塩基の存在下あるいは非存在下で実施され得る。

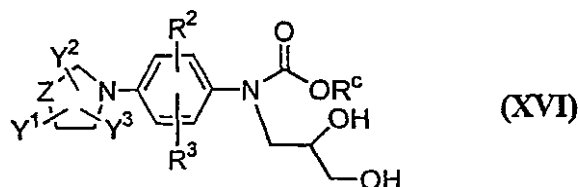
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反応は、トルエン、DMF、THF、CH₃CN等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応はまた、BF₃・OEt₂、ZnCl₂、Ti(OiPr)₄、ランタニド金属錯体等のようなルイス酸の存在下で、かつDCE、DMF、THF等、またはそれらの混合物の存在下で実施され得る。反応温度は、0～120℃の範囲で、好ましくは0～100℃の範囲の温度で実施され得る。反応時間は、3～24時間、好ましくは4～12時間の範囲であり得る。

【0177】

本発明のさらなる別の実施形態では、下記式(XVI)：

【化157】



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【0178】

(式中、

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R^c は、(C₁～C₈) アルキル基 (例えば、メチル、エチル、プロピル、ベンジル、アリル基等) を表し、

R² および R³ は、同じであるか、または異なり、独立して、水素、ハロゲン原子、(C₁～C₆) アルキル基、ハロ(C₁～C₆) アルキル、シアノ、ニトロ、SR^a、NR^a、OR^a (ここで、R^a は、置換もしくは無置換の(C₁～C₆) アルキル基、またはハロ(C₁～C₆) アルキルを表す) を表し、

Z は、S、O、=CH、またはNR^b (ここで、R^b は、水素、あるいは置換もしくは無置換の(C₁～C₆) アルキル、(C₂～C₆) アルケニル、(C₁～C₆) シクロアルキル、(C₁～C₆) アルコキシ、アリール、アラルキル、アリールオキシ、(C₁～C₆) アルキルカルボニル、アリールカルボニル、(C₁～C₆) アルコキシカルボニル、

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またはアリールオキシカルボニルを表す) を表し、

Y¹ は、=O、または=S基を表し、

Y² および Y³ は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、=O、=S基、あるいは(C₁～C₆) アルキル、ヒドロキシ(C₁～C₆) アルキル、(C₁～C₆) アルコキシ(C₁～C₆) アルキル、(C₁～C₆) アルコキシカルボニル、カルボキシ(C₁～C₆) アルキル、(C₁～C₆) アルキルスルホニル、(C₁～C₆) アルキルカルボニルアミノ(C₁～C₆) アルキル、アリールカルボニルアミノ(C₁～C₆) アルキル、(C₁～C₆) アルキルカルボニルオキシ(C₁～C₆) アルキル、アミノ(C₁～C₆) アルキル、モノ(C₁～C₆) アルキルアミノ、ジ(C₁～C₆) アルキルアミノ、アリールアミノ、(C₁～C₆) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、Y² および Y³ はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成する)

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を有する新規中間体を提供する。

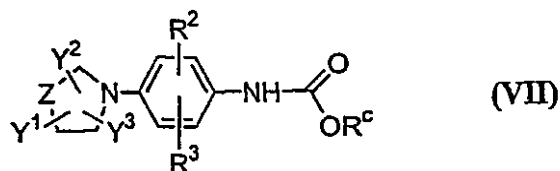
【0179】

式(XVI)を有する新規中間体は、以下の：

(i) 下記式(VII)：

【化158】

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【0180】

(式中、すべての記号は、上記定義の通りである)
を有する化合物を、下記式 (XIV) :

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【化159】

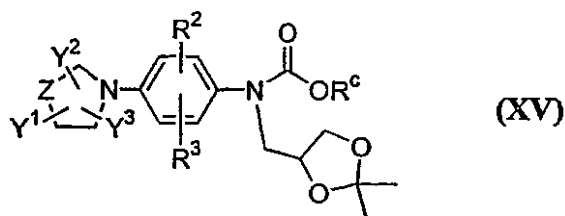


【0181】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表す)
を有する化合物と反応させて、下記式 (XV) :

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【化160】



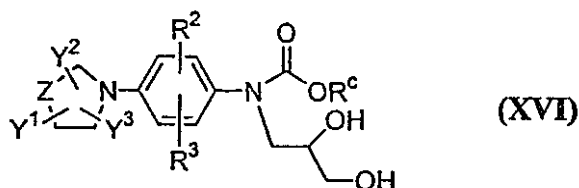
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【0182】

(式中、R^c、Y¹、Y²、Y³、R²、R³ および Z は、上記定義の通りである)
を有する化合物を生産することと、

(i i) 式 (XV) を有する化合物中のアセトニド部分を、従来法を用いて加水分解して、
下記式 (XVI) :

【化161】



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【0183】

(式中、R^c、Y¹、Y²、Y³、R²、R³ および Z は、上記定義の通りである)
を有する化合物を生産することと
を含む方法によって調製され得る。

【0184】

式 (XV) を有する化合物を生産するための、式 (VII) を有する化合物と、式 (XI) 50

V) を有する化合物との反応は、塩基の存在下で実施され得る。使用される塩基は、 K_2CO_3 、 NaH 、 $t-BuOK$ 、 LDA 等から選択され得る。反応は、 DMF 、 THF 、 $DMSO$ 、 $EtOH$ 等のような溶媒の存在下で実施され得る。反応は、 $-78 \sim 120^\circ C$ の範囲の温度で、好ましくは $-78^\circ C \sim 100^\circ C$ の範囲の温度で実施され得る。反応時間は、 $2 \sim 24$ 時間、好ましくは $2 \sim 20$ 時間の範囲であり得る。

【0185】

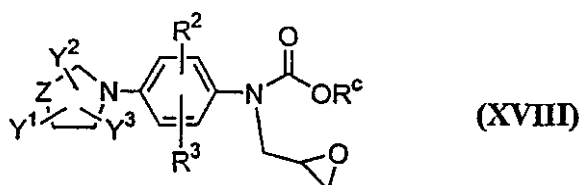
式(XVI)を有する化合物を生産するための、式(XV)を有する化合物の加水分解は、 HCl 、 H_2SO_4 等のような希鉱酸、酢酸水、 p -トルエンスルホン酸、カンファスルホン酸、トリフルオロ酢酸等のような有機酸を用いて実施され得る。反応は、水、メタノール、 THF 、ジオキサン等、またはそれらの混合物のような適切な溶媒の存在下で実施され得る。反応は、 $30 \sim 100^\circ C$ の範囲の温度で、好ましくは $30 \sim 60^\circ C$ の範囲の温度で実施され得る。反応時間は、 10 分 ~ 5 時間、好ましくは 30 分 ~ 2.5 時間の範囲であり得る。

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【0186】

本発明のさらなる別の実施形態では、下記式(XVII)：

【化162】



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【0187】

(式中、

R^c は、($C_1 \sim C_8$) アルキル基 (例えば、メチル、エチル、プロピル、ベンジル、アリル基等) を表し、

R^2 および R^3 は、同じであるか、または異なり、独立して、水素、ハロゲン原子、($C_1 \sim C_6$) アルキル基、ハロ($C_1 \sim C_6$) アルキル、シアノ、ニトロ、 SR^a 、 NR^a 、 OR^a (ここで、 R^a は、置換もしくは無置換の($C_1 \sim C_6$) アルキル基、またはハロ($C_1 \sim C_6$) アルキルを表す) を表し、

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Z は、 S 、 O 、 $=CH$ 、または NR^b (ここで、 R^b は、水素、あるいは置換もしくは無置換の($C_1 \sim C_6$) アルキル、($C_2 \sim C_6$) アルケニル、($C_1 \sim C_6$) シクロアルキル、($C_1 \sim C_6$) アルコキシ、アリール、アラルキル、アリールオキシ、($C_1 \sim C_6$) アルキルカルボニル、アリールカルボニル、($C_1 \sim C_6$) アルコキシカルボニル、またはアリールオキシカルボニルを表す) を表し、

Y^1 は、 $=O$ 、または $=S$ 基を表し、

Y^2 および Y^3 は、独立して、水素、ハロゲン、シアノ、ニトロ、ホルミル、ヒドロキシ、アミノ、 $=O$ 、 $=S$ 基、あるいは($C_1 \sim C_6$) アルキル、ヒドロキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルコキシカルボニル、カルボキシ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルスルホニル、($C_1 \sim C_6$) アルキルカルボニルアミノ($C_1 \sim C_6$) アルキル、アリールカルボニルアミノ($C_1 \sim C_6$) アルキル、($C_1 \sim C_6$) アルキルカルボニルオキシ($C_1 \sim C_6$) アルキル、アミノ($C_1 \sim C_6$) アルキル、モノ($C_1 \sim C_6$) アルキルアミノ、ジ($C_1 \sim C_6$) アルキルアミノ、アリールアミノ、($C_1 \sim C_6$) アルコキシ、アリール、アリールオキシ、アラルキル、ヘテロアリール、ヘテロアラルキル、ヘテロシクリル、もしくはヘテロシクロアルキルから選択される置換または無置換の基を表し、 Y^2 および Y^3 はまた、隣接炭素原子上に存在する場合、任意に1個または2個のヘテロ原子を含有する、置換もしくは無置換の5または6員の芳香環あるいは非芳香環構造を一緒に形成す

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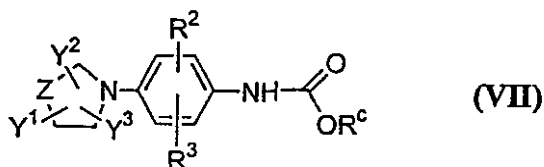
る)

を有する新規中間体を提供する。

【0188】

式(XVII)を有する新規中間体は、下記式(VII)：

【化163】



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【0189】

(式中、すべての記号は、上記定義の通りである)

を有する化合物を、下記式(XVII)：

【化164】



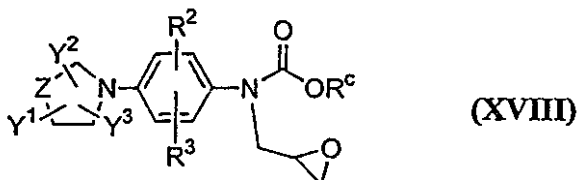
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【0190】

(式中、Lは、脱離基(例えば、ハロゲン原子、アルコキシ、スルホニル基等)を表す)

を有する化合物と反応させて、下記式(XVII)：

【化165】



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【0191】

(式中、R^c、Y¹、Y²、Y³、R²、R³およびZは、上記定義の通りである)

を有する化合物を生産することを含む方法によって調製され得る。

【0192】

上記に定義した式(VII)を有する化合物と、上記に定義した式(XVII)を有する化合物との反応は、NaH、NaOMe、K₂CO₃、n-BuLi、LDA等のような塩基の存在下で実施され得る。反応は、DMF、THF、DMSO、ベンゼン等、またはそれらの混合物のような溶媒の存在下で実施され得る。反応は、-78~70℃の範囲の温度で、好ましくは-78~50℃の範囲の温度で実施され得る。反応時間は、1~15時間、好ましくは1~10時間の範囲であり得る。

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【0193】

上述の反応のいずれかにおいて、基質分子中の任意の反応性基は、従来の化学的実践に従って保護されることが理解されよう。上述の反応のいずれかにおける適切な保護基は、水酸基またはフェノール性水酸基を保護するためのt-ブチルジメチルシリル、メトキシメチル、トリフェニルメチル、ベンジルオキシカルボニル、テトラヒドロピラン(THP)等、アミノまたはアニリノ基の保護のためのN-t-ブトキシカルボニル(N-Boc)、N-ベンジルオキシカルボニル(N-Cbz)、N-フルオレニルメトキシカルボニル(-N-Fmoc)、ベンゾフェノンイミン、プロパルギルオキシカルボニル(PO

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C) 等、アルデヒドのアセタール保護、ケトン等のケタール保護等である。かかる保護基の形成および除去の方法は、保護される分子に適切な従来法である。

【0194】

エナンチオマーは、適用可能であれば、プロセスにおいて単一エナンチオマー形態の反応物を用いることにより、あるいは単一エナンチオマー形態の試薬または触媒の存在下で反応を行うことにより調製され得る。単一エナンチオマーはまた、従来法によりラセミ混合物を分割することにより調製されてもよい。本発明の一部を形成する化合物の立体異性体は、適用可能であれば、プロセスにおいて単一エナンチオマー形態の反応物を用いることにより、あるいは単一エナンチオマー形態の試薬または触媒の存在下で反応を行うことにより、あるいは従来法によりラセミ混合物を分割することにより調製され得る。幾つかの好ましい方法としては、微生物分割の使用、適用可能であれば、マンデル酸、カンファスルホン酸、酒石酸、乳酸等のようなキラル酸、またはブルシン、キナ皮アルカロイドおよびそれらの誘導体等のようなキラル塩基により形成されるジアステレオマー塩の分割が挙げられる。一般に使用される方法は、「Enantiomers, Racemates and Resolution」(Wiley Interscience, 1981)においてJaques等により編集されている。適切である場合に、式 (I) を有する化合物は、キラルアミン、アミノ酸、アミノ酸に由来するアミノアルコールで処理することにより分割してもよく、従来の反応条件を用いて、酸をアミドに変換してもよく、ジアステレオマーを分別晶出またはクロマトグラフィのいずれかにより分離してもよく、式 (I) を有する化合物の立体異性体を、純粋なジアステレオマーアミドを加水分解することによって調製してもよい。

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【0195】

薬学的に許容可能な塩は、適用可能であれば、式 (I) を有する化合物を、溶媒（例えば、エーテル、THF、メタノール、*t*-ブタノール、ジオキサン、イソプロパノール、エタノール等）中で、1～4当量の塩基（例えば、水酸化ナトリウム、ナトリウムメトキシド、水素化ナトリウム、カリウム*t*-ブトキシド、水酸化カルシウム、水酸化ナグネシウム等）と反応させることで調製される。溶媒の混合物を使用してもよい。また、リシン、アルギニン、ジエタノールアミン、コリン、トロメタミン、グアニジン、およびそれらの誘導体等のような有機塩基を使用してもよい。あるいは、適用可能であれば、付加酸は、酢酸エチル、エーテル、アルコール、アセトン、THF、ジオキサン等のような溶媒中で、塩化水素酸、塩化臭素酸、硝酸、硫酸、リン酸、*p*-トルエンスルホン酸、メタンスルホン酸、酢酸、クエン酸、マレイン酸、サリチル酸、ヒドロキシナフトエ酸、アスコルビン酸、パルミチン酸、コハク酸、安息香酸、ベンゼンスルホン酸、酒石酸等のような酸で処理することにより調製される。また、溶媒の混合物を使用してもよい。アミノ酸基および他の基の塩は、アルコール、ケトン、エーテル等のような溶媒中で、式 (I) を有する化合物を、それぞれの基と反応させることで調製され得る。溶媒の混合物を使用してもよい。

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【0196】

本発明の一部を形成する一般式 (I) を有する化合物の様々な多形は、種々の条件下で、式 (I) を有する化合物の結晶化により調製され得る。例えば、一般に使用される種々の溶媒、またはそれらの混合物を再結晶に使用すること、種々の温度での結晶化、結晶化中の非常に速い冷却から非常に遅い冷却に及ぶ様々な冷却様式。また、化合物の加熱または冷却、続く徐冷または急冷により多形を得てもよい。多形の存在は、固体プローブNMR分光法、IR分光法、示差走査熱測定分析、粉末X線回折、またはかかる他の技法により決定され得る。

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【0197】

本発明はまた、通常薬学的に使用されるなキャリア、希釈剤等と組み合わせて、上記に定義した一般式 (I) を有する化合物、それらの誘導体、それらの類縁体、それらの互変異性型、それらの立体異性体、それらの多形、それらの薬学的に許容可能な塩、またはそれらの薬学的に許容可能な溶媒和物を含有する薬学的組成物を提供する。本発明による薬学的組成物は、細菌感染の治療に使用することができる。本発明による薬学的組成物はまた

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、多剤耐性に関連した薬剤感染の治療に使用することができる。

【0198】

本発明の一部を形成する式（I）を有する化合物の薬学的に許容可能な溶媒和物は、水、メタノール、エタノール等のような溶媒中に、好ましくは水中に、式（I）を有する化合物を溶解し、種々の結晶化技法を用いることで再結晶させることのような従来法により調製され得る。

【0199】

薬学的組成物は、錠剤、カプセル、粉末、シロップ、溶液、懸濁液等のような通常使用される形態であってもよく、適切な固体または液体キャリアもしくは希釈剤中に風味剤、甘味料を含有してもよく、あるいは注射用溶液もしくは懸濁液を形成するための滅菌媒質中に存在してもよい。かかる組成物は通常、1～20重量%、好ましくは1～10重量%の活性化合物を含有し、組成物の残りは、薬学的に許容可能なキャリア、希釈剤または溶媒である。

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【0200】

適切な薬学的に許容可能なキャリアとしては、固体充填剤または希釈剤、および滅菌水溶液または有機溶液が挙げられる。活性化合物は、上記範囲の所望の投与量を提供するのに十分な量で、かかる薬学的組成物中に存在する。したがって、経口投与に関して、化合物は、カプセル、錠剤、粉末、シロップ、溶液、懸濁液等を形成するための適切な固体、液体キャリアまたは希釈剤と組み合わせることができる。薬学的組成物は、望ましい場合、風味剤、甘味料、賦形剤等のような付加的成分を含有してもよい。非経口投与に関して、化合物は、注射溶液もしくは懸濁液を形成するための滅菌水性または有機媒質と組み合わせることができる。例えば、ゴマ油または落下製油、水性ポリエチレングリコール等中の溶液、ならびに化合物の塩基との水溶性の薬学的に許容可能な酸付加塩（単数または複数）の水溶液を使用することができる。続いて、この方法で調製される注射用溶液は、静脈内、腹腔内、皮下、または筋肉内に投与することができ、ヒトにおいては筋肉投与が好ましい。

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【0201】

式（I）を有する化合物のほかに、本発明の薬学的組成物はまた、β-ラクタムまたはアミノグリコシドのような他の臨床的に有用な抗菌剤から選択される1つまたはそれより多い既知の薬剤を含有するか、あるいはそれらと同時投与してもよい。これらは、例えばメチシリン耐性ブドウ球菌に対して治療上の有効性を広げるために、アキサシリンまたはフルクロキサシリンのようなペニシリン類、およびメロペナムまたはイミフェネムのようなカルバペネム類を含んでもよい。本発明の式（I）を有する化合物はまた、グラム陰性菌、および抗菌剤に対して耐性である細菌に対する活性を改良するために、殺菌性／透過性増加性タンパク質製品（BPI）または流出ポンプ阻害剤を含有するか、あるいはそれらと同時投与してもよい。

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【0202】

上記に定義した式（I）を有する化合物は、経口または非経口経路のいずれかによって、ヒトを含む哺乳類に臨床的に投与される。経口経路による投与が好ましく、それはより簡便であり、注射の痛みおよび刺激の可能性を回避する。しかしながら、疾患または他の異常等により、患者が薬物を飲み込むことができない状況、あるいは経口後の吸収に障害がある状況では、必然的に薬剤は非経口投与される。いずれの経路によって、投与量は、1日当たり約5mg/kg～約20mg/kg（被験体の体重）の範囲で、単回でまたは分割量で投与される。しかしながら、治療される個々の被験体に対する最適投与量は、治療責任者によって決定され、概して、少なめの用量が最初に投与され、その後、最も適切な投与量を決定するために増加していく。

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【0203】

本発明を、以下に付与した実施例で詳細に説明するが、実施例は、単に説明の手段として提供され、したがって、本発明の範囲を限定するものと解釈されるべきではない。

【実施例】

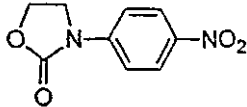
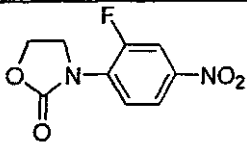
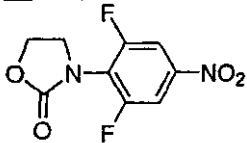
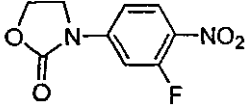
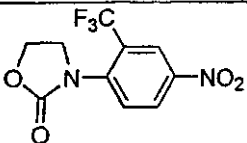
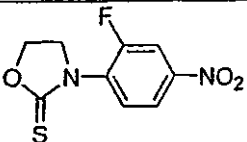
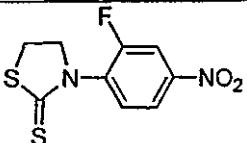
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【0204】

調製1～9に関する一般的な手順

4-フルオロニトロベンゼン等のような適切なニトロ化合物と、酸素、窒素、または硫黄から選択される2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基（複素環はまた、置換または無置換のフェニル基と縮合させてもよい）（1.1当量）と、乾燥DMF中の無水 K_2CO_3 （2.0当量）との混合物を、0～100℃の範囲の温度（基質に応じて）で一晩攪拌した。冷水を反応混合物に添加して、形成した固体をろ過した。ろ過した固体を乾燥して、純粋な化合物を得た。収率50～80%。

【表1-1】

S.No.	調製物	分析データ
1		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.25 (d, $J=9.2$ Hz, 2H), 7.72 (d, $J=9.2$ Hz, 2H), 4.57 (t, $J=7.3$ Hz, 2H), 4.18 (t, $J=7.3$ Hz, 2H). Mass (CI method): 209.
2		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.12-7.93 (m, 3H), 4.56 (t, $J=7.3$ Hz, 2H), 4.23 (t, $J=7.3$ Hz, 2H). Mass (CI method): 227.
3		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.92 (d, $J=7.8$ Hz, 2H), 4.64 (t, $J=7.4$ Hz, 2H), 4.07 (t, $J=7.4$ Hz, 2H). Mass (CI method): 245, 215.
4		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.00 (m, 1H), 7.15 (m, 2H), 4.56 (t, $J=7.4$ Hz, 2H), 4.06 (t, $J=7.4$ Hz, 2H). Mass (CI method): 226, 180, 164, 152, 135, 109, 94.
5		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.64-8.48 (m, 2H), 7.69 (d, $J=8.8$ Hz, 1H), 4.60 (t, $J=7.3$ Hz, 2H), 4.01 (t, $J=7.3$ Hz, 2H). Mass (CI method): 276, 232, 217, 171, 144.
6		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.14-8.04 (m, 2H), 7.90 (t, $J=7.6$ Hz, 1H), 4.76 (t, $J=8.4$ Hz, 2H), 4.23 (t, $J=8.4$ Hz, 2H). Mass (CI method): 242, 223, 167, 121, 94.
7		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 8.14-8.07 (m, 2H), 7.72 (t, $J=7.6$ Hz, 1H), 4.43 (t, $J=7.6$ Hz, 2H), 3.57 (t, $J=7.6$ Hz, 2H).

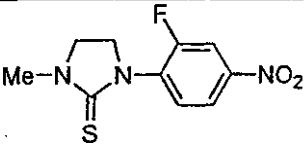
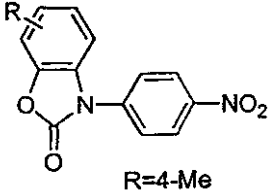
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【表 1 - 2】

		Mass (CI method): 258, 239, 212, 193, 108.
8		¹ H NMR (CDCl ₃ , 200MHz): δ 8.11-8.02 (m, 2H), 7.96 (t, J=7.8 Hz, 1H), 4.09-3.83 (2t, 4H), 3.27 (s, 2H). Mass (CI method): 255, 236, 209, 190.
9	 R=4-Me	¹ H NMR (CDCl ₃ , 200MHz): δ 8.23 (m, 2H), 7.81 (t, J=7.4 Hz, 1H), 7.22 (t, J=7.4 Hz, 1H), 7.03 (d, J=8.4 Hz, 1H). Mass (CI method): 288, 258, 243, 197, 94.

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試料番号

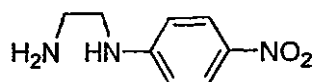
調製物

分析データ

調製 10 : N1 - (2-アミノエチル) - 4-ニトロアニリン

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【化 1 6 6】



【0205】

4-フルオロベンゼン (5 g、35.4 mmol) の CH₃CN (250 ml) 中の溶液を、アルゴン下で室温にて一晩攪拌した。反応混合物をろ過した、ろ液を濃縮した。得られた残渣を液油エーテルに懸濁させて、ろ過した。固体を収集して、黄色結晶としてニトロ化合物 (4.1 g、64%) を得た。

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【0206】

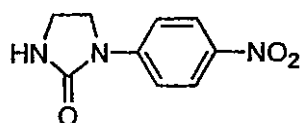
¹H NMR (DMSO + CDCl₃, 200 MHz) : δ 7.97 (d, J = 9.3 Hz, 2H), 7.09 (bs, 1H), 6.62 (d, J = 9.3 Hz, 2H), 2.80 ~ 3.40 (m, 6H)。質量 (CI法) : 181、152、135、105。

【0207】

調製 11 : 1 - (4-ニトロフェニル) - 2-イミダゾリジノン

【化 1 6 7】

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【0208】

ホスゲン (トルエン中 20%、13 ml、26.5 mmol) のトルエン中の溶液を、ジアミン (4 g、22 mmol) (調製 10 で得られたもの) および Et₃N (7.6 ml、55 mmol) のジクロロメタン (100 ml) 中の溶液に、アルゴン下で 0℃ にて滴

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下した。この温度で1時間攪拌した後に、反応混合物を水に注いで、ジクロロメタン（4 × 150 ml）で抽出した。有機抽出物を合わせて、水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を、シリカゲルカラムに通して、黄色固体として生成物（3 g、66%）を得た。

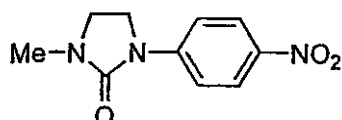
【0209】

¹H NMR (CDCl₃, 200 MHz) : δ 8.17 (d, J = 9.3 Hz, 2H), 7.75 (d, J = 9.2 Hz, 2H), 7.07 (bs, 1H), 4.00 (t, J = 8.8 Hz, 2H), 3.59 (t, J = 8.8 Hz, 2H)。質量 (CI法) : 207、151、105。

【0210】

調製12 : 1-メチル-3-(4-ニトロフェニル)-2-イミダゾリジノン

【化168】



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【0211】

水素化ナトリウム（油中60%、138 mg、5.3 mmol）を、ニトロ化合物（1 g、4.8 mmol）（調製11で得られたもの）の乾燥DMF（15 ml）中の溶液に、アルゴン下で0℃にて、少しずつ添加した。反応混合物をこの温度で15分間攪拌した。ヨウ化メチル（MeI）（0.68 g、4.8 mmol）を添加して、反応混合物を1時間攪拌した。氷片を反応混合物に添加して、形成した固体をろ過して、黄色結晶として生成物（900 mg、84%）を得た。

【0212】

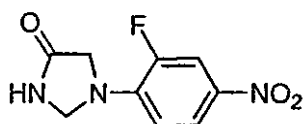
¹H NMR (CDCl₃, 200 MHz) : δ 8.19 (d, J = 9.3 Hz, 2H), 7.70 (d, J = 9.3 Hz, 2H), 3.88 (t, J = 8.8 Hz, 2H), 3.54 (t, J = 8.8 Hz, 2H), 2.93 (s, 3H)。質量 (CI法) : 222。

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【0213】

調製13 : 1-(3-フルオロ-4-ニトロフェニル)-4-イミダゾリジノン

【化169】



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【0214】

4-イミダゾリジノン（9.5 g、110.5 mmol）、3,4-ジフルオロニトロベンゼン（12.2 ml、110.5 mmol）、および乾燥DMF（80 ml）中のジイソプロピルエチルアミン（28.6 ml、165 mmol）を、アルゴン下で60℃にて一晩加熱した。反応混合物を室温まで冷却させて、氷片を添加した。形成した固体をろ過して、水で洗浄した。固体を風乾して、黄色固体としてニトロ化合物（19.5 g、78.5%）を得た。

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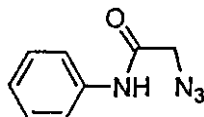
【0215】

^1H NMR (DMSO, 200 MHz) : δ 8.81 (bs, 1H)、8.07~7.96 (m, 2H)、6.82 (t, $J=8.8\text{ Hz}$, 1H)、4.97 (s, 2H)、4.06 (s, 2H)。質量 (CI法) : 226、185、152。

【0216】

調製14 : N1-フェニル-2-アジドアセトアミド

【化170】



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【0217】

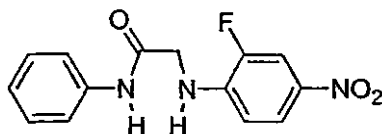
塩化クロロアセチル (5.1 ml, 64.5 mmol) を、アニリン (5 g, 53.7 mmol) および Et_3N (18.7 ml, 134.3 mmol) のジクロロメタン (150 ml) 中の溶液に、アルゴン下で 0°C にて滴下した。反応の完了 (TLC管理) 後、反応混合物をジクロロメタン (300 ml) で希釈した。得られた反応混合物を水、塩水で洗淨し、乾燥した。溶媒の蒸発により得られた残渣を、乾燥 DMF (40 ml) 中に溶解して、 NaN_3 (6.15 g, 94.6 mmol) を添加して、得られた混合物を 80°C で2時間攪拌した。反応混合物を酢酸エチルで希釈して、水、塩水で洗淨して、乾燥した。溶媒の蒸発により得られた残渣を、シリカゲル上でクロマトグラフィを行い、アジドを得た (6 g, 63%)。

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【0218】

調製15 : N1-フェニル-2-(2-フルオロ-4-ニトロアニリノ)アセトアミド

【化171】



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【0219】

調製14で得られたアジド (6 g, 34 mmol) の溶液を、MeOH (60 ml) 中に溶解し、得られた溶液を、炭 (2.5 g) 上10% Pdで一晩水素添加した。反応混合物をセライトパッド上でろ過して、ろ液を濃縮した。この残渣に乾燥 DMF (40 ml) を、続いてジイソプロピルエチルアミン (16.7 ml, 93.8 mmol) および3,4-ジフルオロニトロベンゼン (3.8 ml, 37.5 mmol) を添加した。得られた溶液を、TLCで連続的にモニタリングしながら、 80°C で一晩保持した。氷冷水を反応混合物に添加して、分離した固体をろ過して、黄色固体としてニトロ化合物を得た (6 g, 61%)。

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【0220】

^1H NMR (DMSO + CDCl_3 , 200 MHz) : δ 9.74 (bs, 1H)、7.84~8.00 (m, 2H)、7.58 (d, $J=8.3\text{ Hz}$, 2H)、7.30 (d, $J=8.3\text{ Hz}$, 2H)、7.08 (m, 1H)、6.66 (t, $J=8.8\text{ Hz}$, 1H)、6.45 (bs, 1H)、4.09 (d, $J=5.4\text{ Hz}$, 2H)。質量 (CI

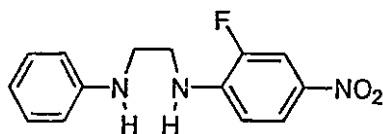
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法) : 290。

【0221】

調製16 : N1-(2-アニリノエチル) 2-フルオロ-4-ニトロアニリン

【化172】



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【0222】

BH₃-THFの1M溶液(45ml、45mmol)を、ニトロ化合物(4.5g、15.5mmol)(調製15で得られたもの)の乾燥THF(30ml)中の溶液に、アルゴン下で0℃にて滴下した。反応混合物を室温で一晩攪拌し、続いて水を慎重に添加して、過剰なボランをクエンチした。真空下で揮発分を反応混合物から除去して、残渣を酢酸エチル(400ml)中に溶解した。有機層を水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を、カラムに通して、生成物(4g、93%)を得た。

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【0223】

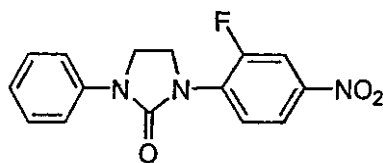
¹H NMR(CDCl₃, 200MHz) : δ 8.02~7.86(m, 2H)、7.26~7.18(m, 2H)、6.82~6.62(m, 4H)、4.94(bs, 1H)、3.83(bs, 1H)、3.51(s, 4H)。質量(CI法) : 274。

【0224】

調製17 : 1-(2-フルオロ-4-ニトロフェニル)-3-フェニル-2-イミダゾリジノン

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【化173】



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【0225】

ホスゲン(トルエン中20%、7.4ml、14.7mmol)の溶液を、ジアミン(4g、14.5mmol)(調製16で得られたもの)およびEt₃N(5.6ml、40.4mmol)のジクロロメタン(50ml)中の溶液に、アルゴン下で0℃にて滴下した。この温度で2時間攪拌し、反応混合物をジクロロメタン(300ml)で希釈して、水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた結晶を、石油エーテルに懸濁させて、ろ過した。生成物を黄色結晶として単離した(4g、91.4%)。

【0226】

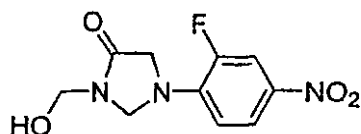
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^1H NMR (CDCl_3 , 200 MHz) : δ 8.10~7.11 (m, 8H)、4.22~4.00 (m, 4H)。質量 (CI法) : 302、106。

【0227】

調製18 : 1-(2-フルオロ-4-ニトロフェニル)-3-ヒドロキシメチル-4-イミダゾリジノン

【化174】



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【0228】

1-(3-フルオロ-4-ニトロフェニル)-4-イミダゾリジノン (9 g、40 mmol) (調製13で得られたもの) およびホルムアルデヒドの40%溶液 (100 mL) の混合物を、還流で4時間加熱した。反応混合物を室温に冷却させて、氷水混合物を添加した。沈殿した固体をろ過して、乾燥して、黄色固体として生成物を得た (8.5 g、収率83%)。

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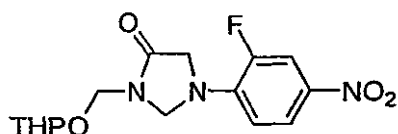
【0229】

^1H NMR ($\text{DMSO}-d_6$, 200 MHz) : δ 8.10~7.95 (m, 2H)、6.90~6.80 (m, 1H)、6.20 (t, $J=6.8\text{ Hz}$, 1H)、5.13 (d, $J=2.9\text{ Hz}$, 2H)、4.77 (d, $J=7.3\text{ Hz}$, 2H)、4.19 (s, 2H)。質量 (CI法) : 226。

【0230】

調製19 : 1-(2-フルオロ-4-ニトロフェニル)-3-ヒドロキシメチル-4-イミダゾリジノン

【化175】



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【0231】

1-(2-フルオロ-4-ニトロフェニル)-3-ヒドロキシメチル-2-イミダゾリジノン (6.7 g、26.2 mmol) (調製18で得られたもの)、p-トルエンスルホン酸ピリジニウム (PPTS) (65 mg、0.39 mmol)、および3,4-ジヒドロ-2H-ピラン (3.6 mL、39.4 mmol) のジクロロメタン (100 mL) 中の溶液を、アルゴン下で室温にて一晩攪拌した。反応混合物をジクロロメタン (400 mL) で希釈して、半飽和塩水 (2×100 mL) で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を、シリカゲルカラムに通して、黄色固体として生成物を得た (7 g、79%)。

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【0232】

^1H NMR (CDCl_3 , 200 MHz) : δ 8.05~7.85 (m, 2H)、6.60~6.45 (m, 1H)、5.30~4.70 (m, 5H)、4.17 (s, 2H)、4.20~3.30 (m, 4H)、2.00~1.40 (m, 6H)。質量 (CI法)

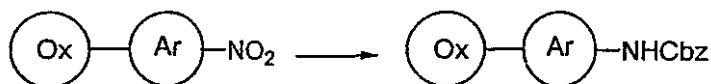
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) : 3 4 0、2 5 6、2 3 7。

【0 2 3 3】

調製 2 0 : 下記：

【化 1 7 6】



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【0 2 3 4】

(式中、「O x」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「A r」は、置換または無置換のフェニル環を表す)

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の変換に関する一般的な手順

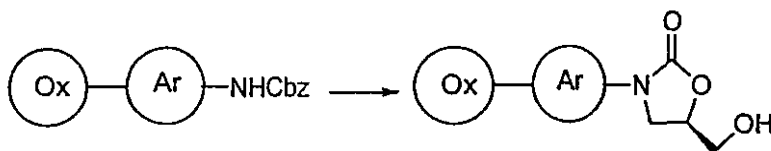
ニトロ化合物のTHF中の溶液を、炭上10%Pd(触媒量)で一晩水素添加した。出発原料が完全に消費した後、Na₂CO₃の5%水溶液(2.2当量)を、続いてクロロギ酸ベンジル(1.2当量)を、0℃で添加した。反応混合物を室温で3時間攪拌した後、反応混合物をセライト床上でろ過して、酢酸エチルで洗浄した。有機層をろ液をから分離して、水で2回、続いて塩水で洗浄した。有機抽出物を乾燥して、蒸発させて、シリカゲルカラム上で精製した。

【0 2 3 5】

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A. 下記：

【化 1 7 7】



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【0 2 3 6】

(式中、「O x」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「A r」は、置換または無置換のフェニル環を表す)

の変換に関する一般的な手順

アルゴン下で-78℃の、出発原料の乾燥THF中の溶液に、1.6M BuLi(1.2当量)を滴下した。反応混合物をこの温度で45分間攪拌した後、酪酸R-グリシジル(1.2当量)を添加した。-78℃で1時間攪拌した。次に、TLCでモニタリングし

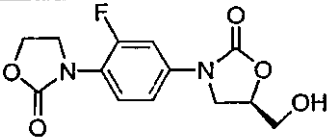
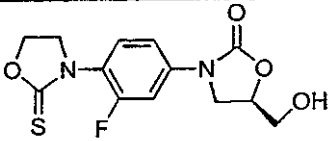
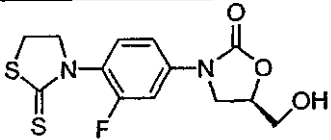
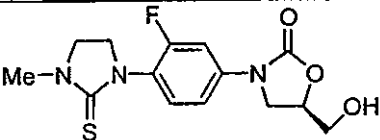
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ながら、冷却浴を取り外した。3～12時間後、反応混合物を、飽和NH₄Cl溶液でクエンチし、酢酸エチルで抽出した。有機抽出物を合わせて、水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を、シリカゲル上でクロマトグラフィを行い、生成物を得た。

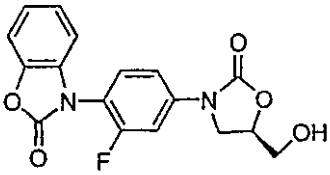
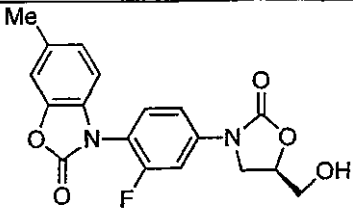
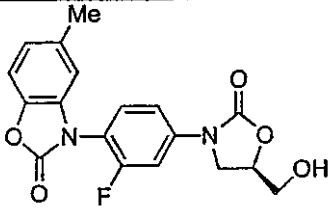
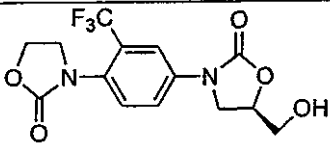
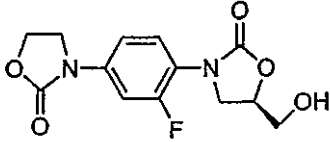
【0237】

実施例1～19を、一般的な手順Aに従って調製した。

【表2-1】

実施例 No.	構造	分析データ
1		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.68-7.50 (m, 2H), 7.38 (d, J=8.8 Hz, 1H), 5.23 (t, J=5.8 Hz, 1H), 4.73-4.72 (m, 1H), 4.47 (t, J=7.4 Hz, 2H), 4.14-3.80 (m, 4H), 3.68-3.56 (m, 2H).
2		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J=11.6 Hz, 1H), 7.52 (t, J=8.8 Hz, 1H), 7.29 (d, J=8.8 Hz, 1H), 4.89 (bs, 1H), 4.76 (t, J=2H), 4.17 (t, J=8.8 Hz, 2H), 3.93-3.68 (m, 4H).
3		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (dd, J=12.7 Hz and 2.2 Hz, 1H), 7.44-7.26 (m, 2H), 4.75-4.68 (m, 2H), 4.37 (t, J=7.8 Hz, 2H), 4.04-3.56 (m, 4H), 3.48 (t, J=7.8 Hz, 2H).
4		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J=2.4 Hz and 12.7 Hz, 1H), 7.47 (t, J=8.4 Hz, 1H), 7.24-7.20 (m, 1H), 4.77-4.69 (m, 1H), 4.10-3.81 (m, 5H), 3.77-3.68 (m, 4H), 3.23 (s, 3H).

【表2-2】

5		¹ HNMR (CDCl ₃ , 200MHz): δ 7.85-7.79 (m, 1H), 7.58 (t, J = 8.0 Hz, 1H), 7.46-7.42 (m, 1H), 7.30-7.18 (m, 4H), 6.90-6.87 (m, 1H), 4.90-4.75 (m, 1H), 4.15-4.07 (m, 3H), 3.87-3.81 (m, 1H).
6		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J= 2.4 Hz and 12.2 Hz, 1H), 7.53-7.26 (m, 2H), 7.11 (s, 1H), 6.97 (d, J=8.4 Hz, 1H), 6.72 (d, J = 7.8 Hz, 1H), 4.81-4.65 (m, 1H), 4.09-3.82 (m, 4 H), 2.41 (s, 3H), 2.09 (hump, 1H).
7		¹ HNMR (CDCl ₃ , 200MHz): δ 7.77 (d, J = 10.4 Hz, 1H), 7.57-7.26 (m, 3H), 6.96 (d, J=7.8 Hz, 1H), 6.64 (s, 1H), 4.82-4.71 (m, 1H), 4.14-4.05 (m, 3 H), 3.84-3.78 (m, 2H), 2.35 (s, 3H).
8		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92-7.89 (m, 2H), 7.44 (d, J = 7.8 Hz, 1H), 7.80-7.71 (m, 1H), 4.54 (t, J = 7.2 Hz, 2 H), 4.08-3.89 (m, 6H), 2.16 (s, 1H).
9		¹ HNMR (CDCl ₃ , 200MHz): δ 7.69-7.48 (m, 2H), 7.23 (d, J = 8.8 Hz, 1H), 4.81-4.72 (m, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.13-3.69 (m, 6 H).

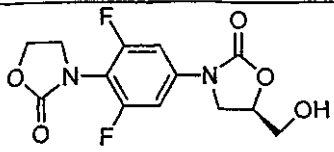
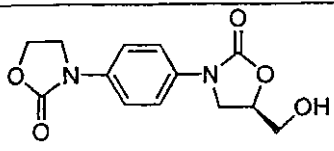
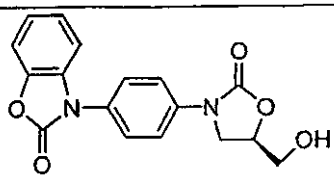
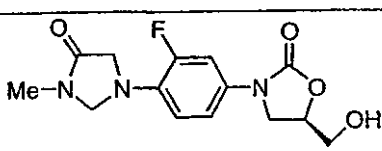
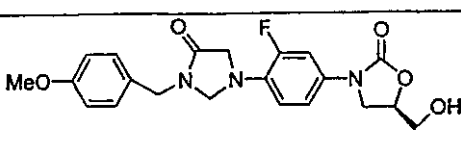
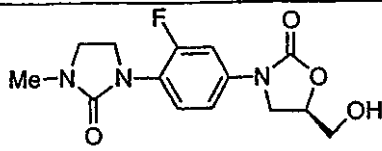
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【表 2 - 3】

10		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29 (d, J = 10.8 Hz, 2H), 4.80-4.73 (m, 1H), 4.57 (t, J = 15.6 Hz, 2H), 4.00-3.73 (m, 8H).
11		¹ HNMR (CDCl ₃ , 200MHz): δ 7.59 (s, 4H), 5.24 (t, J = 5.4 Hz, 1H), 4.67 (bs, 1H), 4.45 (t, J = 7.4 Hz, 2H), 4.13-4.02 (m, 3H), 3.88-3.54 (m, 3H).
12		¹ HNMR (CDCl ₃ , 200MHz): δ 7.79 (d, J = 9.2 Hz, 2H), 7.72 (d, J = 9.2 Hz, 2H), 7.59-7.03 (m, 4H), 5.18 (t, J = 5.8 Hz, 1H), 4.80-4.71 (m, 1H), 4.18-4.02 (m, 2H), 3.98-3.68 (m, 2H).
13		¹ HNMR (CDCl ₃ , 200MHz): δ 2.9 (s, 3H), 4.1 (t, 1H), 3.9 (m, 6H), 4.7 (m, 1H), 4.8 (s, 2H), 6.8 (t, 1H), 7.2 (d, 1H).
14		¹ HNMR (CDCl ₃ , 200MHz): δ 7.4 (dd, J = 2 Hz and 15.4 Hz, 1H), 7.2 (d, J = 8.8 Hz, 2H), 7.0 (d, J = 9.4 Hz, 1H), 6.85 (d, J = 8.4 Hz, 2H), 6.5 (t, J = 9.2 Hz, 1H), 4.75 (s, 3H), 4.50 (s, 2H), 3.95 (m, 6H), 3.8 (s, 3H).
15		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (dd, J = 2.4 Hz and 13.4 Hz, 1H), 7.45 (t, J = 8.8 Hz, 1H), 7.10 (dd, J = 2.2 Hz and 13.0 Hz, 1H), 4.66 (m, 1H), 3.81 (m, 6H), 3.47 (t, 2H), 2.8 (s, 3H).

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【表 2 - 4】

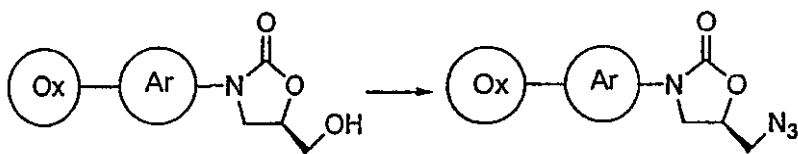
16		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 3.4 (m, 3H), 4.7 (m, 1H), 7.5 (m, 4H).
17		¹ HNMR (CDCl ₃ , 200MHz): δ 7.7-7.2 (m, 9H), 4.8-4.6 (m, 1H), 4.5 (s, 2H), 4.1-3.7 (m, 6H), 3.4 (t, J=8.8 Hz, 2H)
18		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.7 (m, 4H), 7.3-7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 4H), 4.7 (m, 1H), 3.9-4.1 (m, 6H), 3.9 (s, 1H), 3.7 (m, 1H).
19		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.7 (m, 2H), 4.0 (m, 7H), 3.8 (m, 1H).

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B. 下記：

【化178】



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【0238】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表す)

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の変換に関する一般的な手順

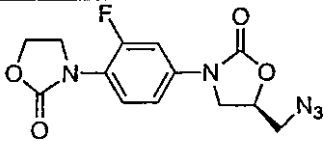
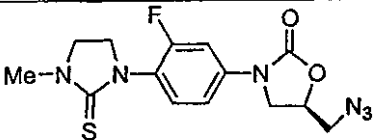
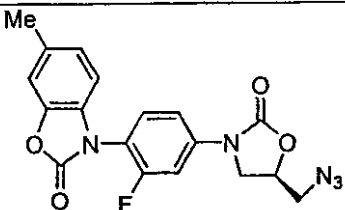
アルコール、トリエチルアミン(2.2当量)の乾燥ジクロロメタン中の溶液に、塩化メタンスルホニル(1.1当量)をアルゴン下で0℃にて添加した。反応混合物を2時間かけて室温にまで加温した後、ジクロロメタンで希釈した。有機層を水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を乾燥DMF中に溶解して、NaN₃(1.5当量)を室温で添加した。得られた反応混合物を、TLCでモニタリングしながら、80℃で2~5時間加熱した。反応混合物を室温に達しさせて、水を添加して、酢酸エチルで抽出した。有機抽出物を合わせて、水(3回)、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣を、カラムに通して、アジドを得た。

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【 0 2 3 9 】

実施例 20～31 を、一般的な手順 B に従って調製した。

【 表 3 - 1 】

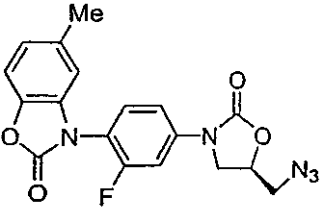
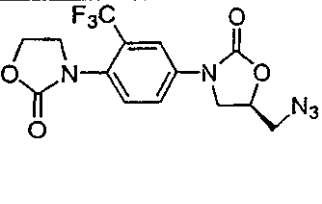
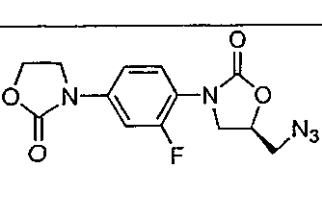
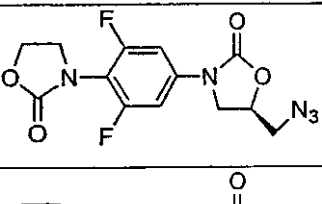
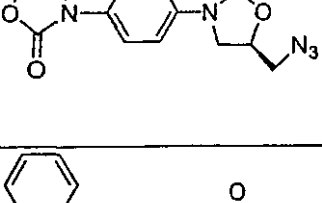
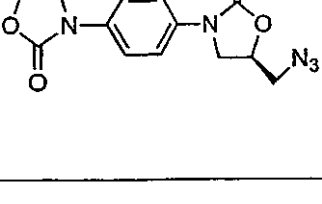
実施例 No.	構造	分析データ
20		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.67-7.52 (m, 2H), 7.38 (d, J=8.8 Hz, 1H), 4.95-4.88 (m, 1H), 4.47 (t, J=7.2 Hz, 2H), 4.16 (t, J=9.4 Hz, 1H), 4.02-3.64 (m, 5H).
21		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.48 (t, J = 8.4 Hz, 1H), 7.22-7.17 (m, 1H), 4.85-4.73 (m, 1H), 4.16-3.52 (m, 8H), 3.22 (s, 3H).
22		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75 (dd, J= 2.0 Hz and 12.2 Hz, 1H), 7.54 (t, J = 8.8 Hz, 1H), 7.40-7.26 (m, 1H), 7.10 (s, 1H), 6.97 (d, J = 7.8 Hz, 1H), 6.71 (d, J = 6.8 Hz, 1H), 4.87-4.79 (m, 1H), 4.17-3.57 (m, 4H), 2.41 (s, 3H).

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【 表 3 - 2 】

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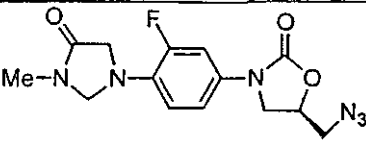
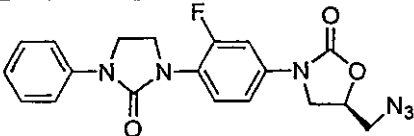
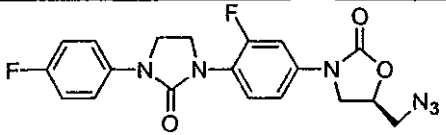
23		¹ HNMR (CDCl ₃ , 200MHz): δ 7.81 (d, 1H), 7.54 (t, 1H), 7.45-7.01 (m, 3H), 6.67 (s, 1H), 4.91-4.79 (m, 1H), 3.95-3.47 (m, 4H), 2.38 (s, 3H).
24		¹ HNMR (CDCl ₃ , 200MHz): δ 7.89 (d, J = 7.4 Hz, 2H), 7.43 (d, J = 9.4 Hz, 1H), 4.87-4.80 (m, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.12 (t, J = 8.8 Hz, 2H), 3.97-3.55 (m, 4H).
25		¹ HNMR (CDCl ₃ , 200MHz): δ 7.71-7.50 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.89-4.75 (m, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.47-3.55 (m, 6H).
26		¹ HNMR (CDCl ₃ , 200MHz): δ 7.31 (s, 2H), 4.83-4.81 (m, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.09-3.55 (m, 6H).
27		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.64 (s, 4H), 4.98-4.89 (m, 1H), 4.50 (t, J = 7.4 Hz, 2H), 4.25-4.07 (m, 4H), 3.88-3.70 (m, 2H).
28		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75 (d, J = 9.2 Hz, 2H), 7.59 (d, J = 9.2 Hz, 2H), 7.48-7.03 (m, 4H), 4.89-4.81 (m, 1H), 4.16 (t, J = 9.2 Hz, 1H), 3.98-3.58 (m, 3H).

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【表 3 - 3】

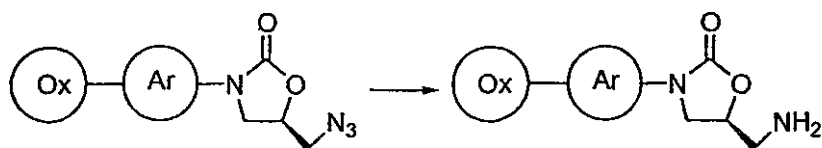
29		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.4 (dd, 1H), 7.1 (dd, 1H), 6.5 (t, 1H), 4.9 (s, 2H), 4.8-4.7 (m, 1H), 4.1-3.5 (m, 6H), 3.0 (s, 3H).
30		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.35 (t, 2H), 7.0-7.2 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.7 (m, 2H).
31		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.6 (m, 2H).

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C. 下記：

【化179】



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【0240】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表す)

の変換に関する一般的な手順

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手順(i)：

アジドのTHF：MeOH(1：3)中の溶液を、炭上10%Pdで一晩水素添加した。反応混合物をろ過して、ろ液を濃縮した。残渣をMeOH中で結晶化させて、アミンを得た。

【0241】

手順(ii)：

トリフェニルホスフィン(1.3当量)を、アジドの乾燥THF中の溶液に少しずつ添加して、得られた混合物を室温で6時間攪拌した。水(数滴)を添加して、反応混合物を60℃で一晩加熱した。溶媒を蒸発させて、残渣をシリカゲルカラムに通して、アミンを得た。

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【 0 2 4 2 】

実施例 3 2 ～ 3 7 を、一般的な手順 C に従って調製した。

【表 4 - 1】

実施例 No.	構造	分析データ
32		¹ HNMR (DMSO-D ₆ , 200MHz): δ 7.66-7.50 (m, 2H), 7.37 (d, j = 9.4 Hz, 1H), 4.66- 4.60 (m, 1H), 4.47 (t, J = 7.8 Hz, 2 H), 4.12-3.83 (m, 6 H), 2.91-2.80 (m, 2 H). Mp: 147 °C
33		¹ HNMR (CDCl ₃ , 200MHz): δ 7.63-7.55 (dd, J = 2.0 Hz and 13.0 Hz, 1H), 7.49-7.22 (m, 2H), 4.63-4.60 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 4.03-3.73 (m, 4H), 3.32 (m, 3H), 3.08 (s, 3H).
34		¹ HNMR (CDCl ₃ , 200MHz): δ 8.02 (s, 2H), 7.87-7.83 (m, 2H), 7.64 (s, 1H), 7.50 (d, J = 8.2 Hz, 1H), 4.84 (s, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.20-3.90 (m, 6H).
35		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.57 (s, 4H), 4.63-4.61 (m, 1H), 4.44 (t, J=7.2 Hz, 2H), 4.08-3.82 (m, 4H), 2.86-2.82 (m, 2H).

【表 4 - 2】

36		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6-7.4 (dd, 1H), 7.1 (dd, 1H), 6.6 (t, 1H), 4.9 (s, 2H), 4.6 (m, 1H), 4.1-3.7 (m, 4H), 3.2-2.8 (m, 4H).
37		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62-7.40 (m, 3H), 7.3 (s, 5H), 4.7 (m, 1H), 4.5 (s, 2H), 4.1 (t, 1H), 3.9-3.8 (m, 4H), 3.4 (t, 2H).

D. 下記：

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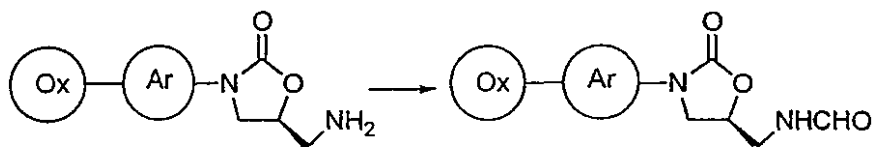
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【化 1 8 0】



【0 2 4 3】

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(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表す)

の変換に関する一般的な手順

アミンのギ酸メチル中の溶液を80℃で一晩加熱した。揮発分を低圧下で除去して、得られた残渣をカラムに通して、非常に純粋な形態のホルメートを得た。

【0 2 4 4】

実施例38および39を、一般的な手順Dに従って調製した。

【表 5】

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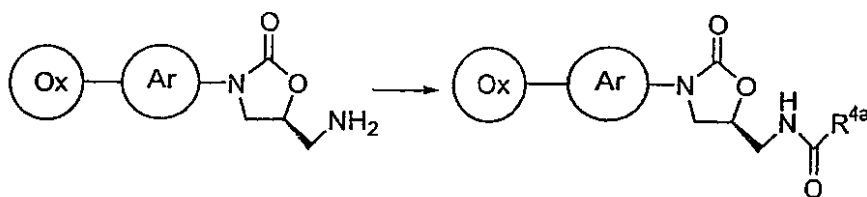
実施例 No.	構造	分析データ
38		¹ HNMR (CDCl ₃ , 200MHz): δ 8.28 (s, 1H), 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 6.15 (bs, 1H), 4.82 (m, 1H), 4.52 (t, J = 7.4 Hz, 2H), 4.48-4.02 (m, 3H).
39		¹ HNMR (CDCl ₃ , 200MHz): δ 8.27 (s, 1H), 7.26-7.23 (m, 2H), 6.32 (bs, 1H), 4.82 (bs, 1H), 4.58 (t, J = 7.2 Hz, 2H), 4.214-3.68 (m, 6H).

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【0 2 4 5】

E. 下記:

【化 1 8 1】



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【0 2 4 6】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換の

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フェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表し、 R^{4a} は、($C_1 \sim C_6$)アルキル、($C_1 \sim C_6$)アルコキシ、($C_2 \sim C_6$)アルケニル、ハロ($C_1 \sim C_6$)アルキル、アリールオキシ、($C_2 \sim C_6$)アルケニルオキシ、アリールオキシカルボニル、または($C_1 \sim C_6$)アルコキシカルボニルを表す)

の変換に関する一般的な手順

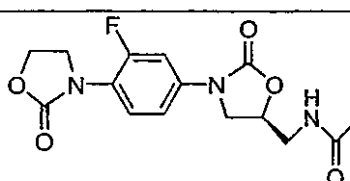
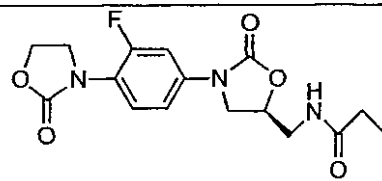
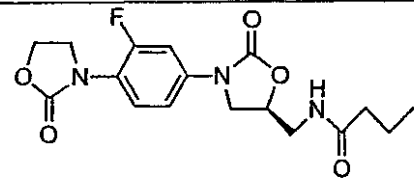
アルゴン下の0℃の、アミン(1.1当量)の乾燥ジクロロメタン中の溶液に、 Et_3N (2.5当量)、続いてそれぞれの酸塩化物(1.2当量)を滴下した。室温で1~6時間攪拌(TLC管理)した後、反応混合物をジクロロメタンで希釈して、水で2度、続いて塩水で洗浄した。有機抽出物を乾燥して、蒸発させて、カラムに通して、アシル化生成物を得た。

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【0247】

実施例40~70を、一般的な手順Eに従って調製した。

【表6-1】

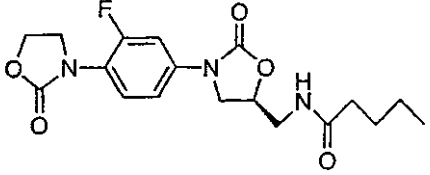
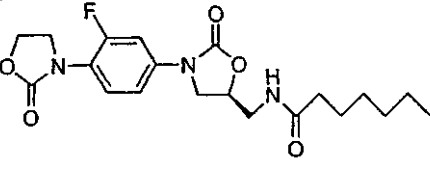
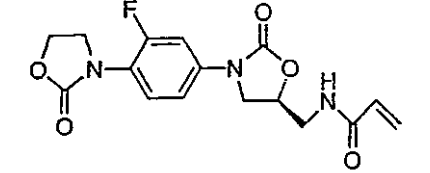
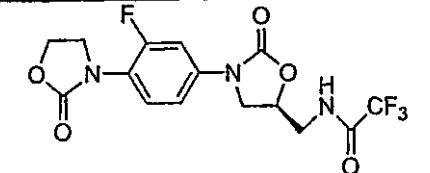
実施例 No.	構造	分析データ
40		^1H NMR ($CDCl_3$, 200MHz): δ 7.62 (dd, $J = 2.60$ Hz and 13.4 Hz, 1H), 7.52 (d, $J = 8.60$ Hz, 1H), 7.13-7.17 (m, 1H), 5.96-5.99 (m, 1H), 4.82-4.76 (m, 1H), 4.52 (t, $J = 7.40$ Hz, 2H), 4.01-4.09 (m, 3H), 3.62-3.81 (m, 3H), 2.02 (s, 3H).
41		^1H NMR ($CDCl_3$, 200MHz): δ 7.66-7.49 (m, 2H), 7.16 (d, $J = 8.8$ Hz, 1H), 6.03 (bs, 1H), 4.82-4.78 (m, 1H), 4.52 (t, $J = 7.8$ Hz, 2H), 4.09-4.0 (m, 3H), 3.83-3.65 (m, 3H), 2.24 (q, $J = 7.8$ Hz, 2H), 1.13 (t, $J = 7.8$ Hz, 3H). Mp: 203 °C
42		^1H NMR ($CDCl_3$, 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, $J = 8.8$ Hz, 1H), 6.01 (bs, 1H), 4.81-4.75 (m, 1H), 4.52 (t, $J = 7.8$ Hz, 2H), 4.09-4.01 (m, 3H), 3.83-3.65 (m, 3H), 2.19 (t, $J = 7.4$ Hz, 2H), 1.65-1.58 (m, 2H), 0.98 (t, $J = 7.4$ Hz, 3H). Mp: 211°C

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【表6-2】

43		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J=8.8 Hz, 1H), 4.82-4.76 (m, 1H), 4.52 (t, J=7.8 Hz, 2H), 4.09-4.01 (m, 2H), 3.83-3.65 (m, 3H), 2.21 (t, J=7.4 Hz, 2H), 1.57-1.49 (m, 2H), 1.38-1.20 (m, 2H), 0.89 (t, 3H). Mp: 187 °C
44		¹ HNMR (CDCl ₃ , 200MHz): δ 7.68-7.52 (m, 2H), 7.17 (d, 8.6 Hz, 1H), 5.96 (hump, 1H), 4.81 (hump, 1H), 4.54 (t, J=7.2 Hz, 2H), 4.11-3.67 (m, 6H), 2.22 (t, J=7.4 Hz, 2H), 1.60 (bs, 8H), 0.87 (s, 3H). Mp: 131 °C
45		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.97 (bs, 1H), 7.6-7.40 (m, 2H), 7.10 (d, J=8.8 Hz, 1H), 6.35-6.15 (m, 2H), 5.63 (dd, J=4.0 Hz and 8.3 Hz, 1H), 4.79-4.86 (m, 1H), 4.53 (t, J=7.8 Hz, 2H), 4.05 (t, J=6.8 Hz, 2H), 3.89-3.56 (m, 4H). Mp: 196 °C
46		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 9.38 (bs, 1H) 7.67-7.5(m, 2H), 7.20 (d, J=8.8 Hz, 1H), 4.88-4.87 (m, 1H), 4.53 (t, J=7.8 Hz, 2H), 4.16-4.02 (m, 3H), 3.89-

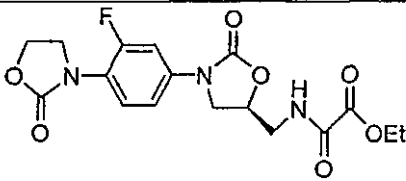
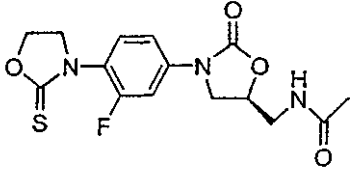
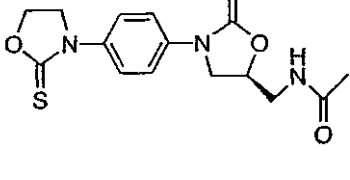
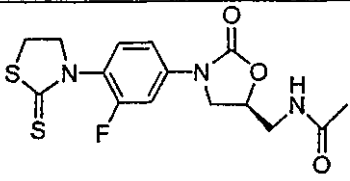
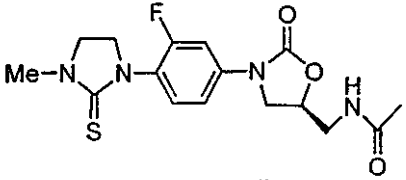
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【表 6 - 3】

		3.70 (m, 1H), 3.67-3.65 (m, 2H). Mp: 194 °C
47		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8Hz, 1H), 4.85-4.83 (m, 1H), 5.55-4.47 (m, 2 H), 4.37-4.31 (m, 2H), 4.14-3.90 (m, 3H), 3.88-3.60 (m, 3H), 1.42 (t, 3H). Mp: 160 °C
48		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75-7.05 (m, 3H), 6.05 (bs, 1H), 4.95-4.62 (m 2H), 4.52 (t, 1H), 4.30-3.32 (m, 6H), 2.023 (s, 3H).
49		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (d, J = 7.81 Hz, 2H), 7.3 (d, J = 7.81 Hz, 2e H), 4.8 (s, 1H), 4.4 (s, 4H), 4.1 (t, 1H), 3.8 (t, 1H), 3.5 (s, 1H), 32.3 (s, 1H), 2.0 (s, 3H).
50		¹ HNMR (CDCl ₃ , 200MHz): δ 7.99 (hump, 1H), 7.73 (d, J = 13.0 Hz, 1H), 7.43 (d, J = 8.0 Hz, 1H) 7.31 (d, J = 8.8 Hz, 1H), 4.83 (hump, 1H), 4.42 (t, J = 7.6 Hz, 2H), 4.15-3.89 (m, 3H), 3.62-3.55 (m, 4H), 2.0 (s, 3H). Mp: 220 °C
51		¹ HNMR (CDCl ₃ , 200MHz): δ 7.61 (dd, J = 2.6 Hz and 12.7 Hz, 1H), 7.48 (t, J = 8.4 Hz, 1H), 7.19 (dd, J = 2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J =

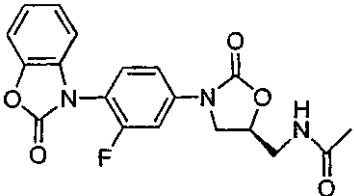
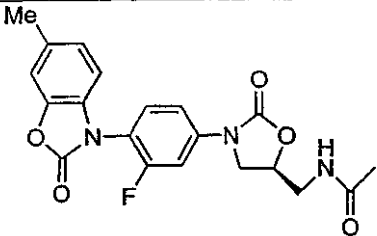
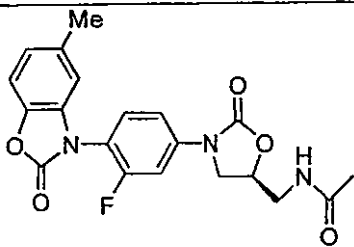
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【表 6 - 4】

		2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J = 8.4 Hz, 1H), 4.79-4.77 (m, 1H), 4.05 (t, J = 8.8 Hz, 1H), 3.97-3.88 (m, 2H), 3.81-3.74 (m, 3H), 3.69-3.61 (m, 2H), 3.23 (s, 3H), 2.03 (s, 3H). Mp: 171 °C
52		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J = 2.2 Hz and 12.0 Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.37-7.14 (m, 4H), 6.82 (t, J = 3.4 Hz, 1H), 6.03 (t, J = 5.4 Hz, 1H), 4.83-4.80 (m, 1H), 4.10 (t, J = 9.0 Hz, 1H), 3.88-3.80 (m, 1H), 3.71-3.66 (m, 2H), 2.04 (s, 3H).
53		¹ HNMR (CDCl ₃ , 200MHz): δ 7.74 (dd, J = 2.6 Hz and 12.2Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.49-7.26 (m, 2H), 7.10-6.95 (m, 2H), 6.72-6.68 (m, 1H), 6.09-6.01 (m, 1H), 4.84 (bs, 1H), 4.10 (t, J = 8.8 Hz, 1H), 3.88-3.66 (m, 3H), 2.41 (s, 3H), 2.04 (s, 3H). Mp: 213 °C
54		¹ HNMR (CDCl ₃ , 200MHz): δ 7.80-6.94 (m, 4H), 6.63 (s, 1H), 6.0 (bs, 1H), 4.82-4.90 (m, 1H), 4.11 (t, J = 9.2 Hz, 1H), 3.89-3.66 (m, 3H), 2.35 (s, 3H), 2.09 (s, 3H). Mp: 202 °C

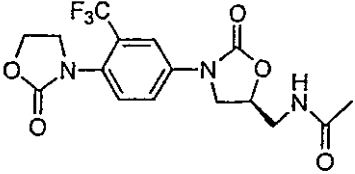
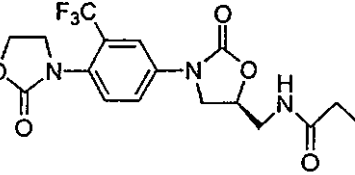
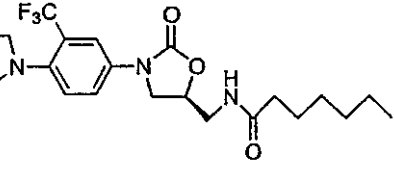
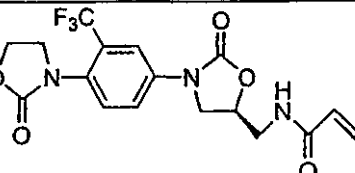
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【表 6 - 5】

55		¹ HNMR (CDCl ₃ , 200MHz): δ 7.93 (s, 1H), 7.76 (d, J = 8.8 Hz, 1H), 7.42 (d, J = 8.8 Hz, 1H), 6.57 (bs, 1H), 4.79 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.11-3.60 (m, 6H), 1.99 (s, 3H). Mp: 143 °C.
56		¹ HNMR (CDCl ₃ , 200MHz): δ 7.93-7.79 (m, 2H), 7.43 (d, J = 8.8 Hz, 1H), 6.12 (bs, 1H), 4.82-4.78 (m, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09 (t, J = 9.4 Hz, 1H), 3.96-3.66 (m, 5H), 2.30-2.17 (m, 2H), 1.20 (t, J = 9.4 Hz, 3H). Mp: 143 °C
57		¹ HNMR (CDCl ₃ , 200MHz): δ 7.91 (s, 1H), 7.78 (d, J = 8.2 Hz, 1H), 6.26 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.06 (t, J = 9.4 Hz, 1H), 3.95-3.67 (m, 5H), 2.47-2.05 (m, 4H), 1.83-1.54 (m, 6H), 0.83-0.78 (m, 3H). Mp: hygroscopic
58		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92 (s, 1H), 7.85 (d, J = 8.2 Hz, 1H), 7.45 (d, J = 8.8 Hz, 1H), 6.40-6.07 (m, 3H), 5.75 (d, J = 10.4 Hz, 1H), 4.89 (hump, 1H), 4.56 (t, J = 7.8 Hz,

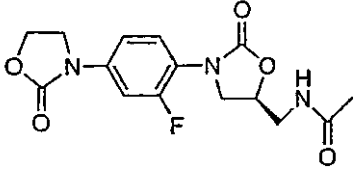
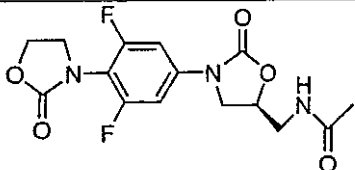
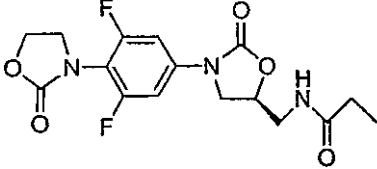
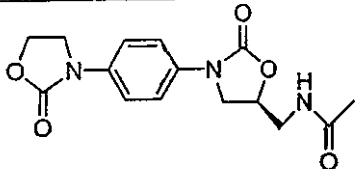
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【表 6 - 6】

		2H), 4.13 (t, J = 9.2 Hz, 1H), 3.98-3.78 (m, 5H). Mp: 191°C
59		¹ HNMR (CDCl ₃ , 200MHz): δ 7.65-7.41 (m, 2H), 7.23 (d, J = 7.2 Hz, 1H), 6.12 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.47-4.00 (m, 3H), 3.81-3.59 (m, 3H), 2.05 (s, 3H). Mp: 120 °C
60		¹ HNMR (CDCl ₃ , 200MHz): δ 7.27 (d, J = 9.8 Hz, 2H), 6.01 (hump, 1H), 4.80 (hump, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.06-3.67 (m, 6H), 2.03 (s, 3H). Mp: 219 °C
61		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.32-7.26 (m, 2H), 7.09 (hump, 1H), 4.81 (hump, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.05-3.62 (m, 6H), 2.25-2.18 (m, 2H), 1.11 (t, J = 7.8 Hz, 3H). Mp: 224 °C
62		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.64 (s, 2H), 7.55 (s, 2H), 7.09-7.25 (m, 1H), 4.70-4.85 (m, 1H), 4.46 (t, 2H), 4.13-3.81 (m, 4H), 3.57 (bs, 2H), 1.96 (s, 3H). Mp: 231 °C

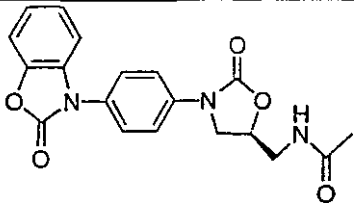
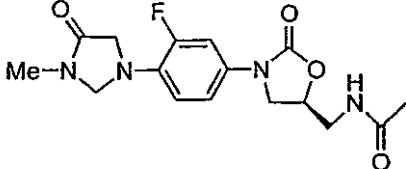
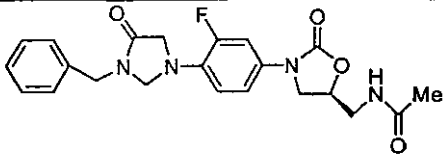
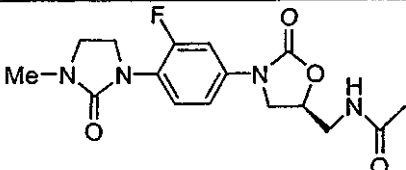
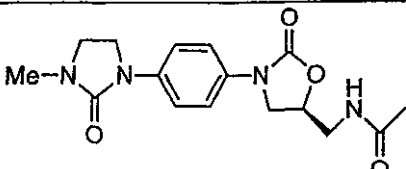
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【表 6 - 7】

63		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (d, J = 8.8 Hz, 2H), 7.54 (d, J = 8.8 Hz, 2H), 7.24-6.99 (m, 4H), 6.19 (bs, 1H), 4.80 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 3.85 (t, J = 7.0 Hz, 1H), 3.69-3.63 (m, 2H), 2.02 (s, 3H). Mp: 229 °C
64		¹ HNMR (CDCl ₃ , 200MHz): δ 7.10 (d, 1H), 6.6 (t, 1H), 6.0 (m, 1H), 4.90 (s, 2H), 4.9 (m, 1H), 4.0 (s, 3H), 3.80 (m, 3H), 3.0 (s, 3H), 2.0 (s, 3H). Mp: 230 °C
65		¹ HNMR (CDCl ₃ , 200MHz): δ 7.26-7.46 (m, 6H), 7.01 (d, 1H), 6.63 (t, 1H), 6.05 (s, 1H), 4.71-4.89 (m, 2H), 4.77 (s, 1H), 4.60 (s, 2H), 3.94-4.04 (m, 3H), 3.61-3.76 (m, 3H), 2.01 (s, 3H).
66		¹ HNMR (CDCl ₃ , 200MHz): δ 7.50 (m, 2H), 7.10 (d, J = 8.4 Hz, 1H), 6.18 (t, 1H), 4.7 (m, 1H), 4.0 (t, J = 9.4 Hz, 1H), 3.6 (m, 7H), 2.9 (s, 3H), 2.0 (s, 3H). Mp: 182 °C
67		¹ HNMR (CDCl ₃ , 200MHz): δ 2.0 (s, 3H), 2.8 (s, 3H), 4.0 (t, 1H), 3.4-3.8 (m, 5H), 4.8 (m, 1H), 6.2 (m, 1H), 7.6 (m, 4H).

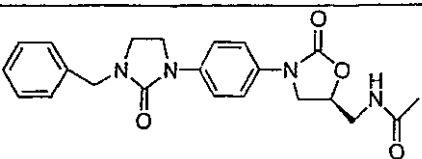
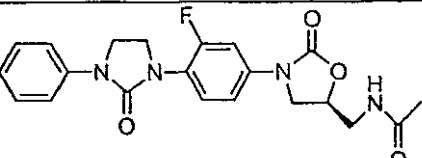
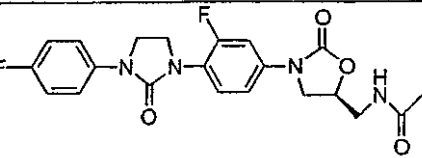
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【表 6 - 8】

		Mp: 217 °C
68		¹HNMR (CDCl₃, 200MHz): δ 7.6-7.3 (m, 9H), 6.2 (bt, 1H), 4.8-4.7 (m, 1H), 4.5 (s, 2H), 4.06 (t, J=9.3 Hz, 1H), 3.90-3.3 (m, 6H), 2.0 (s, 3H). Mp: 204 °C
69		¹HNMR (CDCl₃, 200MHz): δ 7.70-7.50 (m, 4H), 7.40-7.30 (t, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 1H), 4.80 (m, 5H), 4.0 (m, 5 H), 3.8 (m, 1H), 3.6 (m, 2H), 2.0 (s, 3H). Mp: 182 °C
70		¹HNMR (CDCl₃, 200MHz): δ 8.3 (m, 1H), 7.6 (m, 4H), 7.3 (m, 1H), 7.2 (t, 2H), 4.7 (m, 1H), 4.1 (t, 1H), 3.8-4.0 (m, 4H), 3.7 (t, 1H), 3.0 (m, 2H), 1.8 (s, 3H). Mp: 194 °C

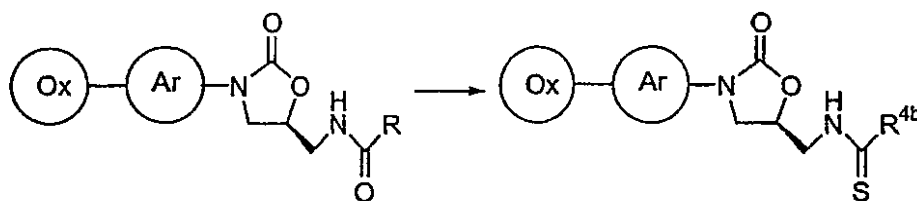
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F. 下記：

【化 1 8 2】



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【0 2 4 8】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表し、R^{4b}は、(C₁~C₆)アルキル、ハロ(C₁~C₆)アルキル、-C(=O)-(C₁~C₆)アルコキシ、-C(=O)-アリールオキシ、-C(=S)-(C₁~C₆)アルキル、または-C(=S)-アリールを表す)

の変換に関する一般的な手順

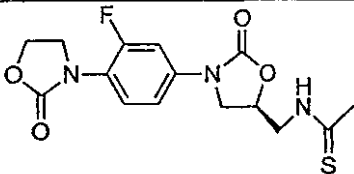
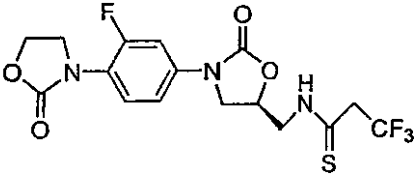
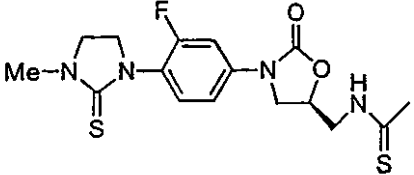
アミド体(1当量)およびLawesson試薬(0.6当量)の乾燥ジオキサン中の溶液を、5 50

5～90℃で3～10時間加熱した（TLC管理）。反応混合物を室温に冷却させて、酢酸エチルで希釈した。得られた混合物を水（4回）、続いて塩水で洗浄し、乾燥した。溶媒の蒸発により得られた残渣を、シリカゲルカラムに通して、それぞれのチオ酢酸を得た。

【0249】

実施例71～80を、一般的な手順Fに従って調製した。

【表7-1】

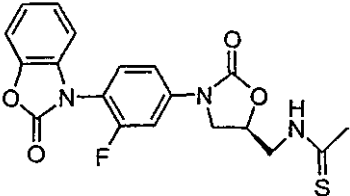
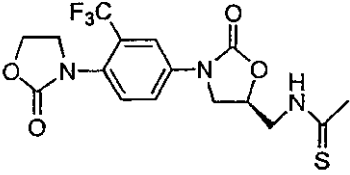
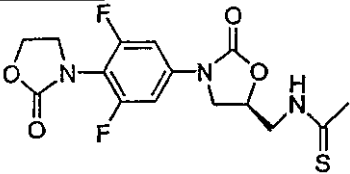
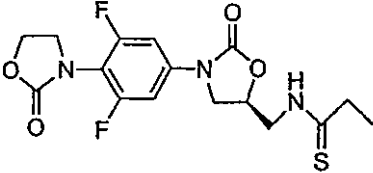
実施例 No.	構造	分析データ
71		¹ HNMR (CDCl ₃ , 200MHz): δ 7.94 (bs, 1H), 7.66-7.52 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 5.20-4.85 (m, 1H), 4.54 (t, J = 7.8 Hz, 2H), 4.25-3.82 (m, 6H), 2.61 (s, 3H). Mp: 171 °C
72		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.51 (s, 1H), 7.64-7.47 (m, 2H), 7.16 (d, J = 8.8 Hz, 1H), 5.01 (bs, 1H), 4.53 (t, J = 7.2 Hz, 2H), 4.29-3.89 (m, 4H), 3.63 (q, J = 10.2 Hz, 2H). Mp: 165 °C
73		¹ HNMR (CDCl ₃ , 200MHz): δ 7.90 (bs, 1H), 7.61 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.50 (t, J = 8.2 Hz, 1H), 7.19 (dd, J = 2.4 Hz and 12.8

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【表7-2】

		1H), 7.19 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 5.0 (m, 1H), 4.25-3.74 (m, 8H), 3.24 (s, 3H), 2.6 (s, 3H). Mp: 111 °C
74		¹ HNMR (CDCl ₃ , 200MHz): δ 7.87-7.74 (m, 2H), 7.57 (t, J = 8.2 Hz, 1H), 7.39-7.18 (m, 4H), 6.87-6.85 (m, 1H), 5.08-5.05 (m, 1H), 4.37-4.27 (m, 1H), 4.23-4.06 (m, 2H), 3.94 (t, J = 6.8 Hz, 1H), 2.62 (s, 3H). Mp: 137 °C
75		¹ HNMR (CDCl ₃ , 200MHz): δ 8.1 (s, 1H), 7.9 (s, 1H), 7.8 (d, J = 8.7 Hz, 1H), 7.4 (d, J = 8.79, 1H), 5.0 (s, 1H), 4.6 (t, 2H), 4.0 (m, 6H), 2.6 (s, 3H). Mp: 154 °C
76		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.37 (bs, 1H), 7.50 (d, J = 10.8 Hz, 2H), 4.98(bs, 1H), 4.55 (t, J = 7.8 Hz, 2H), 4.23-3.78 (m, 6H), 2.50 (s, 3H). Mp: 108 °C
77		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (bt, 1H), 7.28 (d, J=9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J=7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J=7.4 Hz, 2H), 1.29 (t, J=7.8 Hz,

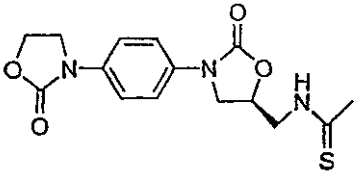
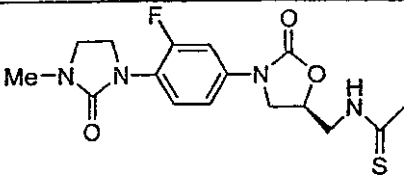
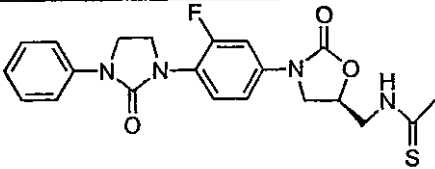
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【表 7 - 3】

		3H) Mp: 168 °C
78		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (hump, 1H), 7.25 (d, J = 9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J = 7.4 Hz, 2H), 1.29 (t, J = 7.8 Hz, 3H). Mp: 195 °C
79		¹ HNMR (CDCl ₃ , 200MHz): δ 8.4 (1H), 7.5 (m, 2H), 7.0 (d, J = 8.8 Hz, 2H), 4.9 (m, 1H), 3.9 (m, 6H), 3.5 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H), 2.5 (s, 3H). Mp: 168 °C
80		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.0 (t, 1H), 5.0 (m, 1H), 4.0 (m, 8H), 2.6 (s, 3H). Mp: 165 °C

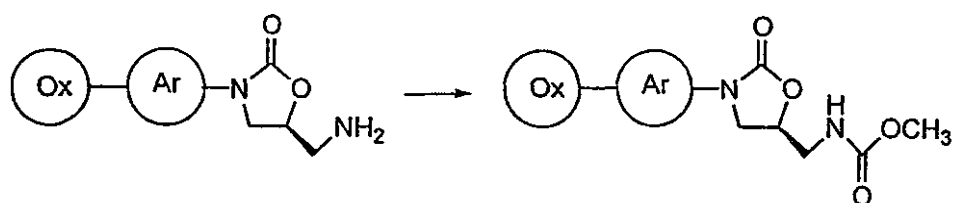
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G. 下記：

【化 1 8 3】



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【 0 2 5 0 】

(式中、「O x」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「A r」は、置換または無置換のフェニル環を表す)

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の変換に関する一般的な手順

アミン（１当量）、 Et_3N （２．２当量）の乾燥ジクロロメタン中の溶液に、アルゴン下でクロロギ酸メチルを０℃で添加した（１．２当量）。反応混合物を室温で一晩攪拌して、ジクロロメタンによる希釈、続く水および塩水での洗浄によりワークアップした。乾燥有機層の蒸発後に得られた残渣をカラムに通して、カーバメートを得た。

【 0 2 5 1 】

実施例 8 1 ~ 8 5 を、一般的な手順 G に従って調製した。

【表 8-1】

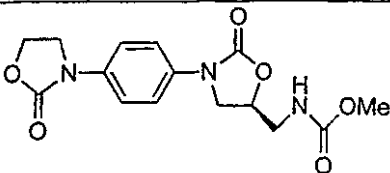
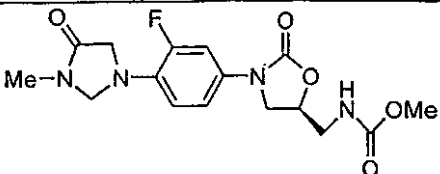
実施例 No.	構造	分析データ
81		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.68-7.49 (m, 2H), 7.16 (d, $J = 8.4$ Hz, 1H), 5.16 (bs, 1H), 4.78 (bs, 1H), 4.52 (t, $J = 7.2$ Hz, 2H), 4.09-4.0 (m, 3H), 3.84-3.55 (m, 6H). Mp: 153 °C
82		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.9 (m, 2H), 7.4 (d, $J = 8.3$ Hz, 1H), 5.2 (s, 1H), 4.8 (s, 1H), 4.5 (t, 1H), 4.0 (m, 9H). Mp: 148 °C
83		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.27 (d, $J = 6.8$ Hz, 2H), 5.16 (bs, 1H), 4.84-4.80 (m, 1H), 4.58 (t, $J = 7.2$ Hz, 2H), 4.07-3.60 (m, 9H). Mp: 157 °C

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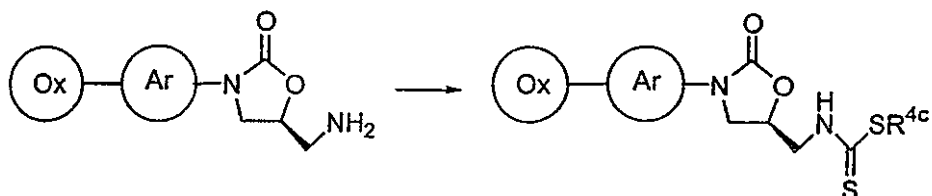
【表 8-2】

84		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.57 (s, 4H), 6.98 (bs, 1H), 4.96-4.76 (m, 1H), 4.51 (t, J = 7.4 Hz, 2H), 4.47 (m, 3H), 3.91-3.84 (m, 1H), 3.65 (s, 1H), 3.51 (bs, 3H). Mp: 195 °C
85		¹ HNMR (CDCl ₃ , 200MHz): δ 3.0 (s, 3H), 3.8 (m, 6H), 4.8 (m, 1H), 4.9 (s, 2H), 5.1 (m, 1H), 6.6 (t, 1H). Mp: 226 °C

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H. 下記:

【化184】



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【0252】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表し、R^{4c}は、(C₁~C₆)アルキル基を表す)

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の変換に関する一般的な手順

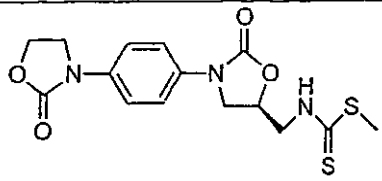
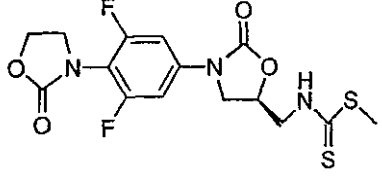
アミン(1当量)、Et₃N(2当量)、および水(数滴)のEtOH中の氷冷混合物に、CS₂(1当量)をアルゴン下で添加した。室温で一晩攪拌して、EtOH中のヨウ化メチル(MeI)(1.1当量)を添加して、攪拌を12時間続けた。揮発分を除去して、残渣を酢酸エチル中に溶解した。有機混合物を、飽和NaHCO₃、水、塩水で洗浄した。得られた残渣をカラムに通して、生成物を得た。

【0253】

実施例86および87を、一般的な手順Hに従って調製した。

【表9】

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実施例 No.	構造	分析データ
86		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 9.98 (bt, 1H), 7.55 (s, 4H), 5.05-5.02 (m, 1H), 4.50 (t, J=7.8 Hz, 2H), 4.12-3.87 (m, 6H), 2.60 (s, 3H). Mp: 161 °C
87		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.26 (s, 1H), 6.15 (d, J = 10.2 Hz, 2H), 4.56-4.49 (m, 3H), 4.27-3.83 (m, 5H), 3.26-3.15 (m, 1H), 2.54 (s, 3H). Mp: 147 °C

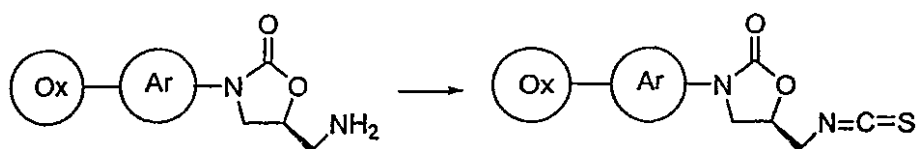
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【0254】

I. 下記工程 (i) :

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【化185】



【0255】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表す)

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の変換に関する一般的な手順

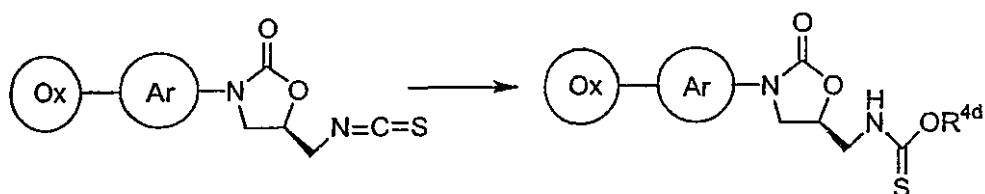
チオホスゲン(1.2当量)を、アミン(1当量)、Et₃N(2.4当量)の乾燥ジクロロエタン中の溶液に、アルゴン下で冷却浴温度で滴下した。反応混合物を3時間かけて室温にまで加温した後、揮発分を除去した。得られた残渣を、シリカゲルカラム上に直接載せて、生成物を得た。

【0256】

下記工程(ii):

【化186】

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【0257】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表し、 R^{4d} は、 $(C_1 \sim C_6)$ アルキル、シクロ $(C_3 \sim C_6)$ アルキル、フッ素で置換された $-C(=O)-(C_1 \sim C_6)$ アルキル基、アリール、ハロ $(C_1 \sim C_6)$ アルキル、ヒドロキシ $(C_1 \sim C_6)$ アルキル、 $(C_1 \sim C_6)$ アルコキシ $(C_1 \sim C_6)$ アルキル、または $(C_2 \sim C_6)$ アルケニルを表す)

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の変換に関する一般的な手順

イソチオシアネートのそれぞれのアルコール中の溶液を、TLCをモニタリングしながら80~100℃に加熱した。出発原料が完全に消費した後、反応混合物を室温に冷却させた。形成した結晶を分離して、エーテルで洗浄して、真空中で乾燥して、純粋な生成物を得た。

【0258】

実施例88~129を、一般的な手順Iに従って調製した。

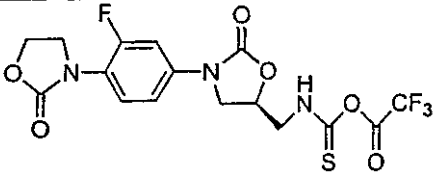
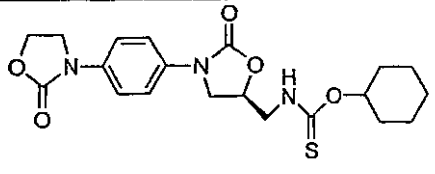
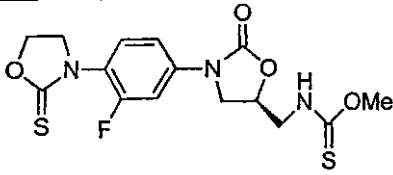
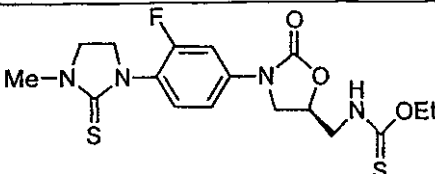
【表10-1】

実施例 No.	構造	分析データ
88		$^1\text{H NMR (CDCl}_3, 200\text{MHz): } \delta$ 7.67-7.56 (m, 2H), 7.16 (d, $J = 2.0$ Hz, 1H), 6.72 (bs, 1H), 4.94 (bs, 1H), 4.52 (t, $J = 7.8$ Hz, 2H), 4.12-3.83 (m, 9H). Mp: 137 °C
89		$^1\text{H NMR (CDCl}_3, 200\text{MHz): } \delta$ 7.66-7.50 (m, 2H), 7.15 (d, $J = 7.4$ Hz, 1H), 6.66 (hump, 1H), 4.94 (bs, 1H), 4.56-4.43 (m, 4H), 4.12-3.84 (m,

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【表10-2】

		4.56-4.43 (m, 4H), 4.12-3.84 (m, 6H), 1.32 (t, J = 6.8 Hz, 3H). Mp: 208 °C
90		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.45 (bs, 1H), 7.65-7.46 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.81 (bs, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09-3.99 (m, 3H), 3.84-3.55 (m, 3H), 3.13(q, J = 10.4 Hz, 2H). Mp: 184 °C
91		¹ HNMR (DMSO-d ₆ , 200MHz): δ 9.54 (m, 1H), 7.57 (s, 4H), 4.90-4.80 (m, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.21-4.01 (m, 4H), 3.88-3.77 (m, 3H), 3.56-3.53 (m, 1H), 1.23-0.97 (m, 6H). Mp: 153 °C
92		¹ HNMR (CDCl ₃ , 200MHz): δ 8.2 (m, 1H), 7.7 (d, J= 10.74 Hz, 1H), 7.5 (t, 1H), 7.3 (d, J = 8.79 Hz, 1H), 5.0 (m, 1H), 4.70 (t, 2H), 4.1 (m, 9H). Mp: 197 °C
93		¹ HNMR (CDCl ₃ , 200MHz): δ 7.02 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.49 (t, J = 8.8 Hz and 12.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 6.63 (bs, 1H), 4.93 (m, 1H),

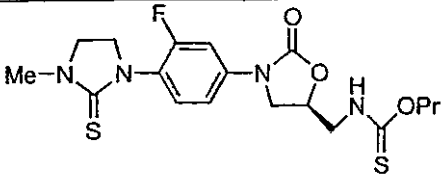
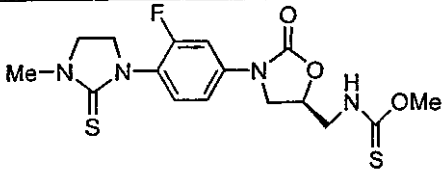
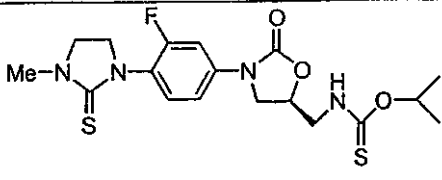
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【表 10 - 3】

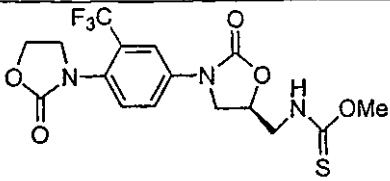
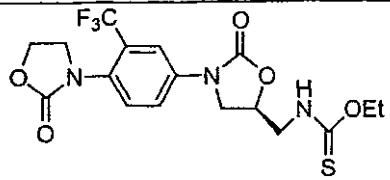
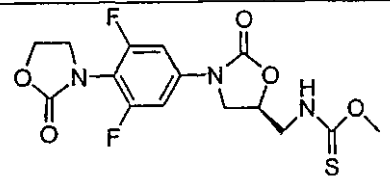
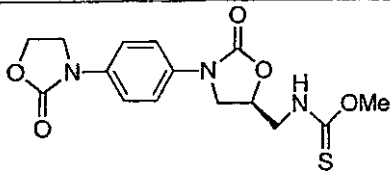
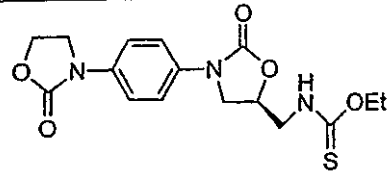
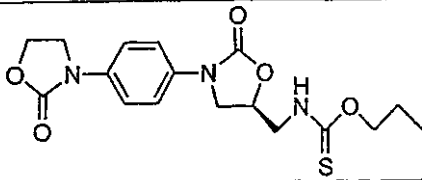
		4.54-4.44 (q, J = 7.4 Hz, 2H), 4.13-3.72 (m, 8H), 3.24 (s, 3H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 197 °C
94		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 6.65 (bs, 1H), 4.94 (m, 1H), 4.38 (t, J = 8.8 Hz, 2H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.78-1.63 (m, 2H), 0.99 (t, 3H). Mp: >200 °C
95		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 6.70 (bs, 1H), 4.94 (m, 1H), 4.13-3.72 (m, 11H), 3.24 (s, 3H). Mp: 179 °C
96		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 13.0 Hz, 1H), 6.55 (bs, 1H), 5.58-5.49 (heptet, 1H), 4.92 (m, 1H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.39-1.25 (m, 6H). Mp: 183 °C

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97		¹ HNMR (CDCl ₃ , 200MHz): δ 7.9 (m, 2H), 7.5 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (t, 2H), 4.0 (m, 9H). Mp: 146 °C
98		¹ HNMR (CDCl ₃ , 200MHz): δ 7.8 (m, 2H), 7.4 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (m, 3H). Mp: 157 °C
99		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29-7.24 (m, 2H), 6.73 (hump, 1H), 4.96 (huimp, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.08-3.83 (m, 9H). Mp: 182 °C
100		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 6.81 (bs, 1H), 4.91 (hump, 1H), 4.49 (t, J = 7.8 Hz, 2H), 4.13-3.82 (m, 9H). Mp: 153 °C
101		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (s, 4H), 6.7 (s, 1H), 4.9 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (t, J = 6.8 Hz, 3H). Mp: 168 °C
102		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.7 (s, 1H), 4.9 (m, 1H), 4.4 (m, 4H), 4.0 (m, 6H), 1.7 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H).

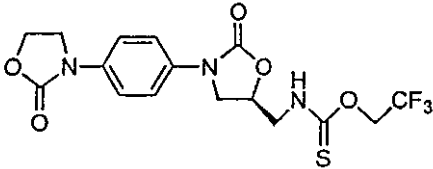
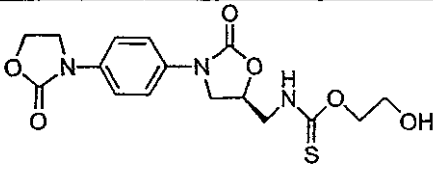
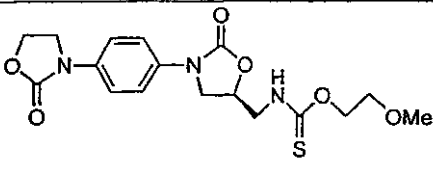
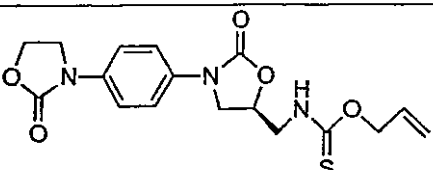
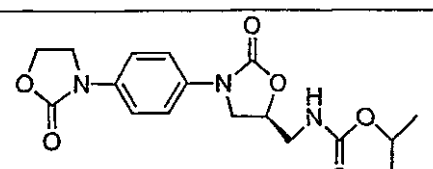
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【表 10 - 5】

		0.95 (t, J = 7.4 Hz, 3H). Mp: 176 °C
103		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 7.26 (bs, 1H), 4.96-4.77 (m, 3H), 4.50 (t, J=7.2 Hz, 2H), 4.15-3.80 (m, 6H). Melting Point (°C): 181 °C
104		¹ HNMR (CDCl ₃ , 200MHz): δ 9.2-8.9 (m, 1H), 7.5 (s, 4H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.5 (m, 8H). Mp: 141 °C
105		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.81 (bt, 1H), 4.91 (m, 1H), 4.67-4.58 (m, 2H), 4.50 (t, J=7.2 Hz, 2H), 4.13-3.82 (m, 6H), 3.68-3.63 (m, 2H), 3.38 (s, 3H). Mp: 149 °C
106		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (s, 4H), 7.26 (s, 2H), 6.7 (s, 1H), 5.93 (m, 1H), 5.29 (m, 2H), 4.9 (m, 3H), 4.5 (t, J = 7.4 Hz, 2H), 4.0 (m, 6H). Mp: 150 °C
107		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.57 (s, 1H), 5.5 (m, 1H), 4.92 (m, 1H), 4.5 (t, J = 7.4 Hz, 2H), 4.0 (m, 6H), 1.31 (dd, J = 10.2 Hz

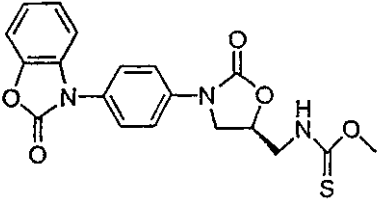
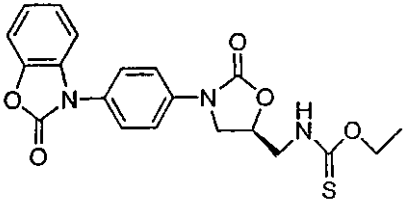
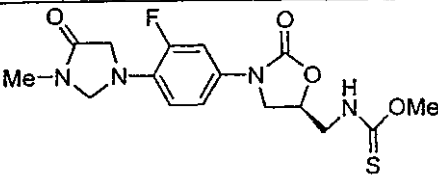
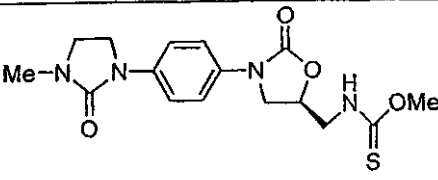
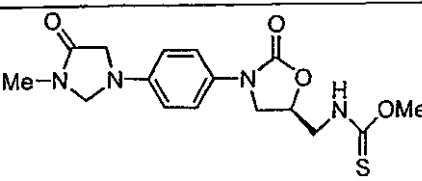
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【表 10 - 6】

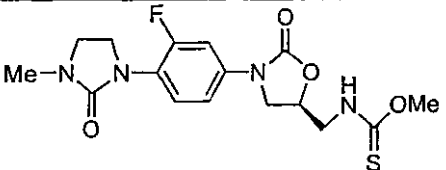
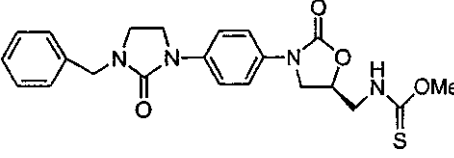
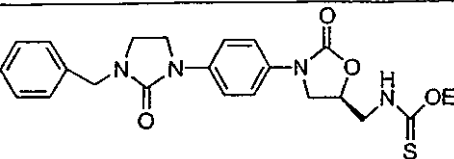
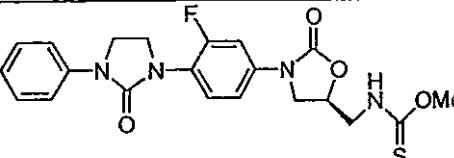
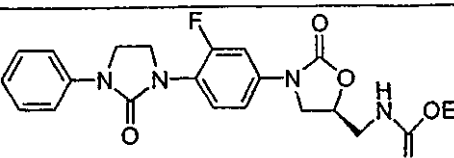
		and 13.8 Hz, 6H). Mp: 140 °C
108		¹ HNMR (CDCl ₃ , 200MHz): δ 7.72 (d, J = 9.2 Hz, 2H), 7.57 (d, J = 9.2 Hz, 2H), 7.31-7.01 (m, 4H), 6.77 (bs, 1H), 4.97-4.96 (m, 1H), 4.19-3.91 (m, 7H). Mp: 141 °C
109		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J = 8.8 Hz, 2H), 7.56 (d, J = 8.8 Hz, 2H), 7.31-7.01 (m, 4H), 6.70 (bs, 1H), 4.97 (m, 1H), 4.55-4.44 (q, J = 6.8 Hz, 2H), 4.19-3.92 (m, 4H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 147 °C
110		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 4.8 (t, 1H), 3.6 (m, 8H), 6.8 (t, 1H), 7.2 (d, 1H), 7.5 (dd, 1H). Mp: 218 °C
111		¹ HNMR (CDCl ₃ , 200MHz): δ 1.5 (s, 3H), 2.9 (s, 3H), 3.6 (t, 2H), 4.9 (m, 1H), 6.8 (m, 1H), 7.8 (d, 2H). Mp: 209 °C
112		¹ HNMR (DMSO-d ₆ , 200MHz): 9.5 (br, 1H), 7.4 (d, J=8.8 Hz, 2H), 6.6 (d, J=8.8 Hz, 2H), 4.90-4.80 (m, 1H), 4.7 (s, 2H), 4.2-3.4 (m, 9H), 2.9 (s, 3H).

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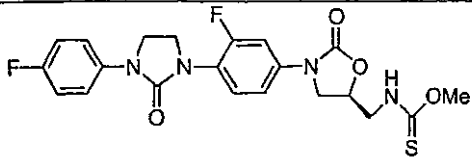
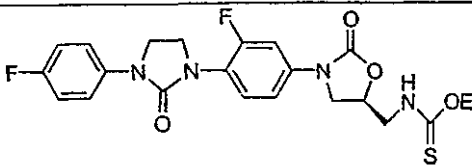
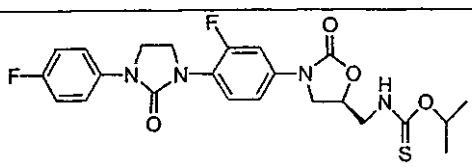
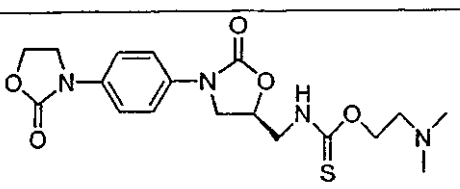
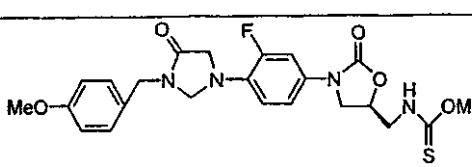
		Mp: 205 °C
113		¹HNMR (CDCl₃, 200MHz): δ 7.5 (m, 2H), 7.1 (m, 1H), 6.9 (s, 1H), 4.9 (m, 1H), 3.8 (m, 9H), 3.4 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H). Mp: 146 °C
114		¹HNMR (CDCl₃, 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.5 (s, 2H), 4.2-3.6 (m, 9H), 3.4 (t, J=8.8 Hz, 2H). Mp: 170 °C
115		¹HNMR (CDCl₃, 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.6 (m, 6H), 3.7 (t, J=8.3 Hz, 2H), 1.3 (t, J=6.8 Hz, 3H). Mp: 160 °C
116		¹HNMR (CDCl₃, 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.4 (m, 3H), 7.0 (m, 1H), 4.9 (m, 1H), 4.2 (m, 1H), 3.8-4.0 (m, 7H), 3.3 (s, 3H). Mp: 174 °C
117		¹HNMR (CDCl₃, 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.3 (m, 3H), 7.1 (t, 1H), 4.8 (m, 1H), 4.4 (m, 2H), 4.2 (m, 1H), 3.7-4.1 (m, 5H), 3.5 (m, 2H), 1.2 (t, 3H). Mp: 195 °C

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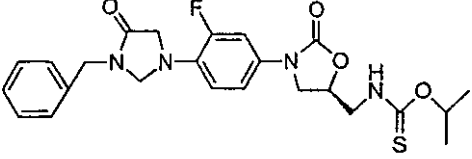
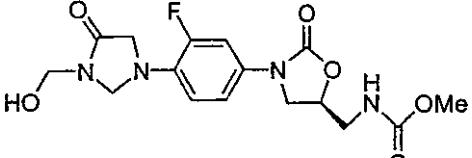
118		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 4H), 4.9 (m, 1H), 4.0 (11H). Mp: 208 °C
119		¹ H NMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.0-7.2 (m, 3H), 4.9 (m, 2H), 4.5 (m, 2H), 4.0 (m, 8H), 1.3 (t, 3H). Mp: 215 °C
120		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 3H), 5.5 (m, 1H), 4.9 (m, 1H), 4.0 (m, 8H), 1.3 (t, 6H). Mp: 220 °C
121		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 7.57 (s, 4H), 5.00-4.75 (m, 1H), 4.44-3.40 (m, 12H), 2.16 (s, 6H). Mp: 161 °C.
122		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.40 (dd, J = 17.6, 2.4 Hz, 1H), 7.24 (d, J = 9.7 Hz, 2H), 7.04 (d, J = 8.8 Hz, 1H), 6.89 (d, J = 8.8 Hz, 2H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.80 (m, 1H), 4.75 (s, 2H), 4.54 (s, 2H), 4.20-3.60 (m, 9H), 3.81 (s, 3H). Mp: 158 °C

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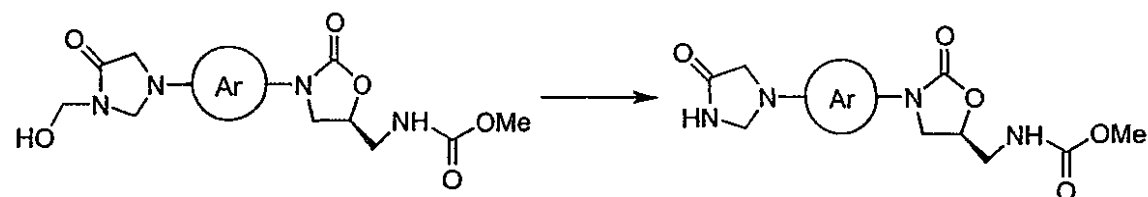
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123		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.50-9.35 (m, 1H), 7.60-6.60 (m, 8H), 5.50-5.30 (m, 1H), 4.95-4.70 (m, 1H), 4.74 (s, 2H), 4.55 (s, 2H), 4.20-3.25 (m, 6H), 1.40-1.10 (bd, 6H). Mp: 192 °C
124		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.55-9.35 (m, 1H), 7.45 (d, <i>J</i> = 18.1 Hz, 1H), 7.15 (d, <i>J</i> = 8.8 Hz, 1H), 6.90-6.80 (m, 1H), 6.09 (t, <i>J</i> = 6.8 Hz, 1H), 4.87 (s, 2H), 4.90-4.75 (m, 1H), 4.71 (d, <i>J</i> = 6.8 Hz, 2H), 4.20-3.10 (m, 9H). Mp: 184 °C

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J. 下記：
【化 1 8 7】



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【0259】

(式中、「Ar」は、置換または無置換のフェニル環を表す)

の変換に関する一般的な手順

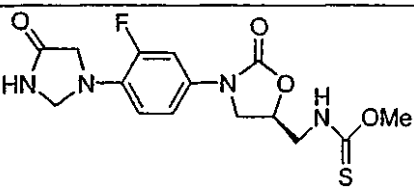
水素化ナトリウム (360 mg、7.5 mmol) を、出発原料 (300 mg、0.75 mmol) の乾燥 THF (30 mL) 中の溶液に添加して、得られた懸濁液を室温で一晩攪拌した。反応混合物を酢酸エチル (150 mL) で希釈して、水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣をシリカゲルカラムに通して、無色固体として生成物を得た (150 mg、収率 54%)。

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【0260】

実施例 125 を、一般的な手順 J に従って調製した。

【表 11】

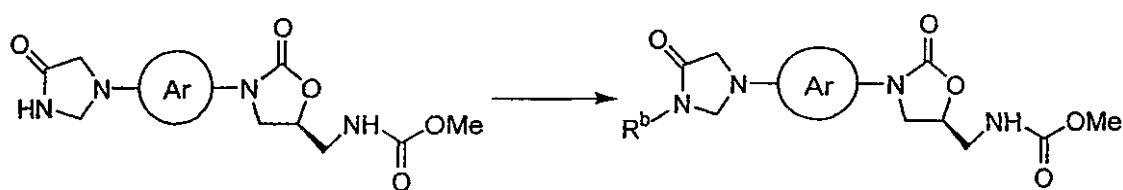
実施例 No.	構造	分析データ
125		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.60-9.40 (m, 1H), 8.62 (s, 1H), 7.45 (d, <i>J</i> = 16.2 Hz, 1H), 7.16 (d, <i>J</i> = 8.6 Hz, 1H), 6.90-6.80 (m, 1H), 4.90- 4.75 (m, 1H), 4.73 (s, 2H), 4.20-3.40 (m, 9H). Mp: 223 °C

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【0261】

K. 下記:

【化188】



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【0262】

(式中、「Ar」は、置換フェニル環を表し、R^bは、(C₁～C₆)アルキルまたはアラルキルを表す)

の変換に関する一般的な手順

出発原料(1当量)の乾燥DMF中の溶液に、アルゴン下で0℃にて、NaH(1.2当量)を、続いて適切なハロゲン化アルキルまたはハロゲン化アラルキル(1.2当量)を

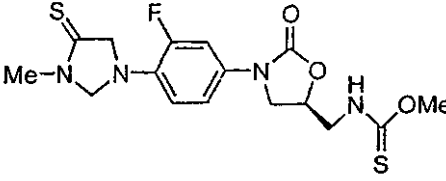
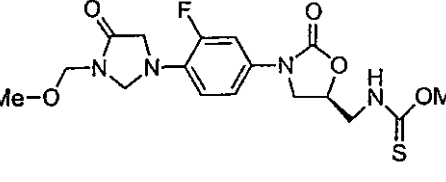
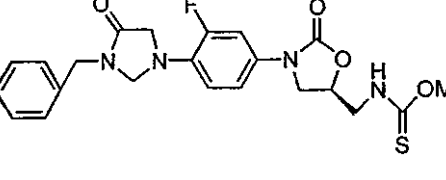
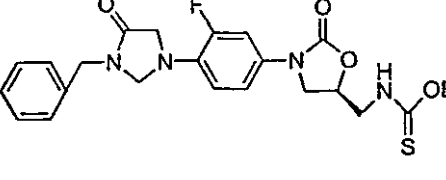
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反応混合物を、TLCをモニタリングしながら2～6時間攪拌した。出発原料が消費した後、反応混合物を酢酸エチルで希釈して、水、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣をシリカゲルカラムに通して、生成物を得た。

【0263】

実施例126～129を、一般的な手順Kに従って調製した。

【表12】

実施例 No.	構造	分析データ
126		$^1\text{H NMR}$ (DMSO- d_6 , 200 MHz): δ 9.60-9.40 (m, 1H), 7.49 (dd, J = 15.6, 2.4 Hz, 1H), 7.18 (d, J = 9.1 Hz, 1H), 6.95-6.80 (m, 1H), 5.17 (s, 2H), 4.95-4.70 (m, 1H), 4.42 (s, 2H), 4.20-3.40 (m, 7H). Mp: 195 °C
127		$^1\text{H NMR}$ (CDCl ₃ , 200 MHz): δ 7.46 (dd, J = 15.1, 2.4 Hz, 1H), 7.10 (d, J = 8.8 Hz, 1H), 6.77 (bt, 1H), 6.65-6.56 (m, 1H), 4.97 (s, 2H), 4.97-4.80 (m, 1H), 4.84 (s, 2H), 4.20-3.55 (m, 9H), 3.37 (s, 3H). Mp: 160 °C.
128		$^1\text{H NMR}$ (CDCl ₃ +DMSO- d_6 , 200 MHz): δ 9.95-9.25 (m, 1H), 7.55-7.25 (m, 6H), 7.45 (d, J = 15.4 Hz, 1H), 6.63-6.54 (m, 1H), 5.00-4.80 (m, 1H), 4.77 (s, 2H), 4.60 (s, 2H), 4.20-3.75 (m, 9H). Mp: 176 °C
129		$^1\text{H NMR}$ (CDCl ₃ , 200 MHz): δ 7.50-7.20 (m, 6H), 7.04 (d, J = 8.6 Hz, 1H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.35 (m, 7H), 4.20-3.60 (m, 6H), 1.31 (t, J = 7.0 Hz, 3H). Mp: 184 °C

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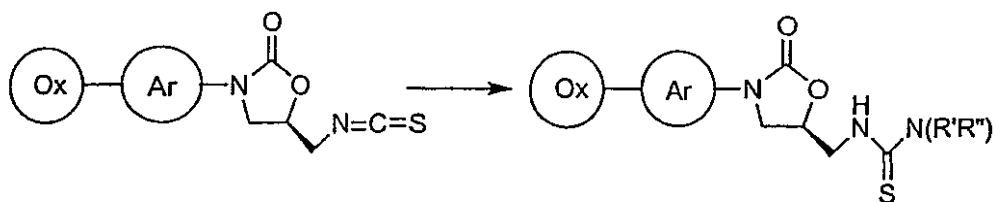
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【 0 2 6 4 】

L. 下記：

【 化 1 8 9 】

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【0265】

(式中、「Ox」は、酸素、窒素、または硫黄から選択され2個のヘテロ原子を含有し、かつ=Oまたは=S基で置換された5員の複素環基(複素環はまた、置換または無置換のフェニル基と縮合させてもよい)を表し、「Ar」は、置換または無置換のフェニル環を表し、R'は、水素、(C₁~C₆)アルキル、(C₂~C₆)アルケニル、置換もしくは無置換のアラルキル、ヘテロアラルキル、ヒドロキシ(C₁~C₆)アルキルを表し、R''は、水素またはアルキルを表すか、あるいは2つのR'およびR''基は、1個もしくは2個のヘテロ原子を含有する5または6員環構造を一緒に形成する)

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の変換に関する一般的な手順

アンモニアガス(または適切なアミン)を、イソチオシアネートのTHF溶液に、-10℃で20分かけてバブリングした。得られた混合物を室温で1時間攪拌した後、酢酸エチルで希釈した。有機層を水(2回)、塩水で洗浄して、乾燥した。溶媒の蒸発により得られた残渣をシリカゲルカラムに通して、生成物を得た。

【0266】

実施例130~143を、一般的な手順Lに従って調製した。

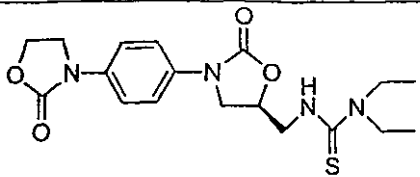
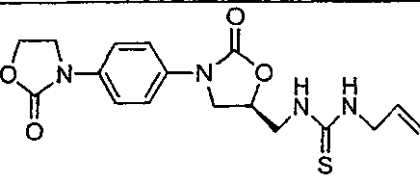
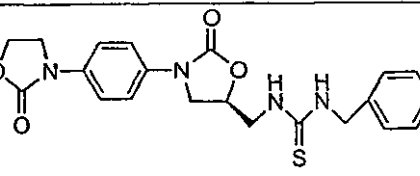
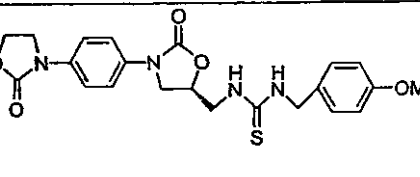
【表13-1】

実施例 No.	構造	分析データ
130		¹ HNMR (CDCl ₃ , 200MHz): δ 7.51 (s, 4H), 4.98-4.95 (m, 1H), 4.49 (t, J=7.8 Hz, 2H), 4.17-3.88 (m, 8H), 3.71-3.69 (m, 3H), 1.93-1.78 (m, 4H). Mp: 159 °C

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【表13-2】

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131		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.63 (s, 1H), 7.57 (s, 4H), 4.94-4.91 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-3.75 (m, 6H), 3.66-3.56 (q, J=6.8 Hz, 4H), 1.07 (t, J=6.8 Hz, 6H). Mp: 103 °C
132		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.79 (bs, 1H), 7.57 (s, 4H), 5.80-5.75 (m, 1H), 5.15-5.01 (m, 2H), 4.86 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-4.01 (m, 5H), 3.85 (m, 2H). Mp: 171 °C
133		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.05 (bs, 1H), 7.86 (bs, 1H), 7.57 (s, 4H), 7.25 (s, 5H), 4.88-4.84 (m, 1H), 4.67 (s, 2H), 4.44 (t, J=7.8 Hz, 2H), 4.16-4.01 (m, 3H), 3.89-3.86 (m, 3H). Mp: 181 °C
134		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.00 (bs, 1H), 7.80 (bs, 1H), 7.57 (s, 4H), 7.19-7.15 (d, J=8.4 Hz, 2H), 6.84-6.80 (d, J=8.2 Hz, 2H), 4.86 (bs, 1H), 4.57 (bs, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.08-4.01 (m, 3H), 3.88-3.85 (m, 3H), 3.70 (s, 3H). Mp: 169 °C

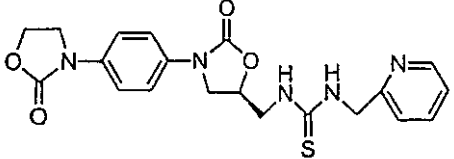
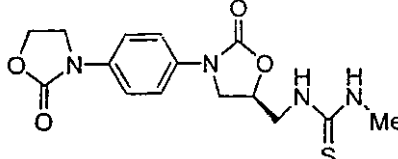
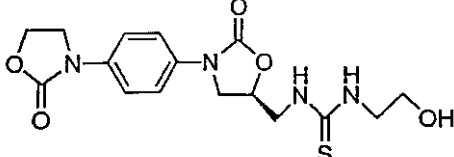
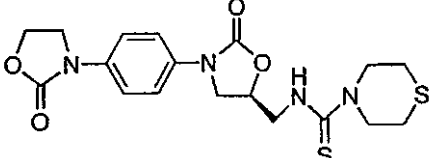
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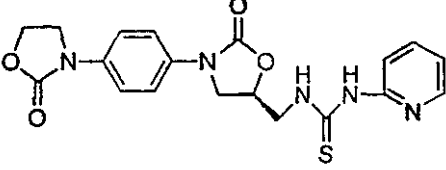
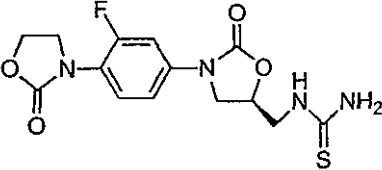
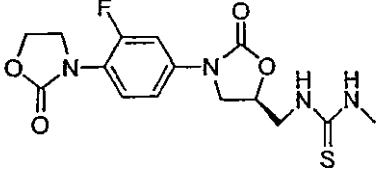
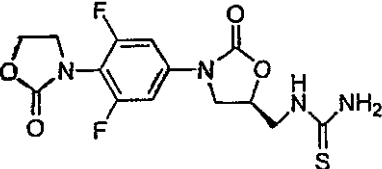
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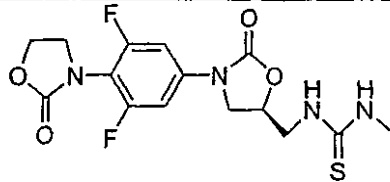
【表 1 3 - 3】

135		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.50-8.48 (d, J=3.8 Hz, 1H), 8.16 (m, 2H), 7.69 (t, J=7.8 Hz, 1H), 7.57 (s, 4H), 7.26-7.22 (d, J=7.8 Hz, 2H), 4.88 (m, 1H), 4.75 (bs, 2H), 4.44 (t, J=7.2 Hz, 2H), 4.18-4.01 (m, 3H), 3.89-3.82 (m, 3H). Mp: 165 °C
136		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.77 (bs, 1H), 7.57 (s, 5H), 4.86 (m, 1H), 4.44 (t, J=7.8 Hz, 2H), 4.17-4.01 (m, 3H), 3.81-3.33 (m, 3H), 2.83 (bs, 3H). Mp: 175 °C
137		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.86 (hump, 1H), 7.66 (hump, 1H), 7.57 (s, 4H), 4.78-4.68 (m, 2H), 4.43 (t, J=7.2 Hz, 2H), 4.12-4.01 (m, 3H), 3.83 (bs, 3H), 3.46-3.33 (m, 4H). Mp: 161 °C
138		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.05 (hump, 1H), 7.57 (s, 4H), 4.95 (m, 1H), 4.43 (t, J=7.2 Hz, 2H), 4.08-3.89 (m, 8H), 2.57 (s, 4H), 2.49 (s, 4H). Mp: 159 °C

【表 1 3 - 4】

139		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 12.06 (bs, 1H), 10.76 (s, 1H), 8.14-8.11 (d, J=5.0 Hz, 1H), 7.77 (t, J=8.2 Hz, 1H), 7.52 (s, 4H), 7.17-7.13 (d, J=3.2 Hz, 1H), 7.04 (t, J=5.8 Hz, 1H), 5.05-5.03 (m, 1H), 4.43 (t, J=7.4 Hz, 2H), 4.22 (t, J=9.2 Hz, 1H), 4.07-3.84 (m, 5H). Mp: 189 °C
140		¹ HNMR (CDCl ₃ +DMSO-d ⁶ , 200MHz): δ 8.07 (bs, 1H), 7.62-7.40 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 6.65 (bs, 1H), 4.85 (bs, 1H), 4.48 (t, J = 8.0 Hz, 2H), 4.04-3.96 (m, 6H). Mp: 178 °C
141		¹ HNMR (CDCl ₃ +DMSO-d ⁶ , 200MHz): δ 7.68-7.19 (m, 5H), 4.92 (hump, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.08-3.98 (m, 6H), 3.10 (s, 3H). Mp: 144 °C
142		¹ HNMR (CDCl ₃ +DMSO-d ⁶ , 200MHz): δ 8.10 (bs, 1H), 7.35 (d, J = 8.4 Hz, 2H), 6.58 (bs, 1H), 4.91-4.89 (m, 1H), 4.58 (t, J = 7.8 Hz, 2H), 4.54-3.87 (m, 6H). Mp: 92 °C

【表 1 3 - 5】

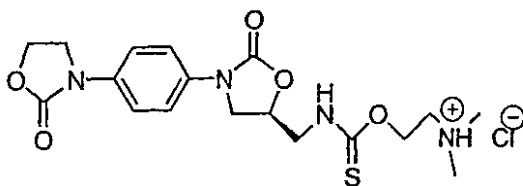
143		¹ H NMR (CDCl ₃ , 200MHz): δ 7.26 (s, 2H), 6.39 (hump, 2H), 4.93 (hump, 1H), 4.60 (t, J = 7.4 Hz, 2H), 4.21-3.93 (m, 6H), 2.99 (d, J = 4.8 Hz, 3H). Mp: 113 °C

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実施例 144

N1-((5S)-3-{3-フルオロ-4-[3-ベンジル-4-オキソ-1-イミダゾリジニル]フェニル}-2-オキソ-1,3-オキサゾラン-5-イルメチル)エチルチオカーバメート塩酸塩

【化190】



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【0267】

N1-((5S)-3-{3-フルオロ-4-[3-ベンジル-4-オキソ-1-イミダゾリジニル]フェニル}-2-オキソ-1,3-オキサゾラン-5-イルメチル)エチルチオカーバメート(実施例121で得られたもの)を、メタノール(100mg)に溶解して、30分間HClガスを用いてバブリングした。得られた混合物からメタノールを蒸発させて、エーテルで二度洗浄して、表題の化合物を得た(収率:100%)。Mp: 100 °C (吸湿性)。

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【0268】

¹H NMR (DMSO-d₆, 200MHz): δ 10.60 (bs, 1H)、9.85~9.65 (m, 1H)、7.58 (s, 4H)、5.00~4.65 (m, 3H)、4.44 (t, J = 7.6 Hz, 2H)、4.25~3.40 (m, 8H)、2.81 (s, 3H)、2.79 (s, 3H)。

【0269】

イン・ビトロデータ:

最小阻害濃度(MIC)は、Approved Standards, NCCLS documents M7-A5 Vol 20-No 2, 2000 Villanova, PAの第5版に定められたガイドラインにより、ブロス微量希釈技法によって決定した。

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【0270】

試験化合物の最初のストック溶液をDMSO中に調製した。滅菌Mueller Hinton Broth(Difco)(MHB)中で続く2倍希釈を行った。

【0271】

凍結培養ストックを、250mlのエレンマイヤーフラスコ中の滅菌MHB 50ml中に接種した。

【0272】

MHBの組成は以下の通りである:

牛抽出物粉末: 2.0 g/L

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カゼインの酸消化物：17.5 g / L

可溶性デンプン：1.5 g / L

最終pH 7.3 ± 0.1

フラスコを、回転振とう機上で、150 rpmで35℃にて4～5時間インキュベートした。接種材料は、0.5 McFarland標準物質の濁度を獲得するように、培養物を滅菌MHBで希釈することで調製した。これは、 1.2×10^8 CFU / mlに相当する。ストックを滅菌ブロス中でさらに希釈して、 $1 \sim 2 \times 10^6$ CFU / mlを得た。上記希釈接種材料50 μlを1～10ウェルに添加した。プレートを37℃で一晩インキュベートした。

【0273】

MICは、肉眼で検出される場合の微量希釈ウェル中の生物の成長を完全に阻害する化合物の最低濃度として判断される。

【表14】

生物	培養物番号	DRCC 番号
黄色ブドウ球菌	ATCC 33591	019
黄色ブドウ球菌	ATCC 49951	213
黄色ブドウ球菌	ATCC 29213	035
エンテロコッカス・フェカリス	ATCC 29212	034
エンテロコッカス・フェカリス	NCTC 12201	153
エンテロコッカス・フェカリス	NCTC 12202	154
大腸菌	ATCC 25922	018

【0274】

ATCC：アメリカン・タイプ・カルチャー・コレクション、アメリカ合衆国 (American Type Culture Collection, USA)

NCTC：ナショナル・コレクションズ・オブ・タイプ・カルチャーズ、コリンダール、英国 (National Collections of Type Cultures, Colindale, UK)

DRCC：レディー博士のカルチャー・コレクション、ハイデラバード、インド (Dr. Reddy's Culture Collection, Hyderabad, India)

イン・ビトロ抗菌活性を、表1に示す。

【表15】

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表 1 :

グラム陽性菌およびグラム陰性菌に対する化合物のイン・ビトロ活性

実施例 No.	抗菌スクリーニング (MIC) $\mu\text{g/ml}$						
	黄色ブドウ球菌			腸球菌種			大腸菌
	<i>019</i> <i>MRSA</i>	<i>213</i> <i>Smith S</i>	<i>035</i> <i>S</i>	<i>034</i> <i>S</i>	<i>153</i> <i>R</i>	<i>154</i> <i>R</i>	<i>18</i> <i>S</i>
40	8.0	4.0	8.0	16.0	8.0	8.0	32.0
62	2.0	1.0	4.0	-	8.0	8.0	32.0
76	2.0	2.0	4.0	4.0	4.0	4.0	>32.0
79	2.0	2.0	4.0	4.0	8.0	8.0	32.0
88	1.0	1.0	2.0	2.0	2.0	2.0	>32.0
89	4.0	4.0	4.0	8.0	8.0	8.0	>32.0
99	2.0	2.0	2.0	2.0	2.0	2.0	>32.0
100	0.5	0.5	0.5	1.0	1.0	1.0	32.0
107	2.0	4.0	4.0	8.0	4.0	4.0	32.0
110	0.5	0.5	0.5	1.0	1.0	1.0	32.0
113	2.0	4.0	4.0	4.0	4.0	8.0	32.0
124	0.25	0.25	0.5	0.5	0.25	0.5	-
125	0.25	0.25	0.5	0.5	0.25	0.5	-
127	0.5	1.0	1.0	1.0	1.0	1.0	-

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【国際公開パンフレット】

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31/42

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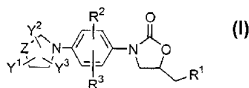
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LOHRAV, Braj, Bhushan; Dr. Reddy's Research Founda-
tion, 7-1-27, Amcetpet, 500016 Hyderabad (IN).(81) Designated States (national): AE, AG, AI, AM, AT, AU,
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GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,
MX, MZ, NO, NZ, PH, PI, PT, RO, RU, SD, SI, SG, SL,
SK, SI, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA,
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(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NL, SN, TD, TG).Published:
without international search report and to be republished
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(54) Title: NOVEL HETEROCYCLIC COMPOUNDS HAVING ANTIBACTERIAL ACTIVITY: PROCESS FOR THEIR PREPA-
RATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM(57) Abstract: The present invention relates to novel oxazolidinone com-
pounds of the general formula (I) where R¹, R², R³, Y¹, Y², Y³, and Z
are as defined in the description; their derivatives, their analogs, their tau-
tomeric forms, their stereoisomers, their polymorphs, their pharmaceu-
tically acceptable salts, their pharmaceutically acceptable solvates and phar-
maceutical compositions containing them.

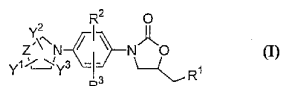
WO 02/051819

PCT/IN01/00227

NOVEL HETEROCYCLIC COMPOUNDS HAVING ANTIBACTERIAL
ACTIVITY: PROCESS FOR THEIR PREPARATION AND
PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

5 **Field of the Invention**

The present invention relates to novel oxazolidinone compounds, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and
10 pharmaceutical compositions containing them. More particularly, the present invention relates to novel oxazolidinones of the general formula (I).



their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable
15 solvates and pharmaceutical compositions containing them.

The present invention also relates to a process for the preparation of the above said novel compounds, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and pharmaceutical compositions containing them.

20 The present invention also relates to novel intermediates, methods for their preparation and their use in the preparation of compounds of formula (I).

Oxazolidinones are useful as antibacterials (J. Med. Chem., 1996, 39, 673), antihistamines and anti allergic agents (EP 291,244), anticonvulsants (DE 3,915,184), treating cognition disorders, anti psychotics, anti platelet aggregators, antidepressants,
25 sedatives, hypnotics, monoamine oxidase inhibitors (WO 97/13768) and as chiral auxiliaries (Aldrichimica Acta, 1982, 15 23) in asymmetric synthesis.

WO 02/051819

PCT/IN01/00227

2

Background of the Invention

Since the discovery of penicillin, pharmaceutical companies have produced more than one hundred antibacterial agents to combat a wide variety of bacterial infections. In the past several years, due to the misuse of these antibiotics there has been rapid
5 emergence of bacterial resistance to several of these antibiotics. The multidrug resistance among these bacterial pathogens may also be due to mutation leading to more virulent clinical isolation, the most disturbing milestone has been the acquisition of resistance to vancomycin, an antibiotic generally regarded as the agent of last resort for serious Gram-positive infections. This growing multidrug resistance has recently
10 rekindled interest in the search for new structural class of antibiotic that inhibit or kill these bacteria possibly by novel mechanisms.

A problem of larger dimension is the increasing incidence of the more virulent, methicillin-resistant *Staphylococcus aureus* (MRSA) among clinical isolates found worldwide. As with vancomycin resistant organisms, many MRSA strains are resistant
15 to most of the known antibiotics, but MRSA strains have remained sensitive to vancomycin. However, in view of the increasing reports of vancomycin resistant clinical isolates and growing problem of bacterial resistance, there is an urgent need for new molecular entities effective against the emerging and currently problematic Gram-positive organisms.

20 Recently, several oxazolidinones have been discovered, which inhibit protein synthesis by binding to the 50S-ribosomal subunit which is close to the site to which chloramphenicol and lincomycin bind but their mode of action is mechanistically distinct from these two antibiotics.

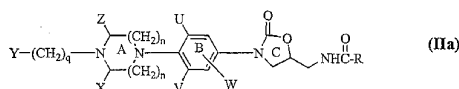
The new class of oxazolidinones of the present invention is useful for the
25 treatment of a number of resistant and sensitive gram-positive strains both *in vitro* and *in vivo*. Some of the hitherto known compounds described in the prior art are outlined below:

- (i) International Patent Application WO 93/23384 discloses compounds of formula (IIa)

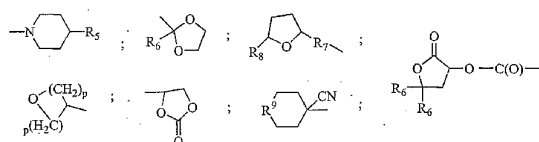
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- where Y represents a hydrogen atom, (C₁-C₆)alkyl or aryl, OH, O(C₁-C₆)alkyl, O-vinyl, O-phenyl, O-C(=O)(C₁-C₆)alkyl, -O-C(=O)-phenyl (phenyl can be substituted with one to three F, Cl, OCH₃, OH, NH₂, or (C₁-C₄)alkyl) or O-C(=O)-O-CH₃, S-(C₁-C₆)alkyl, SO₂-(C₁-C₆)alkyl, -SO₂-N(R³)₂, (where R³ is independently hydrogen, (C₁-C₄)alkyl or phenyl which can be substituted with one to three F, Cl, OCH₃, OH, NH₂, or (C₁-C₄)alkyl);
- C(=O)-(C₁-C₆)alkyl, -C(=O)-O-(C₁-C₆)alkyl, -C(=O)-N(R³)₂, -C(=O)-CH(R⁴)N(R³)₂, -C(=O)-CH(R⁴)-NH-C(NH)-NH₂ (where R⁴ is an amino acid side chain); -N(R³)₂, -N(CH₂)_m (where m is 2-6 and forms a cyclic structure with the nitrogen atom and where one or more carbon atoms can be replaced with S, O or NR³), -C(CH₃)=N-OR or Y represents any of the groups given below :



- where R⁵ is OH, OCH₃, CH₂OH, CH₂OCH₃, CO₂CH₃, CO₂C₂H₅, R⁶ represents CH₃ or hydrogen, R⁷ represents CH₃ or C(=O), R⁸ represents hydrogen or =O, p is 1 or 2, R⁹ represents O, S, S(O), SO₂, CH₂, NH, NCH₃, NC₂H₅, NCHO, NCOCH₃ or NCO₂CH₃, wherein each occurrence of said (C₁-C₆)alkyl may be substituted with one or more F, Cl, Br, I, OR¹, COOR¹, CN, SR¹ or R¹ (where R¹ is a hydrogen or (C₁-C₄)alkyl); X and Z are independently (C₁-C₆)alkyl, (C₃-C₁₂)cycloalkyl or hydrogen or X and Z form a (C₀-C₃) bridging group, preferably X and Z are hydrogen; U, V and W are independently (C₁-C₆)alkyl, F, Cl, Br, hydrogen or a (C₁-C₆)alkyl substituted with one or more of F, Cl, Br or I, preferably U and V are F and W is hydrogen; R is hydrogen, (C₁-C₁₂)alkyl, (C₃-

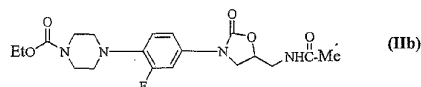
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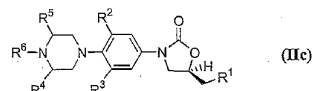
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C₁₂cycloalkyl, (C₁-C₆)alkoxy, (C₁-C₆)alkyl substituted with one or more F, Cl, Br, I or OH, n is 1 or 2; and q is 0-4 inclusive.

An example of this class of compounds is shown in formula (IIb)

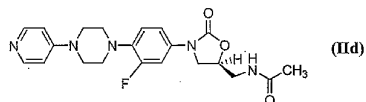


- 5 (ii) International Patent Application WO 98/01447 discloses compounds of formula (IIc)



- wherein R¹ represents -NHC(=O)R^a wherein R^a represents (C₁-C₄)alkyl; R² and R³ represent hydrogen or fluoro; R⁴ and R⁵ are independently hydrogen or methyl; R⁶ represent pyridyl, optionally substituted by substituents selected from (C₁-C₄)alkyl (optionally substituted), halo, trifluoromethyl, (C₁-C₄)alkyl-S(O)_n (wherein n is 0, 1 or 2), (C₁-C₄)alkyl SO₂amino, (C₁-C₄)alkanoylamino, carboxy, hydroxy, amino, (C₁-C₄)alkylamino, di-(C₁-C₄)alkylamino, (C₁-C₄)alkoxycarbonyl, carbamoyl, N-(C₁-C₄)alkylcarbamoyl, di-(N-(C₁-C₄)alkyl)carbamoyl (wherein the (C₁-C₄)alkyl group on
- 10 groups in the last two mentioned carbamoyl groups is optionally substituted by hydroxy, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl), (C₂-C₄)alkenyl (optionally substituted by carboxy or (C₁-C₄)alkoxycarbonyl), (C₁-C₄)alkoxy, cyano, or nitro groups.

An example of this class of compounds is shown in formula (IId)



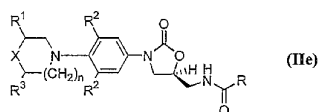
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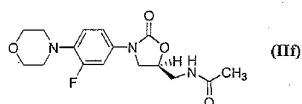
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(iii) International Patent Application No. WO 95/07271 discloses compounds of formula (IIe)

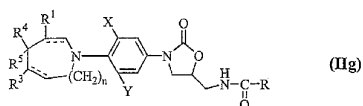


- wherein X represents O, S, SO, SO₂, SNR¹⁰ or SONR¹⁰; R represents hydrogen, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy or -OCH₂Ph or R represents (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino, (C₁-C₈)dialkylamino or (C₁-C₈)alkoxy; R¹ represents hydrogen except when X is O, then R¹ can be hydrogen, CH₃, cyano, -CO₂H, CO₂R or (CH₂)_mR¹¹ (m is 1 or 2); R² represents independently hydrogen, F or Cl; R³ represents hydrogen or CH₃;
 10 R¹⁰ independently represents hydrogen, (C₁-C₄)alkyl (optionally substituted with chloro, fluoro, hydroxy, (C₁-C₈)alkoxy, amino, (C₁-C₈)alkylamino, or (C₁-C₈)dialkylamino) or p-toluenesulfonyl; R¹¹ represents hydrogen, hydroxy, OR, OCOR, NH₂, NHCOR or N(R¹⁰)₂; and n is 0, 1 or 2.

An example of this class of compounds is shown in formula (IIf)



- 15 (iv) International Patent Application WO 95/25106 discloses compounds of formula (IIg)



- where R is hydrogen atom, (C₁-C₈)alkyl, (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino,
 20 (C₁-C₈)dialkylamino, (C₁-C₈)alkoxy or (C₁-C₈)halogen alkyl; R¹ and R³ are each and

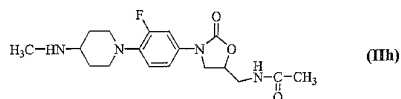
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independently represents hydrogen atom, halogen atom, (C₁-C₈)alkyl, (C₃-C₈)cycloalkyl, -(CH₂)_m-OR¹¹ or -C(=O)-R⁴¹; X and Y are each and independently represents hydrogen atom, halogen atom; R⁴ and R⁵ are each and independently represents hydrogen atom, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, (C₁-C₈)alkylthio, -(CH₂)_m-OR⁵¹,
 5 -O-(CH₂)_m-OR⁵¹, -NR⁴²R⁵², -N=CH-NR⁴⁴R⁵⁵, -C(=O)-NR⁴²R⁵² or -(CH₂)_m-C(=A)-R⁴¹ or they may combine together to form =O, =NR⁴³, =S, =CR⁴⁴R⁵⁴ or an optionally substituted, unsaturated or saturated 5 or 6 membered hetero ring having 1-3 hetero atoms selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom; R¹¹ and R¹² are each and independently represents hydrogen atom, (C₁-C₈)alkyl or methoxymethyl; R⁴¹ is hydrogen atom, -(CH₂)_m-OH, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, -O-CH₂-O-C(=O)-R¹¹ or -(CH₂)_m-C(=O)-OR¹¹; R⁴² and R⁵² are each and independently represents hydrogen atom, -(CH₂)_m-OR¹¹, (C₁-C₈)alkyl, -C(=O)-R⁴¹, -C(=O)-NR¹¹R¹², -(CH₂)_p-phenyl, thiazol-2-yl or they may combine together to form a pyrrolidino group, a piperidino group, a piperazino group, a morpholino group or a thiomorpholino group, each of which may be substituted by (C₁-C₈)alkyl or -(CH₂)_m-OH;
 10 R⁴³ is hydrogen atom, -OR⁵¹, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, -(CH₂)_p-phenyl, NR⁴²R⁵², -NH-C(=NH)-NH₂, [1,2,4]triazol-4-yl or cyano; R⁴⁴ and R⁵⁵ are each and independently represents hydrogen atom, (C₁-C₈)alkyl, -C(=O)-R⁴¹ or -(CH₂)_p-phenyl; R⁵¹ is hydrogen atom, (C₁-C₈)alkyl substituted by one or more hydroxy; (C₂-C₈)alkenyl, (C₁-C₈)halogenalkyl, -(CH₂)_m-OR¹¹, -(CH₂)_m-C(=O)-R⁴¹, -C(=O)-(CH₂)_m-OR⁴ or tosyl;
 20 A is oxygen atom or ethyleneketal; --- is a double bond or a simple bond; m's are each and independently 0, 1 or 2; n is 0 or 1; p's are each and independently 1, 2, 3 or 4;

An example of this class of compounds is shown in formula (IIIh)

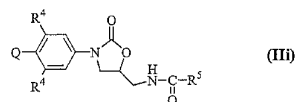


25 (v) International Patent Application WO 96/13502 discloses compounds of formula (IIIi)

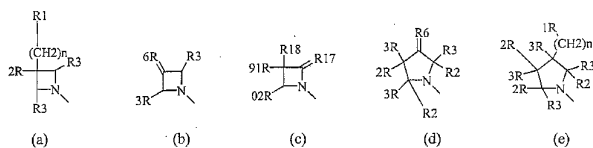
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Q is selected from the structures (a), (b), (c), (d) and (e);



- R¹ is H or F, OR⁷, SR⁷, NR⁸R⁹, CN, (C₁-C₄)alkoxycarbonyl, carboxamide, (C₁-C₄)acyl optionally substituted with one or more of the following : fluorine, hydroxy, (C₁-C₄)alkoxy, (C₁-C₄)acyloxy; NHO(C₁-C₆)alkyl or NHOCH₂Ph, NSO₂R where R is (C₁-C₆)alkyl optionally substituted with one or more F, Cl, (C₁-C₆)alkoxy or phenyl; R² is independently selected from hydrogen or fluorine, hydroxy, OR where R is (C₁-C₆)alkyl; (C₁-C₄)alkyl or Ph; R³ is independently selected from H, phenyl, pyridyl or (C₁-C₃)alkyl which can be optionally substituted with F, Cl, hydroxy, (C₁-C₃)alkoxycarbonyl, (C₁-C₃)acyloxy, (C₁-C₃)alkoxy or N(C₁-C₄ alkyl)₂; R⁴ is independently H, OCH₃, F or Cl; R⁵ is hydrogen, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy; (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino, (C₁-C₈)dialkylamino, (C₁-C₈)alkoxy; R⁶ is O, S, NR¹⁰, CR¹¹R¹², (OR)₂, where R is (C₁-C₆)alkyl; O(CH₂)_m O, (SR)₂ where R is (C₁-C₆)alkyl; S(CH₂)_mS; R⁷ is H, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, -CN, OH, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, (C₁-C₈)alkoxycarbonyl, phenyl; (C₁-C₈)acyl optionally substituted with one or more of the following : hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy; (C₁-C₈)alkoxycarbonyl, carboxamide optionally substituted with a (C₁-C₄)alkyl or phenyl on the carboxamide nitrogen; phenyl, optionally substituted with one or more of the following : halogen, CN, (C₁-C₃)alkoxy, (C₁-C₃)alkoxycarbonyl, (C₁-C₄)alkyl optionally substituted with one or more of F or (C₁-C₃) alkoxy; R⁸ and R⁹ are

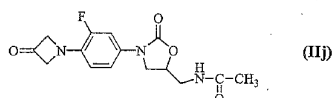
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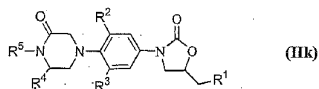
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independently selected from H, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, -CN, OH, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, (C₁-C₈)alkoxycarbonyl, phenyl; (C₁-C₈)acyl optionally substituted with one or more of the following : hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, amino, (C₁-C₄)acylamino, amino (C₁-C₄)acylamino; 5 benzoyl optionally substituted with one or more of the following F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, amino, (C₁-C₄)acylamino, (C₁-C₄)alkoxycarbonylamino; (C₁-C₈)alkoxycarbonyl, benzyloxy, tertbutoxycarbonyl; carboxamide optionally substituted with a (C₁-C₄)alkyl or phenyl on the carboxamide nitrogen; trifluoroacetyl, CO(C₁-C₈ alkyl); R¹⁰ is H, OR⁷, NHR⁷, (C₁-C₈)alkyl optionally substituted with phenyl; 10 R¹¹ and R¹² are independently selected from H, F, (C₁-C₄)alkyl optionally substituted with halogen, hydroxy, (C₁-C₄)alkoxy, (C₁-C₄)alkoxycarbonyl, phenyl; (C₁-C₈)acyl, (C₁-C₄)alkoxycarbonyl, CN; R¹⁷ is O or S; R¹⁸ and R¹⁹ are independently selected from H, (C₁-C₄)alkyl optionally substituted with halogen, hydroxy, (C₁-C₄)alkoxy; OH, (C₁-C₄)alkoxy optionally substituted with hydroxy or (C₁-C₄)alkoxy; NR⁸R⁹, -OC(O) (C₁-C₄)alkyl; R²⁰ is H, CH₃; n is 0 or 1; m is 2 or 3;

An example of this class of compounds is shown in formula (IIj)



(vi) International Patent Application WO 97/27188 discloses compounds of formula (II k)



20

R¹ is of the formula -NHC(=O)(C₁-C₄)alkyl, -NHS(O)_n(C₁-C₄)alkyl, wherein n is 0, 1 or 2 or R¹ is hydroxy; R² and R³ are independently hydrogen or fluoro; R⁴ is hydrogen, methyl, ethyl or oxo; R⁵ is hydrogen, (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₂-C₆)alkynyl, or of 25 the formula R⁶(CH₂)_m wherein m is 1-4 and R⁶ is trifluoromethyl, difluoromethyl,

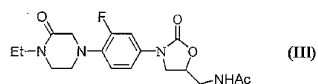
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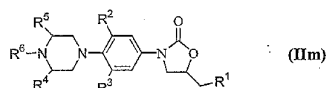
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fluoromethyl, (C₁-C₄)alkoxy, (C₁-C₄)alkylS(O)_p, wherein p is 0, 1 or 2, (C₁-C₄)alkanoyloxy, di-(N-(C₁-C₄)alkyl)amino, N-((C₁-C₄)alkyl)(C₁-C₄)alkanoylamino, cyano, carboxy, (C₁-C₄)alkoxycarbonyl, carbamoyl, -di-(N-(C₁-C₄)alkyl)carbamoyl, N-((C₁-C₄)alkyl)(C₁-C₄)alkanesulphonamido, N¹-((C₁-C₄)alkyl)-di-(N³-(C₁-C₄)alkyl)ureido or of the formula -OC(=O)NR(R⁸) or N(R⁸)SO₂NR⁷(R⁸) wherein R⁷ and R⁸ are independently hydrogen or (C₁-C₄)alkyl and R⁹ is (C₁-C₄)alkyl; or m is 2-4 and R⁶ is hydroxy, (C₁-C₄)alkanoylamino, amino, (C₁-C₄)alkylamino, (C₁-C₄)alkanesulphonamido, ureido, di-(N³-(C₁-C₄)alkyl)ureido or of the formula NHSO₂NR⁷(R⁸);

10 An example of this compound is shown in fig (III)



(vii) International Patent Application WO 98/01446 discloses compounds of formula (IIm)



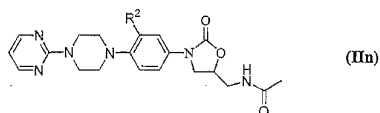
15 R¹ is of the formula -NHC(=O)R³ wherein R³ is (C₁-C₄)alkyl; R² and R³ are independently hydrogen or fluoro; R⁴ and R⁵ are independently hydrogen or methyl; R⁶ is a 6-membered heteroaryl ring containing 2 or 3 ring nitrogen atoms as the only ring heteroatoms and optionally substituted by substituents selected from (C₁-C₄)alkyl (optionally substituted), halo, trifluoromethyl, (C₁-C₄)alkylS(O)_n, (wherein n is 0, 1 or 2), (C₁-C₄)alkylS(O)₂, amino, (C₁-C₄)alkanoylamino, carboxy, hydroxy, amino, (C₁-C₄)alkylamino, di(C₁-C₄)alkylamino, (C₁-C₄)alkoxycarbonyl, carbamoyl, N-(C₁-C₄)alkylcarbamoyl, -di-(N-(C₁-C₄)alkyl)carbamoyl, [wherein (C₁-C₄)alkyl group or groups in the last two mentioned carbamoyl substituents is optionally substituted by hydroxy, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl], (C₂-C₄)alkenyl (optionally substituted by carboxy or (C₁-C₄)alkoxycarbonyl), (C₁-C₄)alkoxy, cyano or nitro;

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10

An example of this compound is shown in fig (IIa)



Summary of the Invention

5 With an objective to develop novel compounds effective against a number of human and veterinary pathogens, including gram-positive aerobic bacteria such as MRSA, streptococci and enterococci as well as anaerobic organisms such as *Bacteroides* spp., *Clostridia* spp. species and acid-fast organisms such as *Mycobacterium tuberculosis*, *Mycobacterium avium* and *Mycobacterium* spp., we focussed our research
10 to develop new compounds effective against the above mentioned organisms. Efforts in this direction have led to the preparation of compounds having general formula (I) as defined above.

The present invention provides novel Oxazolidinones of the general formula (I) as defined above and their derivatives, their analogs, their tautomeric forms, their
15 stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and pharmaceutical compositions containing them, or their mixtures having enhanced activities, without toxic effect or with reduced toxic effect.

A process for the preparation of novel oxazolidinones of the formula (I) as
20 defined above and their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts and their pharmaceutically acceptable solvates is also described.

An aspect of the present invention is to provide pharmaceutical compositions containing compounds of the general formula (I), their analogs, their derivatives, their
25 tautomers, their stereoisomers, their polymorphs, their salts, solvates or their mixtures in

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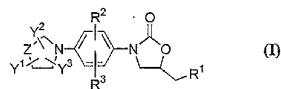
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combination with suitable carriers, solvents, diluents and other media normally employed in preparing such compositions.

Novel intermediates of formulae (VI), (VII), (X), (XVI) (XVIII), and a process for their preparation and their use in the preparation of compounds of formula (I) is also provided.

Detailed Description of the Invention

The present invention relates to compounds having the general formula (I),



- 10 where R^1 represents halo, azido, thioalcohol, isothiocyanate, OR^4 , NHR^4 or $N(R^4)_2$, where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, cyclo (C_3-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxythiocarbonyl, (C_1-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-C(=O)-C(=O)-$ (C_1-C_6) alkyl, $-C(=O)-C(=O)-aryl$, $-C(=O)-C(=O)-$ (C_1-C_6) alkoxy, $-C(=O)-C(=O)-aryloxy$, $-(C=S)-S-(C_1-C_6)alkyl$, $-(C=S)-NH_2$, $-(C=S)-NH-(C_1-C_6)alkyl$, $-C(=S)-N-((C_1-C_6)alkyl)_2$, $-C(=S)-NH-(C_2-C_6)alkenyl$, $(C=S)-(C=O)-(C_1-C_6)alkoxy$, $-(C=S)-(C=O)-aryloxy$, $-C(=S)-O-(C=O)-$ $(C_1-C_6)alkyl$, $C(=S)-C(=S)-$ $(C_1-C_6)alkyl$, $-C(=S)-C(=S)-aryl$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 may be
20 same or different and independently represent hydrogen, halogen atom, $(C_1-C_6)alkyl$ group, halo $(C_1-C_6)alkyl$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-C_6)alkyl$ group, or halo $(C_1-C_6)alkyl$; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen or substituted or unsubstituted $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, $(C_1-C_6)cycloalkyl$, $(C_1-C_6)alkoxy$, aryl, aralkyl, aryloxy, $(C_1-C_6)alkylcarbonyl$, arylcarbonyl, $(C_1-C_6)alkoxycarbonyl$ or aryloxythiocarbonyl; Y^1
25 represents $=O$ or $=S$ group, and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group or substituted or unsubstituted

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PCT/IN01/00227

12

groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates.

Suitable groups represented by R⁴ may be selected from hydrogen atom, (C₁-C₇)acyl group such as -C(=O)H, -C(=O)CH₃, -C(=O)CH₂CH₃, -C(=O)(CH₂)₂CH₃, -C(=O)(CH₂)₃CH₃, -C(=O)(CH₂)₄CH₃, -C(=O)(CH₂)₅CH₃, -C(=O)Ph and the like, the acyl group may be substituted; thio(C₁-C₇)acyl group such as -C(=S)H, -C(=S)CH₃, -C(=S)CH₂CH₃, -C(=S)Ph and the like, the thioacyl group may be substituted; (C₁-C₆)alkoxycarbonyl group containing (C₁-C₆)alkyl group which may be linear or branched such as methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl, isopropoxycarbonyl and the like, the (C₁-C₆)alkoxycarbonyl group may be substituted; cyclo(C₃-C₆)alkoxythiocarbonyl group such as cyclopropoxythiocarbonyl, cyclobutoxythiocarbonyl and the like, the cyclo(C₃-C₆)alkoxythiocarbonyl may be substituted; (C₂-C₆)alkenylcarbonyl such as ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl and the like, the (C₂-C₆)alkenylcarbonyl may be substituted; (C₂-C₆)alkenyloxythiocarbonyl group such as ethenyloxythiocarbonyl, propenyloxythiocarbonyl, butenyloxythiocarbonyl and the like, the (C₂-C₆)alkenyloxythiocarbonyl may be substituted; aryloxythiocarbonyl group such as phenoxythiocarbonyl, benzyloxythiocarbonyl group and the like, the aryloxythiocarbonyl group may be substituted; (C₁-C₆)alkoxythiocarbonyl group such as CH₃O-C(=S)-, C₂H₅O-C(=S)-, C₃H₇O-C(=S)- and the like, which may be substituted; (C₂-C₆)alkenyloxythiocarbonyl group such as ethenyloxythiocarbonyl,

WO 02/051819

PCT/IN01/00227

13

propenyloxythiocarbonyl, butenyloxythiocarbonyl and the like, the (C₂-C₆)alkenyloxythiocarbonyl group may be substituted; aryloxythiocarbonyl group such as phenylO-C(=S)-, benzylO-C(=S)- and the like, which may be substituted; -C(=O)-C(=O)-(C₁-C₆)alkyl group such as -C(=O)-C(=O)methyl, -C(=O)-C(=O)ethyl, -C(=O)-C(=O)propyl and the like, which may be substituted; -C(=O)-C(=O)-aryl group such as -C(=O)-C(=O)phenyl, -C(=O)-C(=O)naphthyl and the like, which may be substituted; -C(=O)-C(=O)-(C₁-C₆)alkoxy group such as -C(=O)-C(=O)methoxy, -C(=O)-C(=O)ethoxy, -C(=O)-C(=O)propyloxy and the like, which may be substituted; -C(=O)-C(=O)-aryloxy group such as -C(=O)-C(=O)phenyloxy, -C(=O)-C(=O)benzyloxy, which may be substituted; -(C=S)-S-(C₁-C₆)alkyl such as -(C=S)-S-methyl, -(C=S)-S-ethyl, -(C=S)-S-propyl and the like, which may be substituted; -(C=S)-NH₂; -(C=S)-NH-(C₁-C₆)alkyl such as -(C=S)-NH-methyl, -(C=S)-NH-ethyl, -(C=S)-NH-propyl and the like, which may be substituted; -C(=S)-N-(C₁-C₆)alkyl₂ such as -C(=S)-N-(methyl)₂, -C(=S)-N-(ethyl)₂, -C(=S)-N-(propyl)₂ and the like, which may be substituted; -C(=S)-NH-(C₂-C₆)alkenyl such as -C(=S)-NH-ethenyl, -C(=S)-NH-propenyl, -C(=S)-NH-butenyl and the like, which may be substituted; -C(=S)-(C=O)-(C₁-C₆)alkoxy such as -C(=S)-(C=O)-methoxy, -C(=S)-(C=O)-ethoxy, -C(=S)-(C=O)-propoxy and the like, which may be substituted; -C(=S)-(C=O)-aryloxy such as -C(=S)-(C=O)-phenyloxy, -C(=S)-(C=O)-naphthyloxy and the like, which may be substituted; -C(=S)-O-(C=O)-(C₁-C₆)alkyl such as -C(=S)-O-(C=O)-methyl, -C(=S)-O-(C=O)-ethyl, -C(=S)-O-(C=O)-propyl and the like, which may be substituted; -C(=S)-C(=S)-(C₁-C₆)alkyl group such as -C(=S)-C(=S)methyl, -C(=S)-C(=S)ethyl, -C(=S)-C(=S)propyl and the like, which may be substituted; -C(=S)-C(=S)aryl group such as -C(=S)-C(=S)phenyl, -C(=S)-C(=S)naphthyl and the like, which may be substituted; thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl.

When the groups represented by R⁴ are substituted, the substituents may be selected from halogen atom such as chlorine, fluorine, bromine and iodine; hydroxy, amino, mono(C₁-C₆)alkylamino such as methylamino, ethylamino, propylamino and the like, di(C₁-C₆)alkylamino such as dimethylamino, diethylamino, methylethylamino,

WO 02/051819

PCT/IN01/00227

14

dipropylamino, ethylpropylamino and the like, cyano, nitro, alkoxy, aryl, hydroxyaryl, pyridyl, hydroxyalkyl, alkoxyaryl or carboxyl and its derivatives.

Suitable groups represented by R^2 and R^3 may be selected from hydrogen, halogen atom such as fluorine, chlorine or bromine; (C₁-C₆)alkyl group such as methyl, ethyl, n-propyl, isopropyl, n-butyl, iso-butyl, t-butyl, n-pentyl, iso-pentyl, n-hexyl and the like; halo(C₁-C₆)alkyl group such as halomethyl, haloethyl, halopropyl, trihalomethyl and the like, wherein the halo group is selected from fluorine, chlorine, bromine or iodine; cyano; nitro; SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group such as methyl, ethyl, propyl, isopropyl and the like; halo(C₁-C₆)alkyl such as halomethyl, haloethyl, halopropyl, haloisopropyl and the like, where the halo group is selected from fluoro, chloro, bromo or iodo.

The substituents on R^a are selected from hydroxy, halogen, nitro, amino, alkoxy, carboxyl or cyano

Suitable groups represented by Z may be selected from S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl such as methyl, ethyl, propyl and the like, which may be substituted; (C₂-C₆)alkenyl such as ethenyl, propenyl, butenyl and the like, which may be substituted; (C₁-C₆)cycloalkyl such as cyclopropyl, cyclobutyl and the like, which may be substituted; (C₁-C₆)alkoxy such as methoxy, propoxy, isopropoxy and the like, which may be substituted; aryl group such as phenyl, naphthyl and the like, which may be substituted; aralkyl such as benzyl, phenethyl and the like, which may be substituted; aryloxy such as phenyloxy, naphthyloxy and the like, which may be substituted; (C₁-C₆)alkylcarbonyl such as methylcarbonyl, ethylcarbonyl, propylcarbonyl and the like, which may be substituted; arylcarbonyl such as phenylcarbonyl, naphthylcarbonyl and the like, which may be substituted; (C₁-C₆)alkoxycarbonyl such as methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl and the like, which may be substituted; or aryloxycarbonyl such as phenyloxycarbonyl, naphthyloxycarbonyl and the like, which may be substituted.

The substituents on R^b are selected from hydroxy, halogen, pyrrolidinythiocarbonyl, nitro, amino, alkoxy, carboxyl or cyano.

WO 02/051819

PCT/IN01/00227

15

Y^1 represents =O or =S group, Y^2 and Y^3 are selected from hydrogen, halogen such as fluorine, chlorine, bromine or iodine; cyano, nitro, formyl, hydroxy, amino, =O, =S group, substituted or unsubstituted (C₁-C₆)alkyl such as methyl, ethyl, n-propyl, isopropyl, n-butyl, iso-butyl, t-butyl and the like; hydroxy(C₁-C₆)alkyl such as
 5 hydroxymethyl, hydroxyethyl, hydroxypropyl and the like, which may be substituted; (C₁-C₆)alkoxy(C₁-C₆)alkyl group such as methoxymethyl, methoxyethyl, ethoxyethyl, ethoxymethyl, methoxypropyl, propoxymethyl, propoxyethyl and the like, which may be substituted; (C₁-C₆)alkoxycarbonyl group such as methoxycarbonyl, ethoxycarbonyl and the like, which may be substituted; carboxy(C₁-C₆)alkyl such as CH₃-COOH, CH₃-CH₂-
 10 COOH and the like, which may be substituted; (C₁-C₆)alkylsulfonyl group such as methylsulfonyl, ethylsulfonyl and the like, which may be substituted; (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl groups such as methylcarbonylaminomethyl, ethylcarbonylaminomethyl, methylcarbonylaminoethyl, ethylcarbonylaminoethyl and the like, which may be substituted; arylcarbonylamino(C₁-C₆)alkyl such as
 15 phenylcarbonylaminomethyl, phenylcarbonylaminoethyl, naphthylcarbonylaminomethyl, naphthylcarbonylaminoethyl and the like, which may be substituted; (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl group such as methylcarbonyloxymethyl, ethylcarbonyloxymethyl, methylcarbonyloxyethyl, propylcarbonyloxymethyl, propylcarbonyloxyethyl, propylcarbonyloxypropyl and the like, which may be
 20 substituted; amino(C₁-C₆)alkyl such as aminomethyl, aminoethyl, aminopropyl and the like, which may be substituted; mono(C₁-C₆)alkylamino such as methylamino, ethylamino, propylamino and the like, which may be substituted; di(C₁-C₆)alkylamino such as dimethylamino, diethylamino, methylethylamino, dipropylamino, ethylpropylamino and the like, which may be substituted; arylamino such as
 25 phenylamino, benzylamino and the like, which may be substituted; (C₁-C₆)alkoxy group such as methoxy, ethoxy, propoxy, isopropoxy and the like, which may be substituted; aryl group such as phenyl, naphthyl and the like, which may be substituted; aryloxy group such as phenoxy, naphthoxy and the like, the aryloxy group may be substituted; aralkyl such as benzyl, phenethyl, C₆H₅CH₂CH₂CH₂, naphthylmethyl and the like, the

WO 02/051819

PCT/IN01/00227

16

alkyl group may be substituted; heteroaryl groups such as pyridyl, thienyl, furyl, pyrrolyl, oxazolyl, thiazolyl, pyrazolyl, imidazolyl, oxadiazolyl, tetrazolyl, benzopyranyl, benzofuranyl and the like, which may be substituted; heteroalkyl such as imidazolemethyl, imidazoleethyl, pyridylmethyl, furyl methyl, oxazolemethyl, 5 imidazolyl and the like, which may be substituted; heterocyclyl group such as pyrrolidinyl, piperidinyl, morpholinyl, piperazinyl and the like; heterocycloalkyl groups such as pyrrolidinemethyl, piperidinemethyl, morpholinemethyl, piperazinemethyl and the like, which may be substituted.

When the groups represented by Y^2 and Y^3 are substituted, the substituents may be selected from hydroxy, nitro, cyano, amino, (*tert*-butyldimethylsilyloxy) TBSO, 10 halogen atom, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₃-C₆)cycloalkyl, aryl group such as phenyl, naphthyl and the like, benzyloxy, acyl group such as formyl, acetyl, and the like, carboxyl or acyloxy group such as formyloxy, acetyloxy and the like..

Suitable cyclic structure formed by Y^2 and Y^3 when present on adjacent carbon 15 atoms which they are attached may be selected from substituted or unsubstituted benzene, pyridine, pyrrolidine, furan, thiophene, morpholine, piperazine, pyrrole and the like.

Pharmaceutically acceptable salts forming part of this invention include salts derived from inorganic bases such as Li, Na, K, Ca, Mg, Fe, Cu, Zn, Mn; salts of organic 20 bases such as N,N'-diacetylenediamine, betaine, caffeine, 2-diethylaminoethanol, 2-dimethylaminoethanol, N-ethylmorpholine, N-ethylpiperidine, glucamine, glucosamine, hydrabamine, isopropylamine, methylglucamine, morpholine, piperazine, piperidine, procaine, purines, theobromine, triethylamine, trimethylamine, tripropylamine, tromethamine, diethanolamine, meglumine, ethylenediamine, N,N'-diphenylethylenediamine, N,N'-dibenzylethylenediamine, N-benzyl phenylethylamine, 25 choline, choline hydroxide, dicyclohexylamine, metformin, benzylamine, phenylethylamine, dialkylamine, trialkylamine, thiamine, aminopyrimidine, aminopyridine, purine, spermidine, and the like; chiral bases like alkylphenylamine, glycinol, phenyl glycinol and the like, salts of natural amino acids such as glycine,

WO 02/051819

PCT/IN01/00227

17

alanine, valine, leucine, isoleucine, norleucine, tyrosine, cystine, cysteine, methionine, proline, hydroxy proline, histidine, ornithine, lysine, arginine, serine, threonine, phenylalanine; unnatural amino acids such as D-isomers or substituted amino acids; guanidine, substituted guanidine wherein the substituents are selected from nitro, amino, alkyl such as methyl, ethyl, propyl and the like; alkenyl such as ethenyl, propenyl, butenyl and the like; alkynyl such as ethynyl, propynyl and the like; ammonium or substituted ammonium salts and aluminum salts. Salts may include acid addition salts where appropriate which are, sulphates, nitrates, phosphates, perchlorates, borates, halides, acetates, tartrates, maleates, citrates, succinates, palmoates, methanesulphonates, benzoates, salicylates, hydroxynaphthoates, benzenesulfonates, ascorbates, glycerophosphates, ketoglutarates and the like. Pharmaceutically acceptable solvates may be hydrates or comprising other solvents of crystallization such as alcohols.

Particularly useful compounds according to this invention include:

- (5R)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-6-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-5-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

18

- (5R)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3,5-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 5 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 3-{4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 10 (5R)-3-[3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 15 (5R)-5-hydroxymethyl-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-hydroxymethyl-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-oxo-3-phenyl-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 20 (5R)-3-[3-fluoro-4-[3-(fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-azidomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5R)-azidomethyl-3-[3-fluoro-4-(3-methyl-2-thio-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-6-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;

WO 02/051819

PCT/IN01/00227

19

- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-5-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;
 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
 5 (5R)-5-azidomethyl-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-azidomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 10 salts;
 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
 (5R)-5-azidomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
 15 (5R)-5-azidomethyl-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-azidomethyl-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-1,3-oxazolan-2-one or its salts;
 (5R)-aminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 20 or its salts;
 (5R)-aminomethyl-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
 25 (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-aminomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

20

- (5R)-5-aminomethyl-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- N-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methanamide or its salts;
- 5 N-{{(5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methanamide or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} propanamide or its salts;
- 10 N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} butanamide or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} pentanamide or its salts;
- 15 N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} heptanamide or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acrylamide or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl}-2,2,2-trifluoroacetamide or its salts;
- 20 Ethyl{{(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} carbamoylmethanoate or its salts;
- N1-{{(5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl}acetamide or its salts;
- 25 N1-{{(5S)-2-oxo-3-[4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
- N1-{{(5S)-2-oxo-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} acetamide or its salts;

WO 02/051819

PCT/IN01/00227

21

- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(6-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(5-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)propanamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)heptanamide or its salts;
- 15 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)acrylamide or its salts;
- N1-((5S)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 20 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)propanamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 25 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;

WO 02/051819

PCT/IN01/00227

23

- (5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
- 10 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methyl carbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
- 15 (5S)-5-methylthioxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) trifluoroacetoxythiocarbamate or its salts;
- 25 (5S)-5-cyclohexyloxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;

WO 02/051819

PCT/IN01/00227

24

- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propylthiocarbamate or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propylthiocarbamate or its salts;
- 20 (5S)-5-[2,2,2-trifluoroethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-[2-hydroxyethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5S)-5-[2-methoxyethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)allylthiocarbamate or its salts;

WO 02/051819

PCT/IN01/00227

25

- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthio carbamate or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 5 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-[4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 25 N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;

WO 02/051819

PCT/IN01/00227

26

- N1-((5S)-3-{3-fluoro-4-[3-methoxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 5 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-{4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)isopropylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-hydroxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 15 N1-((5S)-3-{3-fluoro-4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-methyl-4-thioxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- (5S)-5-[(2S)-2-hydroxymethylazolan-1-yl(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 20 (5S)-5-diethylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-allylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5S)-5-benzylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-[4-methoxybenzylamino(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

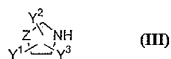
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27

- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylmethylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-methylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 5 (5S)-5-[2-hydroxyethylamino (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[1,4-thiazinan-4-yl (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 10 (5S)-5-amino(thioxo)methylaminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylamino methyl-1,3-oxazolan-2-one or its salts;
 15 (5S)-5-amino(thioxo)methylaminomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylaminomethyl-1,3-oxazolan-2-one or its salts and
 N1-((5S)-3-[4-[4-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate.hydrochloride.
 20

The present invention also relates to a process for the preparation of the compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents hydrogen atom and all other symbols are as defined earlier, which comprises:

- 25 (i) reacting a compound of formula (III)

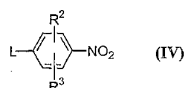


where all the symbols are as defined earlier, with a compound of formula (IV)

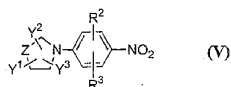
WO 02/051819

PCT/IN01/00227

28

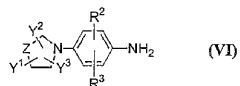


where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R^2 and R^3 are as defined earlier, to produce a compound of formula (V)



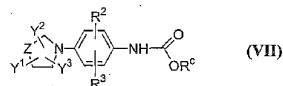
5 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



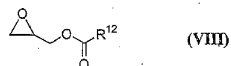
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c represents (C_1-C_3) alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

(iv) reacting the compound of formula (VII) with a compound of formula (VIII)



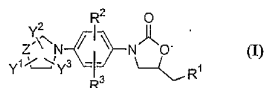
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where R^{12} represents a (C_1-C_3) alkyl group such as methyl, ethyl or propyl in the presence of a base to produce a compound of formula (I)

WO 02/051819

PCT/IN01/00227

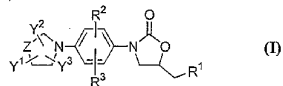
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where R¹ represents hydroxy; Y¹, Y², Y³, R², R³ and Z are as defined earlier,

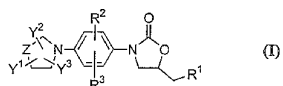
(v) reacting the compound of formula (I) with alkylsulfonyl chloride or aryl sulfonyl chloride to produce a compound of formula (I), where R¹ represents alkyl sulfonyl or

5 aryl sulfonyl, which in turn was reacted with NaN₃ to produce compound of formula (I)



where R¹ represents azido; Y¹, Y², Y³, R², R³ and Z are as defined earlier and

(vi) reducing the compound of formula (I) wherein R¹ represents azido group, to produce compound of formula (I)



10 where R¹ represents NHR⁴ wherein R⁴ represents hydrogen atom; Y¹, Y², Y³, R², R³ and Z are as defined earlier.

The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH,

15 NaOH, K₂CO₃, Na₂CO₃, NaH, KH, triethylamine, diisopropylethyl amine and the like.

The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert

atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a

20 temperature in the range of ambient-80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

WO 02/051819

PCT/IN01/00227

30

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature in the range of 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

The conversion of compound of formula (VI) to compound of formula (VII) may be carried out with alkylchloroformates such as methylchloroformate, ethylchloroformate, propylchloroformate, benzylchloroformate and the like. The solvent of the reaction may be selected from water, acetone, tetrahydrofuran (THF), acetonitrile, dichloromethane (DCM) and the like or mixtures thereof. The reaction may be carried out in the presence of base such as K₂CO₃, Na₂CO₃, NaH, KOH, triethylamine and the like. The temperature of the reaction may be carried out in the presence of 0 to 60 °C, preferably at 0 °C to room temperature. The time of the reaction is maintained in the range of 1-12h, preferably in the range of 1-4h.

The reaction of a compound of formula (VII) with a compound of formula (VIII) to produce a compound of formula (I), where R¹ represents hydroxy group, defined above may be carried out in the presence of a base such as alkali metal hydrides like NaH or KH or organolithiums like CH₃Li, BuLi, LDA and the like or alkoxides such as NaOMe, NaOEt, t-BuOK. The reaction may be carried out in the presence of a solvent such as THF, dioxane, DMF, DMSO, DME and the like or mixtures thereof. Hexamethylphosphamide (HMPA) may be used as a cosolvent. The reaction temperature may range from -78 to 150 °C, preferably at a temperature in the range of -78 to 30 °C. The duration of the reaction may range from 3 to 12 h.

WO 02/051819

PCT/IN01/00227

31

The compound of formula (I) where R^1 represents OH is converted to compound of formula (I) where R^1 represents alkylsulfonyl or arylsulfonyl by treating with alkylsulfonylchloride or arylsulfonylchloride such as methanesulfonyl chloride, p-toluenesulfonyl chloride and the like. The reaction may be carried out in the presence of chloroform, dichloromethane, THF, dioxane and the like or mixtures thereof. The base used in the reaction may be selected from Et_3N , diisopropyl ethylamine, Na_2CO_3 , K_2CO_3 and the like. The temperature of the reaction is maintained in the range of 0 to 50 °C, preferably in the range of 0 to room temperature. The time of the reaction should be maintained in the range of 1-12h, preferably in the range of 1-4h. The compound of formula (I) where R^1 represents alkylsulfonyl or arylsulfonyl is converted to compound of formula (I) where R^1 represents azido group, by treating with NaN_3 . The solvent used in the reaction may be selected from dimethylformamide (DMF), dimethyl sulfoxide (DMSO), methylecyanide and the like. The temperature of the reaction is maintained in the range of room temperature to 120 °C, preferably room temperature to 80 °C. The time of the reaction is maintained in the range of 1-12h, preferably 1-4h.

The reduction of a compound of formula (I) where R^1 represents azido group, to produce a compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature in the range of 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing PPh_3 in water.

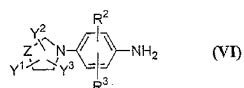
In still another embodiment of the present invention there is provided another process for the preparation of compound of formula (I) where R^1 represents hydroxy and all the symbols are as defined earlier, which comprises:

WO 02/051819

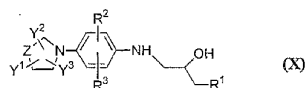
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32

(i) reacting the compound of formula (VI)



where all the symbols are as defined earlier, with a compound of formula (IX)

5 where R¹ represents hydroxy, to produce a compound of formula (X)where R¹ represents hydroxy; Y¹, Y², Y³, R², R³ and Z are as defined earlier, and

(ii) carbonylating the compound of formula (X) with a suitable carbonylating agent to produce the compound of formula (I) where R¹ represents hydroxy and all other symbols are as defined above.

The reaction of a compound of formula (VI) defined above with a compound of formula (IX) defined above to produce a compound of formula (X) may be carried out in the presence or absence of a base such as K₂CO₃, NaH, t-BuOK and the like or mixtures thereof. The reaction may be carried out in the presence of a solvent such as DMF, toluene, THF, CH₃CN, and the like or mixtures thereof. The reaction may also be carried out in the presence of Lewis acids such as BF₃·OEt₂, ZnCl₂, Ti(OiPr)₄, lanthanide metal complexes and the like in the presence of DCE, DMF, THF and the like or mixtures thereof. The reaction temperature may be in the range of 0 to 120 °C, preferably at a temperature in the range of 0 to 100 °C. The reaction time may range from 3 to 24 h, preferably from 4 to 12 h.

The conversion of compound of formula (X) to a compound of formula (I) may be carried out using a carbonylating agent such as dialkyl carbonate, dihalo carbonyl, 1,1'-carbonyldiimidazole and the like in the presence or absence of a base. The base may be selected from triethylamine, tributylamine, diisopropylethylamine, 1,4-

WO 02/051819

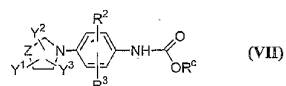
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33

diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), 1,1,5-diazabicyclo[4.3.0]non-5-ene (DBN), alkoxides like NaOMe, NaOEt and the like or the inorganic base such as NaOH, KOH and the like. The reaction may be carried out in the presence of a solvent such as dichloromethane, THF, DMF, ethyl acetate and the like or mixtures thereof. The reaction temperature may be in the range of -20 to 135 °C, preferably at a temperature in the range of 15 to 80 °C. The reaction time may range from 2 to 72 h, preferably from 2 to 50 h.

In still another embodiment of the present invention there is provided yet another process for the preparation of compound of the formula (I) where R¹ represents azido and all other symbols are as defined earlier, which comprises:

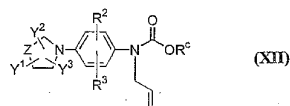
(i) reacting a compound of formula (VII)



where R^c represents (C₁-C₈)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; and all other symbols are as defined earlier, with a compound of formula (XI)



where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XII)



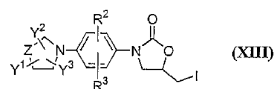
where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier,

(ii) converting the compound of formula (XII) defined above to a compound of formula (XIII)

WO 02/051819

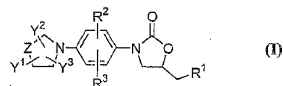
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34



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) converting the compound of formula (XIII) defined above to a compound of formula (I) by reacting with organic or inorganic azide,



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where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier.

The reaction of a compound of formula (VII) with a compound of formula (XI) may be carried out in the presence of base such as NaH, KH, K_2CO_3 , $t-BuOK$, LDA, NaOMe, with or without phase transfer catalyst such as tetrabutylammonium halide and the like. The reaction may be carried out in the presence of a suitable solvent such as THF, DMF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 120 $^{\circ}C$, preferably at -78 to 60 $^{\circ}C$. The reaction time may range from 2 to 20 h, preferably from 4 to 10 h.

The conversion of a compound of formula (XII) to a compound of formula (XIII) defined above may be carried in the presence of reagents such as I_2 , KI, or NaI. The reaction may be carried out in the presence of a solvent such as $CHCl_3$, CH_2Cl_2 , THF, DMF, DMSO, acetonitrile and the like or mixtures thereof. The reaction temperature may be in the range of

0 to 100 $^{\circ}C$, preferably at ambient temperature. The reaction time may range from 2 to 24 h, preferably from 2 to 12 h.

The conversion of a compound of formula (XIII) to a compound of formula (I) where R^1 represents azido group, may be carried out in the presence of one or more equivalents of metal azide such as LiN_3 , NaN_3 or trialkyl silylazide. The reaction may be carried out in the presence of solvent such as THF, acetone, DMF, DMSO and the like

WO 02/051819

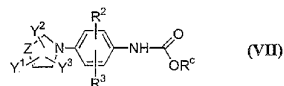
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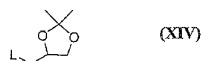
or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using N₂ or Ar. The reaction may be carried out at a temperature in the range of ambient temperature to reflux temperature of the solvent, preferably at a temperature in the range of 50 to 80 °C. The reaction time may range from 0.5 to 18 h, preferably 1 to 4 h.

In yet another embodiment of the present invention, there is provided a process for the preparation of compound of formula (I), where R¹ represents hydroxy group and all other symbols are as defined earlier, which comprises:

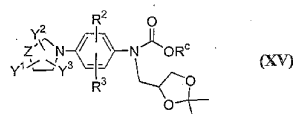
- 10 (i) reacting a compound of formula (VII)



where all the symbols are as defined earlier, with a compound of formula (XIV)



- 15 where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XV)



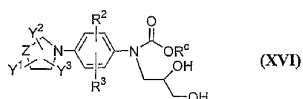
where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- (ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)

WO 02/051819

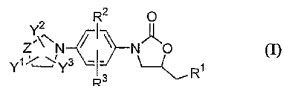
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36



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) cyclising the compound of formula (XVI) with or without a base to a compound of formula (I)



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where R^1 represents hydroxy group and all other symbols are as defined earlier.

The reaction of a compound of formula (VII) with a compound of formula (XIV) to produce a compound of formula (XV) may be carried out in the presence of a base. The base employed may be selected from K_2CO_3 , NaH, t -BuOK, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, EtOH and the like. The reaction may be carried at a temperature in the range of -78 to 120 °C, preferably at a temperature in the range of -78 to 100 °C. The reaction time may range from 2 to 24 h, preferably from 2 to 20 h.

The hydrolysis of a compound of formula (XV) to produce a compound of formula (XVI) may be carried out using dilute mineral acid such as HCl, H_2SO_4 and the like, organic acids such as aqueous acetic acid, p -toluene sulfonic acid, camphorsulfonic acid, trifluoro acetic acid and the like. The reaction may be carried out in the presence of suitable solvent such as water, methanol, THF, dioxane and the like or mixtures thereof. The reaction may be carried at a temperature in the range of 30 to 100 °C, preferably at a temperature in the range of 30 to 60 °C. The reaction time may range from 10 min to 5 h, preferably from 30 min to 2.5 h.

The conversion of a compound of formula (XVI) to a compound of formula (I) where R^1 represents hydroxy group, may be carried out by using a base such as NaOMe, K_2CO_3 , NaH and the like, in presence of the a solvent such as MeOH, DMF, THF, and

WO 02/051819

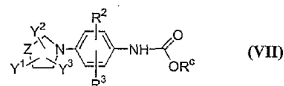
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37

the like. The duration and temperature of the reaction are maintained in the range of 2 to 4 h and room temperature to 150 °C respectively.

- In still another embodiment of the present invention there is provided a process for the preparation of compounds of formula (I) where R^1 represents azido group and all other symbols are as defined earlier, which comprises:

- (i) reacting a compound of formula (VII)

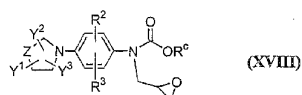


where all the symbols are as defined earlier, with a compound of formula (XVII)



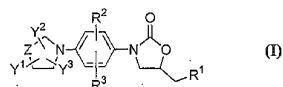
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where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XVIII)



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

- (ii) converting the compound of formula (XVIII) defined above to a compound of formula (I) by reacting with an organic or an inorganic azide,



where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

- The reaction of a compound of formula (VII) defined above with a compound of formula (XVII) defined above may be carried out in the presence of a base such as NaH, NaOMe, K_2CO_3 , n-BuLi, LDA and the like. The reaction may be carried out in the

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WO 02/051819

PCT/IN01/00227

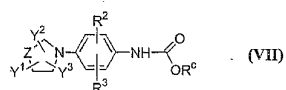
38

presence of a solvent such as DMF, THF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 70 °C preferably at a temperature in the range of -78 to 50 °C. The reaction time may range from 1 to 15 h preferably 1 to 10 h.

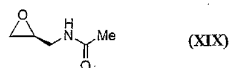
- 5 The conversion of a compound of formula (XVIII) to a compound of formula (I) where R^1 represents azido group, may be carried out in the presence of one or more equivalent of metal azide such as LiN_3 , NaN_3 or trialkyl silylazide. The reaction may be carried out in the presence of solvent such as THF, acetone, DMF, DMSO and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained by using N_2 or Ar. The reaction may be carried out at a temperature in the range of ambient temperature to reflux temperature of the solvent, preferably at a temperature in the range of 50 to 80 °C. The reaction time may range from 0.5 to 18 h, preferably 1 to 4 h.

- 15 In still another embodiment of the present invention there is provided yet another process for the preparation of compound of the formula (I), where R^1 represents NHR^4 , wherein R^4 represents acetyl group and all other symbols are as defined earlier, which comprises:

- (i) reacting a compound of formula (VII)



- 20 where all the symbols are as defined earlier, with a compound of formula (XIX)

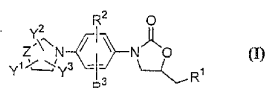


to produce a compound of formula (I)

WO 02/051819

PCT/IN01/00227

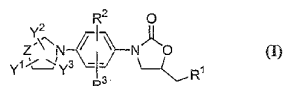
39



where R^1 represents NHR^4 , where R^4 represents acetyl group; and Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier.

The compound of formula (VII) defined above may be converted to a compound of formula (I) defined above, by reacting with compound of formula (XIX) in presence of a base such as NaH, LDA, BuLi and the like. The reaction may be carried out at a temperature in the range of -78 to 100 $^{\circ}\text{C}$, preferably in the range of -78 to 80 $^{\circ}\text{C}$. The reaction time may range from 3 to 10 h.

In yet another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents formyl group; from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom,



where all other symbols are as defined earlier.

The reaction of compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, to produce a compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents formyl group, may be carried out in presence of alkyl formates such as methyl formate, ethyl formate and the like. The duration of the reaction may range from 4 to 48 h, preferably 12 to 24 h. The reaction may be carried out at a temperature in the range of 60 to 120 $^{\circ}\text{C}$, preferably at reflux temperature.

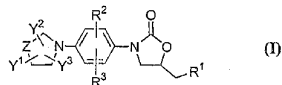
In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4

WO 02/051819

PCT/IN01/00227

40

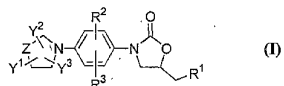
represents $-C(=O)-R^{4a}$, where R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl; from a compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen atom,



where all other symbols are as defined earlier.

The compound of formula (I), where R¹ represents NHR⁴, wherein R⁴ represents $-C(=O)-R^{4a}$, R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl, may be prepared from compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen atom, by treating with appropriate halide such as acetyl chloride like acetyl chloride, propionyl chloride and the like; alkylchloroformate like methylchloroformate, ethylchloroformate and the like; aralkylchloroformate like benzylchloroformate and the like. The reaction may be carried out in the presence of a solvent such as CH₂Cl₂, CHCl₃, toluene, THF and the like or mixtures thereof. The reaction may be carried out in the presence of a base like Et₃N, diisopropyl ethylamine, K₂CO₃, NaH, KOt-Bu and the like. The reaction may be carried at a temperature in the range of -20 to 60 °C, preferably at a temperature in the range of 0 to room temperature. The reaction time may range from 1 to 12 h, preferably from 1 to 4 h.

Alternatively, the compound of formula (I), where R¹ represents NHR⁴ wherein R⁴ represents acetyl group, may be prepared by reacting compound of formula (I) where R¹ represents azido group, by treating with thioacetic acid.



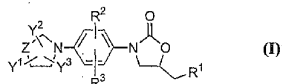
WO 02/051819

PCT/IN01/00227

41

The compound of formula (I) where R^1 represents azido group may be converted to a compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents acetyl group by using thioacetic acid, with or without using a solvent such as THF, DMF, toluene and the like. The reaction may be carried out at a temperature in the range of 25 to 40 °C, preferably at room temperature. The reaction may range from 3 to 24 h, preferably from 4 to 12 h.

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, halo $(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; from compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, halo $(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$.



where all symbols are as defined earlier.

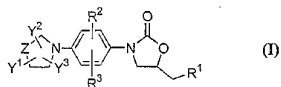
Conversion of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, halo $(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; to a compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, halo $(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; may be carried out by taking a solution of the amide and Lawesson's reagent (2,4-bis(methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide) in dry dioxane, toluene, THF, DMF and the like. The reaction may be carried at a temperature in the range of room temperature to 130 °C, preferably at a temperature in the range of 55 to 90 °C. The reaction time may range from 3 to 24 h, preferably from 3 to 10 h.

WO 02/051819

PCT/IN01/00227

42

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-SR^{4c}$, wherein R^{4c} represents (C_1-C_6) alkyl group; from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom,



where all other symbols are as defined earlier.

The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-SR^{4c}$, wherein R^{4c} represents (C_1-C_6) alkyl group, may be prepared from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, by using CS_2 in the presence of a base such as Et_3N , diisopropyl ethylamine, K_2CO_3 , NaH , $KOt-Bu$ and the like, followed by the appropriate alkylhalide such as methyl iodide, ethyl bromide, propyl bromide and the like. The reaction may be carried out in the presence of a solvent such as water, ethanol, methanol, isopropanol, CH_3CN and the like, or mixtures thereof. The reaction may be carried at a temperature in the range of room temperature to $60^\circ C$, preferably at room temperature. The reaction time may range from 6 to 24 h.

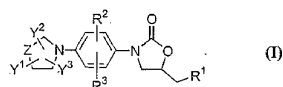
In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine; aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl, which comprises:

(i) converting the compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, to a compound of formula (I) where R^1 represents isothiocyanate group,

WO 02/051819

PCT/IN01/00227

43



where all other symbols are as defined earlier,

- (ii) converting the compound of formula (I) where R^1 represents isothiocyanate group, to a compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine; aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl group and all other symbols are as defined earlier.

- The compound of formula (I) where R^1 represents isothiocyanate group, may be prepared from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, by using thiophosgene, in the presence of a base such as Et_3N , K_2CO_3 , $NaOH$ and the like. The reaction may be carried out in the presence of a solvent such as ethanol, methanol, isopropanol, CH_2Cl_2 , CH_3CN and the like. The reaction may be carried at a temperature in the range of 0 to 60 °C, preferably at 0 °C.
- The reaction may be carried out in an inert atmosphere using argon or any other inert gas. The reaction time may range from 3 to 24 h.

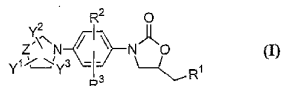
- The compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine; aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl, is prepared from the compound of formula (I) where R^1 represents isothiocyanate group, by using respective alcohol such as methanol, ethanol, propanol, cyclohexanol and the like, in the presence of a base such as NaH , KH and the like. The reaction may be carried out in the presence of a solvent such as THF, toluene, DMF and the like. The reaction may be carried at a temperature in the range of room temperature to 130 °C, preferably at reflux temperature of the solvent used. The reaction time may range from 6 to 24 h.

WO 02/051819

PCT/IN01/00227

44

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, wherein R' represents hydrogen, $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy $(C_1-C_6)alkyl$, R'' represents hydrogen or $(C_1-C_6)alkyl$ or the two R' and R'' groups together form a 5 or 6 membered cyclic structures containing one or two hetero atoms; from a compound of formula (I) where R^1 represents isothiocyanate group,



where all other symbols are as defined earlier.

The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, where in R' and R'' independently represent hydrogen, is prepared by passing ammonia gas into a solution of compound of formula (I) where R^1 represents isothiocyanate group, by using a solvent such as THF, toluene, and the like. The reaction may be carried at a temperature in the range of $-10^\circ C$ to room temperature, preferably at $-10^\circ C$. The reaction time may range from 20 min to 4 h, preferably 30 min.

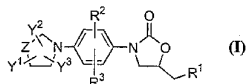
The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, R' represents hydrogen, $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy $(C_1-C_6)alkyl$, R'' represents hydrogen or $(C_1-C_6)alkyl$ or R' and R'' groups together form a 5 or 6 membered cyclic structures containing one or two hetero atoms, is prepared by treating compound of formula (I) where R^1 represents isothiocyanate group, by using appropriate amine such as methylamine, ethylamine, dimethylamine, diethylamine, benzylamine, aniline, proline, morpholine, thiomorpholine, pyridylmethylamine and the like, in the presence of a solvent such as THF, DMF, toluene, and the like. The reaction may be carried at a temperature in the range of room temperature to $140^\circ C$, preferably at 60 to $100^\circ C$. The reaction time may range from 1 to 24 h, preferably 4 to 12 h.

WO 02/051819

PCT/IN01/00227

45

In yet another embodiment of the present invention there is provided a process for the preparation of compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) where Z represents NR^b wherein R^b represents $(\text{C}_1\text{-C}_6)\text{alkyl}$ group substituted with hydroxy group, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom,



where all other symbols are as defined earlier.

The compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) wherein Z represents NR^b wherein R^b represents $(\text{C}_1\text{-C}_6)\text{alkyl}$ group substituted with hydroxy group at the α -position, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom, may be prepared by treating with a base such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine, piperidine, 4-dimethylaminopyridine (DMAP), 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na_2CO_3 , K_2CO_3 , NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like. The solvents used in the reaction may be selected from THF, ether, dioxane, toluene, benzene, DMF, DMSO, methylecyanide and the like. The temperature of the reaction may be maintained in the range of -20 to 150°C , preferably in the range of -10 to 100°C . The duration of the reaction may be in the range of 0.2 to 64 h, preferably in the range of 1 to 48 h.

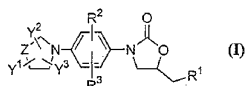
In still another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where Z represents NR^b wherein R^b represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$ or aralkyl, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom; from a compound of formula (I)

WO 02/051819

PCT/IN01/00227

46

where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom,

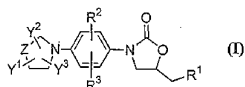


where all other symbols are as defined earlier.

- 5 The compound of formula (I), wherein Z represents NR^b wherein R^b represents substituted or unsubstituted ($\text{C}_1\text{-C}_6$)alkyl or aralkyl, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) wherein Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, may be carried out in the presence of a base
- 10 such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine, piperidine, DMAP, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na_2CO_3 , K_2CO_3 , NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like, followed by reacting with alkyl halide such as methyl iodide, methoxymethylchloride, allylbromide, benzylbromide and the
- 15 like. The solvent used in the reaction may be selected from DMF, DMSO, THF, dioxane, benzene, toluene and the like. The temperature of the reaction may be maintained in the range of -5 to 150 °C, preferably in the range of 0 °C to reflux temperature of the solvent. The duration of the reaction may be in the range of 0.2 to 48 h, preferably in the range of 0.5 to 24 h.

20

In another embodiment of the present invention there is provided a process for the preparation of a compound of formula (I) where R^1 represents halogen, from compound of formula (I) where R^1 represents hydroxy group,



WO 02/051819

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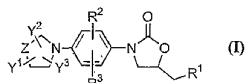
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where all other symbols are as defined above.

The compound of formula (I) where R¹ represents halogen is prepared from compound of formula (I) where R¹ represents hydroxy group may be carried out by treating with tetrahalomethane group such as CBr₄, CCl₄ and the like, in the presence of PPh₃, P(alkyl)₃ and the like. The reaction may be carried out in the presence of a solvent such as dry dichloromethane, chloroform, tetrachloromethane, benzene, DMF, DMSO, THF and the like. The temperature of the reaction may be maintained in the range of 0 to 60 °C, preferably at room temperature. The duration of the reaction may be in the range of 2 to 24 h, preferably 8 to 13h.

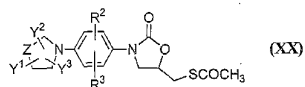
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In another embodiment of the present invention there is provided a process for the preparation of a compound of formula (I) where R¹ represents 'SH', from compound of formula (I) where R¹ represents halogen atom,



15 where all other symbols are as defined above, which comprises

(i) reacting the compound of formula (I) where R¹ represents halogen atom, to produce a compound of formula (XX),



where all other symbols are as defined earlier, with a base and thioacetic acid,

20 (ii) reacting the compound of formula (XX), to produce a compound of formula (I) where R¹ represents 'SH' group and all other symbols are as defined earlier, with base.

The compound of formula (XX) is prepared from compound of formula (I) where R¹ represents hydroxy group is prepared by using thioacetic acid in the presence of a base such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine,

WO 02/051819

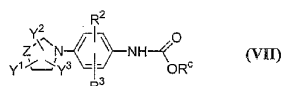
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48

piperidine, DMAP, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na₂CO₃, K₂CO₃, NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like. The solvent used in the reaction may be selected from THF, benzene, dioxane and the like. The temperature of the reaction is maintained in the range of room temperature to reflux temperature, preferably at reflux temperature. The duration of the reaction is maintained in the range of 2 to 24 h, preferably 6h.

The compound of formula (I), where R¹ represents 'SH' group is prepared from compound of formula (XX) by reacting with a base such as K₂CO₃, NaOH, KOH, BuLi and the like. The reaction may be carried out at a temperature in the range of room temperature to reflux temperature. The duration of the reaction may be in the range of 1 to 24h.

In still another embodiment of the present invention there is provided a novel intermediate of the formula (VII)



wherein R^c represents (C₁-C₆)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group; Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-

WO 02/051819

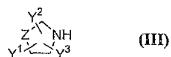
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49

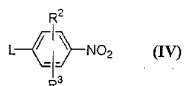
- C₆alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

- The novel intermediate of formula (VII) may be prepared by a process, which comprises:

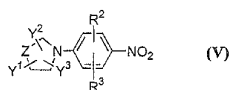
- (i) reacting a compound of formula (III)



where all the symbols are as defined earlier, with a compound of formula (IV)

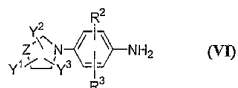


- where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)



where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



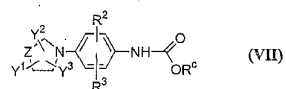
- where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

WO 02/051819

PCT/IN01/00227

50

(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above,

5 The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K_2CO_3 , Na_2CO_3 , NaH, KH, triethylamine, diisopropylethyl amine and the like. The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N_2 or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a temperature in the range of ambient to 80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

15 The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/ CH_3CO_2H and the like.

20 The conversion of compound of formula (VI) to compound of formula (VII) may be carried out with an alkylchloroformate such as methylchloroformate, ethylchloroformate, propylchloroformate, benzylchloroformate and the like. The solvent of the reaction may be selected from water, acetone, tetrahydrofuran (THF), acetonitrile, dichloromethane (DCM) and the like or mixtures thereof. The reaction may be carried

WO 02/051819

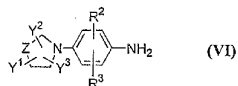
PCT/IN01/00227

51

out in the presence of base such as K_2CO_3 , Na_2CO_3 , NAH , KOH , triethylamine and the like. The temperature of the reaction may be carried out in the presence of 0 to 60 °C, preferably at 0 °C to room temperature. The time of the reaction is maintained in the range of 1-12h, preferably in the range of 1-4h.

5

In still another embodiment of the present invention there is provided a novel intermediate of formula (VI)



- where R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group; Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; any two of Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

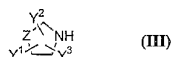
WO 02/051819

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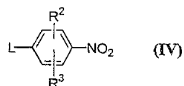
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The novel intermediate of formula (VI) may be prepared by a process, which comprises:

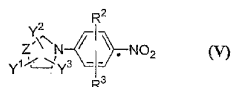
- (i) reacting a compound of formula (III)



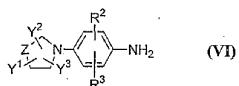
- 5 where all the symbols are as defined earlier, with a compound of formula (IV)



where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)



- 10 where Y¹, Y², Y³, R², R³ and Z are as defined earlier, and
(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- 15 The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K₂CO₃, Na₂CO₃, NaH, KH, triethylamine, diisopropylethyl amine and the like. The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction
20 may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a

WO 02/051819

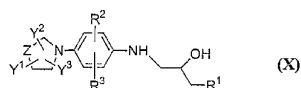
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53

temperature in the range of ambient-80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (X)



wherein R¹ represents halo, azido, thioalcohol, isothiocyanate, OR^d, NHR^d or N(R^d)₂, where R^d represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C₁-C₆)alkoxycarbonyl, (C₃-C₆)cycloalkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, (C₂-C₆)alkenylcarbonyl, aryloxythiocarbonyl, (C₁-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, aryloxythiocarbonyl, -C(=O)-C(=O)-alkyl, -C(=O)-C(=O)-aryl, -C(=O)-C(=O)-alkoxy, -C(=O)-C(=O)-aryloxy, -C(=S)-S-alkyl, -C(=S)-NH₂, -C(=S)-NH-alkyl, -C(=S)-N-(alkyl)₂, -C(=S)-NH-alkenyl, (C=S)-(C=O)-alkoxy, -C(=S)-(C=O)-aryloxy, -C(=S)-O-(C=O)-alkyl, C(=S)-C(=S)-alkyl, -C(=S)-C(=S)-aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O,

WO 02/051819

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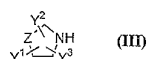
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=CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² or Y³ represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

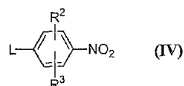
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The novel intermediate of formula (X) may be prepared by a process, which comprises:

(i) reacting a compound of formula (III)



20 where all the symbols are as defined earlier, with a compound of formula (IV)

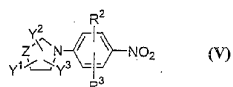


where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)

WO 02/051819

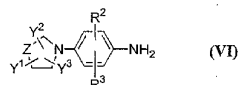
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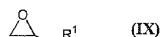
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)

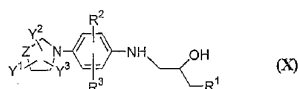


5 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) reacting the compound of formula (VI) with a compound of formula (IX)



where R^1 represents NHR^4 or $N(R^4)_2$, where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, (C_3-C_6) cycloalkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxythiocarbonyl, (C_1-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-C(=O)-C(=O)-alkyl$, $-C(=O)-C(=O)-aryl$, $-C(=O)-C(=O)-alkoxy$, $-C(=O)-C(=O)-aryloxy$, $-(C=S)-S-alkyl$, $-(C=S)-NH_2$, $-(C=S)-NH-alkyl$, $-(C=S)-N-(alkyl)_2$, $-(C=S)-NH-alkenyl$, $(C=S)-(C=O)-alkoxy$, $-(C=S)-(C=O)-aryloxy$, $-(C=S)-O-(C=O)-alkyl$, $C(=S)-C(=S)-alkyl$, $-C(=S)-C(=S)-aryl$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl, to produce a compound of formula (X)



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K_2CO_3 , Na_2CO_3 , NaH, KH, triethylamine, diisopropylethyl amine and the like.

The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a temperature in the range of ambient to 80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

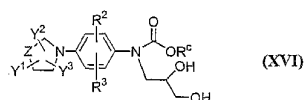
The reaction of a compound of formula (VI) defined above with a compound of formula (IX) defined above to produce a compound of formula (X) may be carried out in the presence or absence of a base such as K₂CO₃, NaH, t-BuOK and the like or mixtures thereof. The reaction may be carried out in the presence of a solvent such as toluene, DMF, THF, CH₃CN. The reaction may also be carried out in the presence of Lewis acids such as BF₃·OEt₂, ZnCl₂, Ti(OiPr)₄, lanthanide metal complexes and the like in the presence of DCE, DMF, THF or the like or mixtures thereof. The reaction temperature may be in the range of 0 to 120 °C, preferably at a temperature in the range of 0 to 100 °C. The reaction time may range from 3 to 24 h, preferably from 4 to 12 h.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (XVI)

WO 02/051819

PCT/IN01/00227

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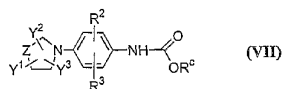


- where R^2 represents (C₁-C₆)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y^1 represents =O or =S group and Y^2 or Y^3 represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

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The novel intermediate of formula (XVI) may be prepared by a process, which comprises:

- (i) reacting a compound of formula (VII)

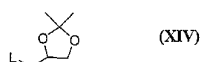


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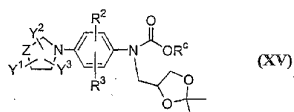
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where all the symbols are as defined earlier, with a compound of formula (XIV)

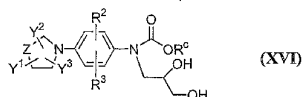


where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XV)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier and

(ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier.

The reaction of a compound of formula (VII) with a compound of formula (XIV) to produce a compound of formula (XV) may be carried out in the presence of a base. The base employed may be selected from K₂CO₃, NaH, t-BuOK, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, EtOH and the like. The reaction may be carried at a temperature in the range of -78 to 120 °C, preferably at a temperature in the range of -78 to 100 °C. The reaction time may range from 2 to 24 h, preferably from 2 to 20 h.

The hydrolysis of a compound of formula (XV) to produce a compound of formula (XVI) may be carried out using dilute mineral acid such as HCl, H₂SO₄ and the like, organic acids such as aqueous acetic acid, p-toluene sulfonic acid, camphor sulfonic acid, trifluoro acetic acid and the like. The reaction may be carried out in the presence of suitable solvent such as water, methanol, THF, dioxane and the like or mixtures thereof.

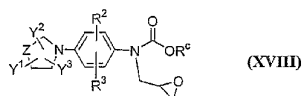
WO 02/051819

PCT/IN01/00227

59

The reaction may be carried at a temperature in the range of 30 to 100 °C, preferably at a temperature in the range of 30 to 60 °C. The reaction time may range from 10 min to 5 h, preferably from 30 min to 2.5 h.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (XVIII)



wherein R^c represents (C₁-C₈)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² or Y³ represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

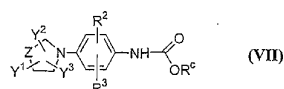
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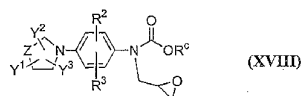
The novel intermediate of formula (XVIII) may be prepared by a process, which comprises: reacting a compound of formula (VII)



where all the symbols are as defined earlier, with a compound of formula (XVII)



where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XVIII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier.

- 10 The reaction of a compound of formula (VII) defined above with a compound of formula (XVII) defined above may be carried out in the presence of a base such as NaH, NaOMe, K₂CO₃, n-BuLi, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 70 °C
- 15 preferably at a temperature in the range of -78 to 50 °C. The reaction time may range from 1 to 15 h preferably 1 to 10 h.

- It is appreciated that in any of the above-mentioned reactions, any reactive group in the substrate molecule may be protected according to conventional chemical practice. Suitable protecting groups in any of the above mentioned reactions are
- 20 tertiarybutyldimethylsilyl, methoxymethyl, triphenyl methyl, benzyloxycarbonyl, tetrahydropyran(THP) etc, to protect hydroxyl or phenolic hydroxy group; N-tert-butoxycarbonyl (N-Boc), N-benzyloxycarbonyl (N-Cbz), N-9-fluorenyl methoxy carbonyl (-N-FMOC), benzophenoneimine, propargyloxy carbonyl (POC) etc, for

protection of amino or anilino group, acetal protection for aldehyde, ketal protection for ketone and the like. The methods of formation and removal of such protecting groups are those conventional methods appropriate to the molecule being protected.

The enantiomers may be prepared by using reactants in their single enantiomeric form in the process wherever applicable or by conducting the reaction in the presence of reagents or catalysts in their single enantiomeric form. The single enantiomers may also be prepared by resolving the racemic mixture by conventional methods. The stereoisomers of the compounds forming part of this invention may be prepared by using reactants in their single enantiomeric form in the process wherever possible or by conducting the reaction in the presence of reagents or catalysts in their single enantiomer form or by resolving the mixture of stereoisomers by conventional methods. Some of the preferred methods include use of microbial resolution, resolving the diastereomeric salts formed with chiral acids such as mandelic acid, camphorsulfonic acid, tartaric acid, lactic acid, and the like wherever applicable or chiral bases such as brucine, cinchona alkaloids and their derivatives and the like. Commonly used methods are compiled by Jaques et al in "Enantiomers, Racemates and Resolution" (Wiley Interscience, 1981). Where appropriate the compounds of formula (I) may be resolved by treating with chiral amines, aminoacids, aminoalcohols derived from aminoacids; conventional reaction conditions may be employed to convert acid into an amide; the diastereomers may be separated either by fractional crystallization or chromatography and the stereoisomers of compound of formula (I) may be prepared by hydrolyzing the pure diastereomeric amide.

The pharmaceutically acceptable salts are prepared by reacting the compounds of formula (I) wherever applicable with 1 to 4 equivalents of a base such as sodium hydroxide, sodium methoxide, sodium hydride, potassium t-butoxide, calcium hydroxide, magnesium hydroxide and the like, in solvent like ether, THF, methanol, t-butanol, dioxane, isopropanol, ethanol and the like. Mixture of solvents may be used. Organic bases like lysine, arginine, diethanolamine, choline, tromethamine, guanidine and their derivatives etc. may also be used. Alternatively, acid addition salts wherever

applicable are prepared by treatment with acids such as hydrochloric acid, hydrobromic acid, nitric acid, sulfuric acid, phosphoric acid, p-toluenesulphonic acid, methanesulfonic acid, acetic acid, citric acid, maleic acid, salicylic acid, hydroxynaphthoic acid, ascorbic acid, palmitic acid, succinic acid, benzoic acid, benzenesulfonic acid, tartaric acid and the like in solvents like ethyl acetate, ether, alcohols, acetone, THF, dioxane etc. Mixture of solvents may also be used. The salts of amino acid groups and other groups may be prepared by reacting the compounds of formula (I) with the respective groups in solvent like alcohols, ketones, ether and the like. Mixture of solvents may be used.

Various polymorphs of a compound of general formula (I) forming part of this invention may be prepared by crystallization of compound of formula (I) under different conditions. For example, using different solvents commonly used or their mixtures for recrystallization; crystallizations at different temperatures; various modes of cooling, ranging from very fast to very slow cooling during crystallizations. Heating or melting the compound followed by gradual or fast cooling may also obtain polymorphs. The presence of polymorphs may be determined by solid probe nmr spectroscopy, IR spectroscopy, differential scanning calorimetry, powder X-ray diffraction or such other techniques.

The present invention also provides pharmaceutical compositions, containing compounds of the general formula (I), as defined above, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts or their pharmaceutically acceptable solvates in combination with the usual pharmaceutically employed carriers, diluents and the like. The pharmaceutical compositions according to this invention can be used for the treatment of bacterial infections. They can also be used for the treatment of bacterial infections associated with multidrug resistance.

Pharmaceutically acceptable solvates of compound of formula (I) forming part of this invention may be prepared by conventional methods such as dissolving the

WO 02/051819

PCT/IN01/00227

63

compounds of formula (I) in solvents such as water, methanol, ethanol etc., preferably water and recrystallizing by using different crystallization techniques.

The pharmaceutical compositions may be in the forms normally employed, such as tablets, capsules, powders, syrups, solutions, suspensions and the like, may contain
5 flavorants, sweeteners etc. in suitable solid or liquid carriers or diluents, or in suitable sterile media to form injectable solutions or suspensions. Such compositions typically contain from 1 to 20 %, preferably 1 to 10 % by weight of active compound, the remainder of the composition being pharmaceutically acceptable carriers, diluents or solvents.

10 Suitable pharmaceutically acceptable carriers include solid fillers or diluents and sterile aqueous or organic solutions. The active compounds will be present in such pharmaceutical compositions in the amounts sufficient to provide the desired dosage in the range as described above. Thus, for oral administration, the compounds can be combined with a suitable solid, liquid carrier or diluent to form capsules, tablets,
15 powders, syrups, solutions, suspensions and the like. The pharmaceutical compositions, may, if desired, contain additional components such as flavorants, sweeteners, excipients and the like. For parenteral administration, the compounds can be combined with sterile aqueous or organic media to form injectable solutions or suspensions. For example, solutions in sesame or peanut oil, aqueous propylene glycol and the like can be used, as
20 well as aqueous solutions of water-soluble pharmaceutically-acceptable acid addition salts or salts with base of the compounds. The injectable solutions prepared in this manner can then be administered intravenously, intraperitoneally, subcutaneously, or intramuscularly, with intramuscular administration being preferred in humans.

In addition to the compounds of formula (I) the pharmaceutical compositions of
25 the present invention may also contain or be co-administered with one or more known drugs selected from other clinically useful antibacterial agents such as β -lactams or aminoglycosides. These may include penicillins such as oxacillin or flucloxacillin and carbapenems such as meropenem or imipenem to broaden the therapeutic effectiveness against, for example, methicillin-resistant staphylococci. Compounds of the formula (I)

WO 02/051819

PCT/IN01/00227

64

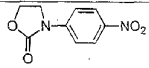
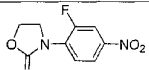
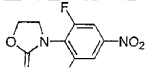
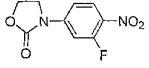
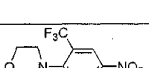
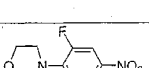
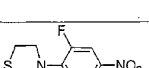
of the present invention may also contain or be co-administered with bactericidal/permeability-increasing protein product (BPI) or efflux pump inhibitors to improve activity against gram negative bacteria and bacteria resistant to antimicrobial agents.

- 5 The compounds of the formula (I) as defined above are clinically administered to mammals, including human beings, via either oral or parenteral routes. Administration by the oral route is preferred, being more convenient and avoiding the possible pain and irritation of injection. However, in circumstances where the patient cannot swallow the medication, or absorption following oral administration is impaired, as by disease or
10 other abnormality, it is essential that the drug be administered parenterally. By either route, the dosage is in the range of about 5 mg/kg to about 20 mg / kg body weight of the subject per day administered singly or as a divided dose. However, the optimum dosage for the individual subject being treated will be determined by the person responsible for treatment, generally smaller doses being administered initially and thereafter increments
15 made to determine the most suitable dosage.

The invention is explained in detail in the examples given below which are provided by way of illustration only and therefore should not be construed to limit the scope of the invention.

20 **General procedure for preparations 1-9:**

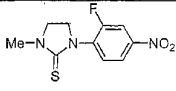
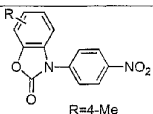
- A mixture of appropriate nitro compound such as 4-fluoronitrobenzene and the like, a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group, (1.1 eq) and
25 anhydrous K_2CO_3 (2.0 eq) in dry DMF was stirred at temperature ranging from 0 to 100 °C (depending on the substrate) overnight. Cold water was added to the reaction mixture and the solid formed was filtered. The filtered solids were dried to yield pure compound. Yield: 50-85%.

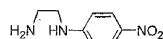
S.No.	Preparation	Analytical data
1		¹ HNMR (CDCl ₃ , 200MHz): δ 8.25 (d, J=9.2 Hz, 2H), 7.72 (d, J=9.2 Hz, 2H), 4.57 (t, J=7.3 Hz, 2H), 4.18 (t, J=7.3 Hz, 2H). Mass (CI method): 209.
2		¹ HNMR (CDCl ₃ , 200MHz): δ 8.12-7.93 (m, 3H), 4.56 (t, J=7.3 Hz, 2H), 4.23 (t, J=7.3 Hz, 2H). Mass (CI method): 227.
3		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92 (d, J=7.8 Hz, 2H), 4.64 (t, J=7.4 Hz, 2H), 4.07 (t, J=7.4 Hz, 2H). Mass (CI method): 245, 215.
4		¹ HNMR (CDCl ₃ , 200MHz): δ 8.00 (m, 1H), 7.15 (m, 2H), 4.56 (t, J=7.4 Hz, 2H), 4.06 (t, J=7.4 Hz, 2H). Mass (CI method): 226, 180, 164, 152, 135, 109, 94.
5		¹ HNMR (CDCl ₃ , 200MHz): δ 8.64-8.48 (m, 2H), 7.69 (d, J=8.8 Hz, 1H), 4.60 (t, J=7.3 Hz, 2H), 4.01 (t, J=7.3 Hz, 2H). Mass (CI method): 276, 232, 217, 171, 144.
6		¹ HNMR (CDCl ₃ , 200MHz): δ 8.14-8.04 (m, 2H), 7.90 (t, J=7.6 Hz, 1H), 4.76 (t, J=8.4 Hz, 2H), 4.23 (t, J=8.4 Hz, 2H). Mass (CI method): 242, 223, 167, 121, 94.
7		¹ HNMR (CDCl ₃ , 200MHz): δ 8.14-8.07 (m, 2H), 7.72 (t, J=7.6 Hz, 1H), 4.43 (t, J=7.6 Hz, 2H), 3.57 (t, J=7.6 Hz, 2H).

WO 02/051819

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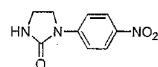
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		Mass (CI method): 258, 239, 212, 193, 108.
8		¹ H NMR (CDCl ₃ , 200MHz): δ 8.11-8.02 (m, 2H), 7.96 (t, J=7.8 Hz, 1H), 4.09-3.83 (2t, 4H), 3.27 (s, 2H). Mass (CI method): 255, 236, 209, 190.
9		¹ H NMR (CDCl ₃ , 200MHz): δ 8.23 (m, 2H), 7.81 (t, J=7.4 Hz, 1H), 7.22 (t, J=7.4 Hz, 1H), 7.03 (d, J=8.4 Hz, 1H). Mass (CI method): 288, 258, 243, 197, 94.

Preparation 10: N1-(2-aminoethyl)-4-nitroaniline

5 A solution of 4-fluoronitrobenzene (5 g, 35.4 mmol) in CH₃CN (250 ml) was stirred at room temperature under argon overnight. The reaction mixture was filtered and the filtrate was concentrated. The residue obtained was suspended in pet. ether and filtered. The solids were collected to afford the nitro compound (4.1 g, 64 %) as yellow crystals.

10 ¹H NMR (DMSO+CDCl₃, 200 MHz): δ 7.97 (d, J=9.3 Hz, 2H), 7.09 (bs, 1H), 6.62 (d, J=9.3 Hz, 2H), 2.80-3.40 (m, 6H). Mass(CI method): 181, 152, 135, 105.

Preparation 11: 1-(4-Nitrophenyl)-2-imidazolidinone

15 A solution of phosgene (20 % in toluene, 13 ml, 26.5 mmol) in toluene was added drop wise to a solution of the diamine (4 g, 22 mmol) (obtained in preparation 10) and Et₃N (7.6 ml, 55 mmol) in dichloromethane (100 ml) at 0 °C under argon. After being stirred at same temperature for 1 h, the reaction mixture was poured in water and extracted with dichloromethane (4x150 ml). The combined organic extracts were

WO 02/051819

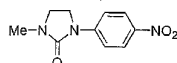
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67

washed with water, brine and dried. The residue obtained upon evaporation of the solvents was passed through a column of silica gel to afford the product (3 g, 66 %) as yellow solid.

¹H NMR (CDCl₃, 200 MHz): δ 8.17 (d, J=9.3 Hz, 2H), 7.75 (d, J=9.2 Hz, 2H), 7.07 (bs, 1H), 4.00 (t, J=8.8 Hz, 2H), 3.59 (t, J=8.8 Hz, 2H). Mass (CI method): 207, 151, 105.

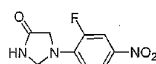
Preparation 12: 1-Methyl-3-(4-nitrophenyl)-2-imidazolidinone



Sodium hydride (60 % in oil, 138 mg, 5.3 mmol) was added portion wise to a solution of the nitro compound (1 g, 4.8 mmol) (obtained in preparation 11) in dry DMF (15 ml) under argon at 0 °C. Stirred the reaction mixture at the same temperature for 15 min. Methyl iodide (MeI) (0.68 g, 4.8 mmol) was added and the reaction mixture was stirred for 1 h. Ice pieces were added to the reaction mixture and the solid formed was filtered to afford the product (900 mg, 84 %) as yellow crystals.

¹H NMR (CDCl₃, 200 MHz): δ 8.19 (d, J=9.3 Hz, 2H), 7.70 (d, J=9.3 Hz, 2H), 3.88 (t, J=8.8 Hz, 2H), 3.54 (t, J=8.8 Hz, 2H), 2.93 (s, 3H). Mass (CI method): 222.

Preparation 13: 1-(3-Fluoro-4-nitrophenyl)-4-imidazolidinone



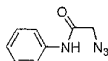
A solution of 4-imidazolidinone (9.5 g, 110.5 mmol), 3,4-difluoro nitrobenzene (12.2 ml, 110.5 mmol) and diisopropyl ethylamine (28.6 ml, 165 mmol) in dry DMF (80 ml) was heated to 60 °C overnight under argon. The reaction mixture was allowed to cool to room temperature and ice pieces were added. The solid formed was filtered and washed with water. The solid was dried under air to yield the nitro compound (19.5 g, 78.5 %) as yellow crystals.

¹H NMR (DMSO, 200 MHz): δ 8.81 (bs, 1H), 8.07-7.96 (m, 2H), 6.82 (t, J=8.8 Hz, 1H), 4.97 (s, 2H), 4.06 (s, 2H). Mass (CI method): 226, 185, 152.

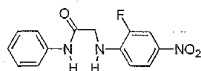
WO 02/051819

PCT/IN01/00227

68

Preparation 14: N1-phenyl-2-azidoacetamide

Chloroacetyl chloride (5.1 ml, 64.5 mmol) was added drop wise to a solution of aniline (5 g, 53.7 mmol) and Et₃N (18.7 ml, 134.3 mmol) in dichloromethane (150 ml) at 0°C under argon. After the completion of reaction (TLC control), the reaction mixture was diluted with dichloromethane (300 ml). The resultant mixture was washed with water, brine and dried. The residue obtained upon evaporation of solvent was taken up in dry DMF (40 ml), added NaN₃ (6.15 g, 94.6 mmol) and the resultant mixture was stirred at 80 °C for 2 h. The reaction mixture was diluted with ethyl acetate and washed with water, brine and dried. The residue obtained upon evaporation of the solvent was chromatographed over silica gel to afford the azide (6 g, 63%).

Preparation 15: N1-phenyl-2-(2-fluoro-4-nitroanilino)acetamide

A solution of the azide (6 g, 34 mmol) obtained in preparation 14 was taken in MeOH (60 ml) and the resultant solution was hydrogenated over 10% Pd on charcoal (2.5 g) overnight. The reaction mixture was filtered on a celite pad and the filtrate was concentrated. To this residue dry DMF (40 ml) was added followed by diisopropyl ethyl amine (16.7 ml, 93.8 mmol) and 3,4-difluoronitro benzene (3.8 ml, 37.5 mmol). The resultant solution was kept at 80°C overnight with continuous monitoring by TLC. Ice-cold water was added to the reaction mixture and the solid separated was filtered to afford the nitro compound as a yellow solid (6 g, 61 %).

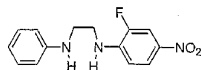
¹H NMR (DMSO-CDCl₃, 200 MHz): δ 9.74 (bs, 1H), 7.84-8.00 (m, 2H), 7.58 (d, J=8.3 Hz, 2H), 7.30 (d, J=8.3 Hz, 2H), 7.08 (m, 1H), 6.66 (t, J=8.8 Hz, 1H), 6.45 (bs, 1H), 4.09 (d, J=5.4 Hz, 2H). Mass (CI Method): 290.

25

WO 02/051819

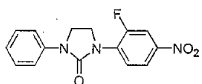
PCT/IN01/00227

69

Preparation 16: N1-(2-anilinoethyl)-2-fluoro-4-nitroamine

A 1 M solution of BH_3 .THF (45 ml, 45 mmol) was added drop wise to a solution of the nitro compound (4.5 g, 15.5 mmol) (obtained in preparation 15) in dry THF (30 ml) at 0 °C under argon. The reaction mixture was stirred overnight at room temperature and then water was added cautiously to quench the excess borane. The volatiles were removed from the reaction mixture under vacuum and the residue was taken up in ethyl acetate (400 ml). The organic layer was washed with water, brine and dried. The residue obtained upon evaporation of the solvent was passed through column to afford the product (4 g, 93 %).

^1H NMR (CDCl_3 , 200 MHz): δ 8.02-7.86 (m, 2H), 7.26-7.18 (m, 2H), 6.82-6.62 (m, 4H), 4.94 (bs, 1H), 3.83 (bs, 1H), 3.51 (s, 4H). Mass (CI method): 274.

Preparation 17: 1-(2-Fluoro-4-nitrophenyl)-3-phenyl-2-imidazolidinone

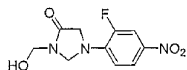
A solution of phosgene (20 % in toluene, 7.4 ml, 14.7 mmol) was added drop wise to a solution of the diamine (4 g, 14.5 mmol) (obtained in preparation 16) and Et_3N (5.6 ml, 40.4 mmol) in dichloromethane (50 ml) at 0 °C under argon. Stirred for 2 h at the same temperature the reaction mixture was diluted with dichloromethane (300 ml) and washed with water, brine and dried. The crystals obtained upon evaporation of the solvents were suspended in petroleum ether and filtered. The product was isolated as yellow crystals (4 g, 91.4 %).

^1H NMR (CDCl_3 , 200 MHz): δ 8.10-7.11 (m, 8H), 4.22-4.00 (m, 4H). Mass (CI Method): 302, 106.

WO 02/051819

PCT/IN01/00227

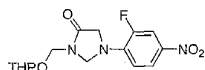
70

Preparation 18: 1-(2-Fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone

A mixture of 1-(2-fluoro-4-nitrophenyl)-4-imidazolidinone (9 g, 40 mmol) (obtained in preparation 13) and 40% solution of formaldehyde (100 mL) was heated to reflux for 4 h. The reaction mixture was allowed to cool to room temperature and ice water mixture was added. The precipitated solid was filtered and dried to give the product as yellow solid (8.5 g, 83% yield).

^1H NMR (DMSO- d_6 , 200MHz): δ 8.10-7.95 (m, 2H), 6.90-6.80 (m, 1H), 6.20 (t, J = 6.8 Hz, 1H), 5.13 (d, J = 2.9 Hz, 2H), 4.77 (d, J = 7.3 Hz, 2H), 4.19 (s, 2H).

Mass (CI method): 226.

Preparation 19: 1-(2-Fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone

A solution of 1-(2-fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone (6.7 g, 26.2 mmol) (obtained in preparation 18), pyridinium p-toluenesulphonate (PPTS) (65 mg, 0.39 mmol) and 3,4-dihydro-2H-pyran (3.6 mL, 39.4 mmol) in dichloromethane (100 mL) was stirred at room temperature under argon overnight. The reaction mixture was diluted with dichloromethane (400 mL), washed with half-saturated brine (2×100 mL) and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product as yellow solid (7 g, 79%).

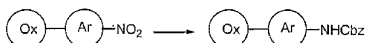
^1H NMR (CDCl_3 , 200MHz): δ 8.05-7.85 (m, 2H), 6.60-6.45 (m, 1H), 5.30-4.70 (m, 5H), 4.17 (s, 2H), 4.20-3.30 (m, 4H), 2.00-1.40 (m, 6H).

Mass (CI method): 340, 256, 237.

WO 02/051819

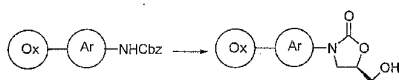
PCT/IN01/00227

71

Preparation 20: General procedure for the conversion of

where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring

A solution of the nitro compound in THF was hydrogenated over 10% Pd on charcoal (catalytic amount) overnight. After the complete consumption of starting material, a 5% solution of Na_2CO_3 (2.2 eq) in water was added followed benzyl chloroformate (1.2 eq) at 0 °C. After stirring the reaction mixture for 3 h at room temperature, it was filtered over celite bed and washed with ethyl acetate. The organic layer was separated from the filtrate and washed with water twice followed by brine. The organic extract was dried, evaporated and purified on a column of silica gel.

Examples:**A. General procedure for the conversion of**

where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

To a solution of the starting material in dry THF at -78 °C under argon was added 1.6M BuLi (1.2 eq) drop wise. The reaction mixture was stirred for 45 min at the same temperature and then R-glycidyl butyrate (1.2 eq) was added. Stirred for 1 h at -78 °C. Then the cold bath was removed while monitoring with TLC. After 3-12 h, the reaction mixture was quenched with saturated NH_4Cl solution and extracted with ethyl

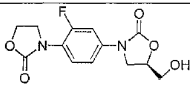
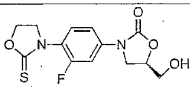
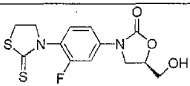
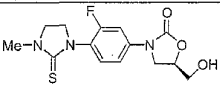
WO 02/051819

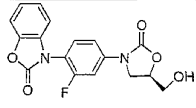
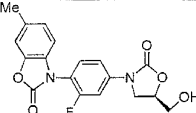
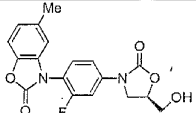
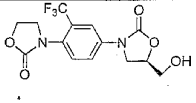
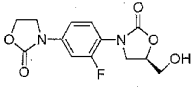
PCT/IN01/00227

72

acetate. The combined organic extracts were washed with water, brine and dried. The residue obtained upon evaporation of solvents was chromatographed over silica gel to afford the product.

5 Examples 1-19 have been prepared according to the general procedure A

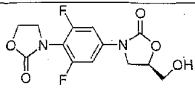
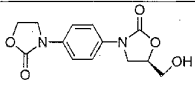
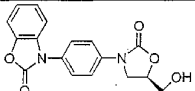
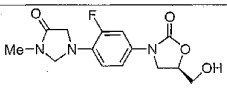
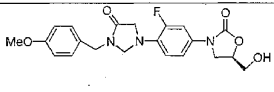
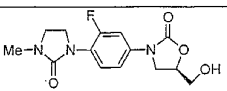
Example No.	Structure	Analytical Data
1		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.68-7.50 (m, 2H), 7.38 (d, J=8.8 Hz, 1H), 5.23 (t, J=5.8 Hz, 1H), 4.73-4.72 (m, 1H), 4.47 (t, J=7.4 Hz, 2H), 4.14-3.80 (m, 4H), 3.68-3.56 (m, 2H).
2		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J=11.6 Hz, 1H), 7.52 (t, J=8.8 Hz, 1H), 7.29 (d, J=8.8 Hz, 1H), 4.89 (bs, 1H), 4.76 (t, J=2H), 4.17 (t, J=8.8 Hz, 2H), 3.93-3.68 (m, 4H).
3		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (dd, J=12.7 Hz and 2.2 Hz, 1H), 7.44-7.26 (m, 2H), 4.75-4.68 (m, 2H), 4.37 (t, J=7.8 Hz, 2H), 4.04-3.56 (m, 4H), 3.48 (t, J=7.8 Hz, 2H).
4		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J=2.4 Hz and 12.7 Hz, 1H), 7.47 (t, J=8.4 Hz, 1H), 7.24-7.20 (m, 1H), 4.77-4.69 (m, 1H), 4.10-3.81 (m, 5H), 3.77-3.68 (m, 4H), 3.23 (s, 3H).

5		¹ HNMR (CDCl ₃ , 200MHz): δ 7.85-7.79 (m, 1H), 7.58 (t, J = 8.0 Hz, 1H), 7.46-7.42 (m, 1H), 7.30-7.18 (m, 4H), 6.90-6.87 (m, 1H), 4.90-4.75 (m, 1H), 4.15-4.07 (m, 3H), 3.87-3.81 (m, 1H).
6		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J = 2.4 Hz and 12.2 Hz, 1H), 7.53-7.26 (m, 2H), 7.11 (s, 1H), 6.97 (d, J = 8.4 Hz, 1H), 6.72 (d, J = 7.8 Hz, 1H), 4.81-4.65 (m, 1H), 4.09-3.82 (m, 4H), 2.41 (s, 3H), 2.09 (hump, 1H).
7		¹ HNMR (CDCl ₃ , 200MHz): δ 7.77 (d, J = 10.4 Hz, 1H), 7.57-7.26 (m, 3H), 6.96 (d, J = 7.8 Hz, 1H), 6.64 (s, 1H), 4.82-4.71 (m, 1H), 4.14-4.05 (m, 3H), 3.84-3.78 (m, 2H), 2.35 (s, 3H).
8		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92-7.89 (m, 2H), 7.44 (d, J = 7.8 Hz, 1H), 7.80-7.71 (m, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.08-3.89 (m, 6H), 2.16 (s, 1H).
9		¹ HNMR (CDCl ₃ , 200MHz): δ 7.69-7.48 (m, 2H), 7.23 (d, J = 8.8 Hz, 1H), 4.81-4.72 (m, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.13-3.69 (m, 6H).

WO 02/051819

PCT/IN01/00227

74

10		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29 (d, J = 10.8 Hz, 2H), 4.80-4.73 (m, 1H), 4.57 (t, J = 15.6 Hz, 2H), 4.00-3.73 (m, 8H).
11		¹ HNMR (CDCl ₃ , 200MHz): δ 7.59 (s, 4H), 5.24 (t, J = 5.4 Hz, 1H), 4.67 (bs, 1H), 4.45 (t, J = 7.4 Hz, 2H), 4.13-4.02 (m, 3H), 3.88-3.54 (m, 3H).
12		¹ HNMR (CDCl ₃ , 200MHz): δ 7.79 (d, J = 9.2 Hz, 2H), 7.72 (d, J = 9.2 Hz, 2H), 7.59-7.03 (m, 4H), 5.18 (t, J = 5.8 Hz, 1H), 4.80-4.71 (m, 1H), 4.18-4.02 (m, 2H), 3.98-3.68 (m, 2H).
13		¹ HNMR (CDCl ₃ , 200MHz): δ 2.9 (s, 3H), 4.1 (t, 1H), 3.9 (m, 6H), 4.7 (m, 1H), 4.8 (s, 2H), 6.8 (t, 1H), 7.2 (d, 1H).
14		¹ HNMR (CDCl ₃ , 200MHz): δ 7.4 (dd, J = 2 Hz and 15.4 Hz, 1H), 7.2 (d, J = 8.8 Hz, 2H), 7.0 (d, J = 9.4 Hz, 1H), 6.85 (d, J = 8.4 Hz, 2H), 6.5 (t, J = 9.2 Hz, 1H), 4.75 (s, 3H), 4.50 (s, 2H), 3.95 (m, 6H), 3.8 (s, 3H).
15		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (dd, J = 2.4 Hz and 13.4 Hz, 1H), 7.45 (t, J = 8.8 Hz, 1H), 7.10 (dd, J = 2.2 Hz and 13.0 Hz, 1H), 4.66 (m, 1H), 3.81 (m, 6H), 3.47 (t, 2H), 2.8 (s, 3H).

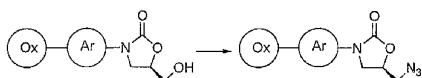
WO 02/051819

PCT/IN01/00227

75

16		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 3.4 (m, 3H), 4.7 (m, 1H), 7.5 (m, 4H).
17		¹ HNMR (CDCl ₃ , 200MHz): δ 7.7-7.2 (m, 9H), 4.8-4.6 (m, 1H), 4.5 (s, 2H), 4.1-3.7 (m, 6H), 3.4 (t, J=8.8 Hz, 2H).
18		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.7 (m, 4H), 7.3-7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 4H), 4.7 (m, 1H), 3.9-4.1 (m, 6H), 3.9 (s, 1H), 3.7 (m, 1H).
19		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.7 (m, 2H), 4.0 (m, 7H), 3.8 (m, 1H).

B. General procedure for the conversion of



- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

- 10 To a solution of the alcohol, triethylamine (2.2 eq) in dry dichloromethane, methane sulfonylchloride (1.1 eq) was added at 0 °C under argon. The reaction mixture was warmed to room temperature over 2 h and then diluted with dichloromethane. The organic layer was washed with water, brine and dried. The residue obtained upon

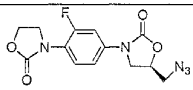
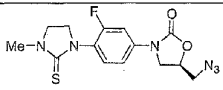
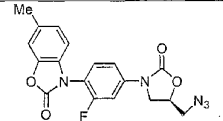
WO 02/051819

PCT/IN01/00227

76

evaporation of the solvent was taken up in dry DMF and then NaN_3 (1.5 eq) was added at room temperature. The resultant mixture was heated to 80 °C for 2-5 h while monitoring by TLC. Allowed the reaction mixture to attain room temperature, water was added and extracted with ethyl acetate. The combined organic extracts were washed with water (3 times), brine and dried. The residue obtained upon evaporation of the solvent was passed through column to obtain the azide.

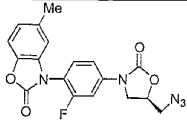
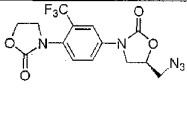
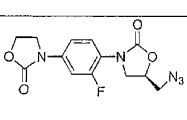
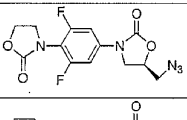
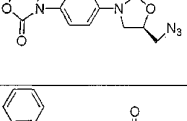
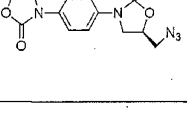
Examples 20-31 have been prepared according to the general procedure B

Example No.	Structure	Analytical Data
20		$^1\text{H NMR}$ ($\text{DMSO}-d_6$, 200MHz): δ 7.67-7.52 (m, 2H), 7.38 (d, $J=8.8$ Hz, 1H), 4.95-4.88 (m, 1H), 4.47 (t, $J=7.2$ Hz, 2H), 4.16 (t, $J=9.4$ Hz, 1H), 4.02-3.64 (m, 5H).
21		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.62 (dd, $J = 2.4$ Hz and 12.7 Hz, 1H), 7.48 (t, $J = 8.4$ Hz, 1H), 7.22-7.17 (m, 1H), 4.85-4.73 (m, 1H), 4.16-3.52 (m, 8H), 3.22 (s, 3H).
22		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.75 (dd, $J=2.0$ Hz and 12.2 Hz, 1H), 7.54 (t, $J = 8.8$ Hz, 1H), 7.40-7.26 (m, 1H), 7.10 (s, 1H), 6.97 (d, $J = 7.8$ Hz, 1H), 6.71 (d, $J = 6.8$ Hz, 1H), 4.87-4.79 (m, 1H), 4.17-3.57 (m, 4H), 2.41 (s, 3H).

WO 02/051819

PCT/IN01/00227

77

23		¹ HNMR (CDCl ₃ , 200MHz): δ 7.81 (d, 1H), 7.54 (t, 1H), 7.45-7.01 (m, 3H), 6.67 (s, 1H), 4.91-4.79 (m, 1H), 3.95-3.47 (m, 4H), 2.38 (s, 3H).
24		¹ HNMR (CDCl ₃ , 200MHz): δ 7.89 (d, J = 7.4 Hz, 2H), 7.43 (d, J = 9.4 Hz, 1H), 4.87-4.80 (m, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.12 (t, J = 8.8 Hz, 2H), 3.97-3.55 (m, 4H).
25		¹ HNMR (CDCl ₃ , 200MHz): δ 7.71-7.50 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.89-4.75 (m, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.47-3.55 (m, 6H).
26		¹ HNMR (CDCl ₃ , 200MHz): δ 7.31 (s, 2H), 4.83-4.81 (m, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.09-3.55 (m, 6H).
27		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.64 (s, 4H), 4.98-4.89 (m, 1H), 4.50 (t, J = 7.4 Hz, 2H), 4.25-4.07 (m, 4H), 3.88-3.70 (m, 2H).
28		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75 (d, J = 9.2 Hz, 2H), 7.59 (d, J = 9.2 Hz, 2H), 7.48-7.03 (m, 4H), 4.89-4.81 (m, 1H), 4.16 (t, J = 9.2 Hz, 1H), 3.98-3.58 (m, 3H).

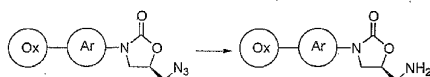
WO 02/051819

PCT/IN01/00227

78

29		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.4 (dd, 1H), 7.1 (dd, 1H), 6.5 (t, 1H), 4.9 (s, 2H), 4.8-4.7 (m, 1H), 4.1-3.5 (m, 6H), 3.0 (s, 3H).
30		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.35 (t, 2H), 7.0-7.2 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.7 (m, 2H).
31		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.6 (m, 2H).

C. General procedure for the conversion of



where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

Procedure (i):

A solution of the azide in THF: MeOH (1:3) was hydrogenated over 10% Pd on charcoal overnight. The reaction mixture was filtered and the filtrate was concentrated. The residue was crystallized in MeOH to afford the amine.

Procedure (ii):

Triphenyl phosphine (1.3 eq) was added portion wise to a solution of the azide in dry THF and the resultant mixture was stirred at room temperature for 6 h. Water (few drops) was added and the reaction mixture was heated to 60 °C overnight. The solvent

WO 02/051819

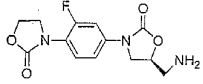
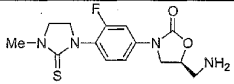
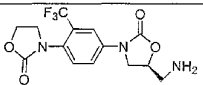
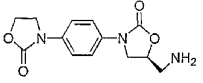
PCT/IN01/00227

79

was evaporated and the residue was passed through a column of silica gel to afford the amine.

Examples 32-37 have been prepared according to the general procedure C

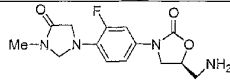
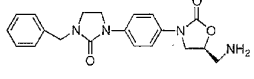
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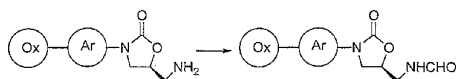
Example No.	Structure	Analytical Data
32		¹ HNMR (DMSO-D ₆ , 200MHz): δ 7.66-7.50 (m, 2H), 7.37 (d, J = 9.4 Hz, 1H), 4.66-4.60 (m, 1H), 4.47 (t, J = 7.8 Hz, 2 H), 4.12-3.83 (m, 6 H), 2.91-2.80 (m, 2 H). Mp: 147 °C
33		¹ HNMR (CDCl ₃ , 200MHz): δ 7.63-7.55 (dd, J = 2.0 Hz and 13.0 Hz, 1H), 7.49-7.22 (m, 2H), 4.63-4.60 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 4.03-3.73 (m, 4H), 3.32 (m, 3H), 3.08 (s, 3H).
34		¹ HNMR (CDCl ₃ , 200MHz): δ 8.02 (s, 2H), 7.87-7.83 (m, 2H), 7.64 (s, 1H), 7.50 (d, J = 8.2 Hz, 1H), 4.84 (s, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.20-3.90 (m, 6H).
35		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.57 (s, 4H), 4.63-4.61 (m, 1H), 4.44 (t, J=7.2 Hz, 2H), 4.08-3.82 (m, 4H), 2.86-2.82 (m, 2H).

WO 02/051819

PCT/IN01/00227

80

36		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6-7.4 (dd, 1H), 7.1 (dd, 1H), 6.6 (t, 1H), 4.9 (s, 2H), 4.6 (m, 1H), 4.1-3.7 (m, 4H), 3.2-2.8 (m, 4H).
37		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62-7.40 (m, 3H), 7.3 (s, 5H), 4.7 (m, 1H), 4.5 (s, 2H), 4.1 (t, 1H), 3.9-3.8 (m, 4H), 3.4 (t, 2H).

D. General procedure for the conversion of

- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

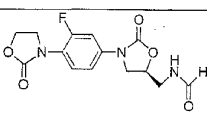
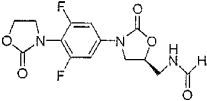
- 10 A solution of amine in methyl formate was heated to 80 °C overnight. The volatiles were removed under low pressure and the residue obtained was passed through column to yield formate in very pure form.

Examples 38 & 39 have been prepared according to the general procedure D

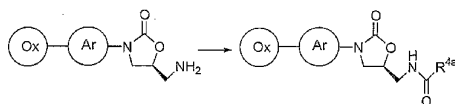
WO 02/051819

PCT/IN01/00227

81

Example No.	Structure	Analytical Data
38		¹ HNMR (CDCl ₃ , 200MHz): δ 8.28 (s, 1H), 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 6.15 (bs, 1H), 4.82 (m, 1H), 4.52 (t, J = 7.4 Hz, 2H), 4.48-4.02 (m, 3H).
39		¹ HNMR (CDCl ₃ , 200MHz): δ 8.27 (s, 1H), 7.26-7.23 (m, 2H), 6.32 (bs, 1H), 4.82 (bs, 1H), 4.58 (t, J = 7.2 Hz, 2H), 4.214-3.68 (m, 6H).

E. General procedure for the conversion of



- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl.
- 10

To a solution of the amine (1 eq) in dry dichloromethane at 0 °C under argon was added Et₃N (2.5 eq) followed by respective acid chloride (1.2 eq) drop wise. After being stirred at room temperature for 1 to 6 h (TLC control), the reaction mixture was diluted with dichloromethane and washed with water twice followed by brine. The organic

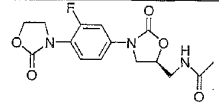
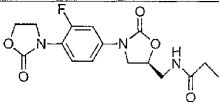
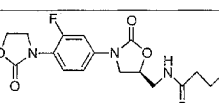
15 extract was dried, evaporated and was passed through column to afford the acylated-product.

WO 02/051819

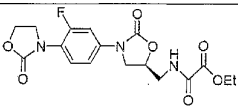
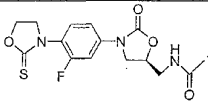
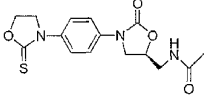
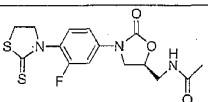
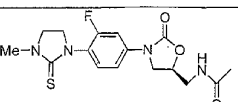
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82

Examples 40-70 have been prepared according to the general procedure E

Example No.	Structure	Analytical Data
40		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.60 Hz and 13.4 Hz, 1H), 7.52 (d, J = 8.60 Hz, 1H), 7.13-7.17 (m, 1H), 5.96-5.99 (m, 1H), 4.82-4.76 (m, 1H), 4.52 (t, J = 7.40 Hz, 2H), 4.01-4.09 (m, 3H), 3.62-3.81 (m, 3H), 2.02 (s, 3H).
41		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.16 (d, J = 8.8 Hz, 1H), 6.03 (bs, 1H), 4.82-4.78 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.0 (m, 3H), 3.83-3.65 (m, 3H), 2.24 (q, J = 7.8 Hz, 2H), 1.13 (t, J = 7.8 Hz, 3H). Mp: 203 °C
42		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2 H), 7.15 (d, J = 8.8 Hz, 1H), 6.01 (bs, 1H), 4.81-4.75 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.01 (m, 3H), 3.83-3.65 (m, 3H), 2.19 (t, J = 7.4 Hz, 2H), 1.65-1.58 (m, 2H), 0.98 (t, J = 7.4 Hz, 3H). Mp: 211°C

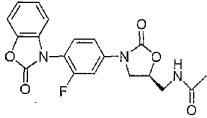
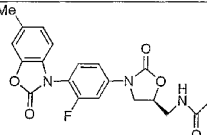
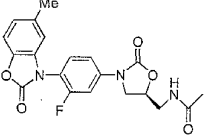
43		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 4.82-4.76 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.01 (m, 2H), 3.83-3.65 (m, 3H), 2.21 (t, J = 7.4 Hz, 2H), 1.57-1.49 (m, 2H), 1.38-1.20 (m, 2H), 0.89 (t, 3H). Mp: 187 °C
44		¹ HNMR (CDCl ₃ , 200MHz): δ 7.68-7.52 (m, 2H), 7.17 (d, 8.6 Hz, 1H), 5.96 (hump, 1H), 4.81 (hump, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.11-3.67 (m, 6H), 2.22 (t, J = 7.4 Hz, 2H), 1.60 (bs, 8H), 0.87 (s, 3H). Mp: 131 °C
45		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.97 (bs, 1H), 7.6-7.40 (m, 2H), 7.10 (d, J = 8.8 Hz, 1H), 6.35-6.15 (m, 2H), 5.63 (dd, J = 4.0 Hz and 8.3 Hz, 1H), 4.79-4.86 (m, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.05 (t, J = 6.8 Hz, 2H), 3.89-3.56 (m, 4H). Mp: 196 °C
46		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 9.38 (bs, 1H) 7.67-7.5(m, 2H), 7.20 (d, J = 8.8 Hz, 1H), 4.88-4.87 (m, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.16-4.02 (m, 3H), 3.89-

		3.70 (m, 1H), 3.67-3.65 (m, 2H). Mp: 194 °C
47		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8Hz, 1H), 4.85-4.83 (m, 1H), 5.55-4.47 (m, 2H), 4.37-4.31 (m, 2H), 4.14-3.90 (m, 3H), 3.88-3.60 (m, 3H), 1.42 (t, 3H). Mp: 160 °C
48		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75-7.05 (m, 3H), 6.05 (bs, 1H), 4.95-4.62 (m, 2H), 4.52 (t, 1H), 4.30-3.32 (m, 6H), 2.023 (s, 3H).
49		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (d, J = 7.81 Hz, 2H), 7.3 (d, J = 7.81 Hz, 2e H), 4.8 (s, 1H), 4.4 (s, 4H), 4.1 (t, 1H), 3.8 (t, 1H), 3.5 (s, 1H), 32.3 (s, 1H), 2.0 (s, 3H).
50		¹ HNMR (CDCl ₃ , 200MHz): δ 7.99 (hump, 1H), 7.73 (d, J = 13.0 Hz, 1H), 7.43 (d, J = 8.0 Hz, 1H), 7.31 (d, J = 8.8 Hz, 1H), 4.83 (hump, 1H), 4.42 (t, J = 7.6 Hz, 2H), 4.15-3.89 (m, 3H), 3.62-3.55 (m, 4H), 2.0 (s, 3H). Mp: 220 °C
51		¹ HNMR (CDCl ₃ , 200MHz): δ 7.61 (dd, J = 2.6 Hz and 12.7 Hz, 1H), 7.48 (t, J = 8.4 Hz, 1H), 7.19 (dd, J = 2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J =

WO 02/051819

PCT/IN01/00227

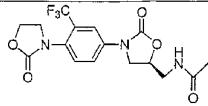
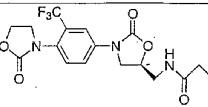
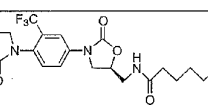
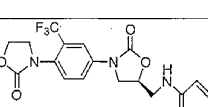
85

		2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J = 8.4 Hz, 1H), 4.79-4.77 (m, 1H), 4.05 (t, J = 8.8 Hz, 1H), 3.97-3.88 (m, 2H), 3.81-3.74 (m, 3H), 3.69-3.61 (m, 2H), 3.23 (s, 3H), 2.03 (s, 3H). Mp: 171 °C
52		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J = 2.2 Hz and 12.0 Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.37-7.14 (m, 4H), 6.82 (t, J = 3.4 Hz, 1H), 6.03 (t, J = 5.4 Hz, 1H), 4.83-4.80 (m, 1H), 4.10 (t, J = 9.0 Hz, 1H), 3.88-3.80 (m, 1H), 3.71-3.66 (m, 2H), 2.04 (s, 3H).
53		¹ HNMR (CDCl ₃ , 200MHz): δ 7.74 (dd, J = 2.6 Hz and 12.2Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.49-7.26 (m, 2H), 7.10-6.95 (m, 2H), 6.72-6.68 (m, 1H), 6.09-6.01 (m, 1H), 4.84 (bs, 1H), 4.10 (t, J = 8.8 Hz, 1H), 3.88-3.66 (m, 3H), 2.41 (s, 3H), 2.04 (s, 3H). Mp: 213 °C
54		¹ HNMR (CDCl ₃ , 200MHz): δ 7.80-6.94 (m, 4H), 6.63 (s, 1H), 6.0 (bs, 1H), 4.82-4.90 (m, 1H), 4.11 (t, J = 9.2 Hz, 1H), 3.89-3.66 (m, 3H), 2.35 (s, 3H), 2.09 (s, 3H). Mp: 202 °C

WO 02/051819

PCT/IN01/00227

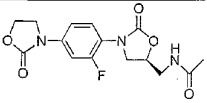
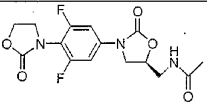
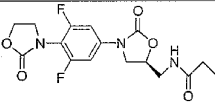
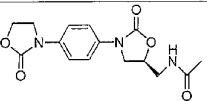
86

55		¹HNMR (CDCl₃, 200MHz): δ 7.93 (s, 1H), 7.76 (d, J = 8.8 Hz, 1H), 7.42 (d, J = 8.8 Hz, 1H), 6.57 (bs, 1H), 4.79 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.11-3.60 (m, 6H), 1.99 (s, 3H). Mp: 143 °C.
56		¹HNMR (CDCl₃, 200MHz): δ 7.93-7.79 (m, 2H), 7.43 (d, J = 8.8 Hz, 1H), 6.12 (bs, 1H), 4.82-4.78 (m, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09 (t, J = 9.4 Hz, 1H), 3.96-3.66 (m, 5H), 2.30-2.17 (m, 2H), 1.20 (t, J = 9.4 Hz, 3H). Mp: 143 °C
57		¹HNMR (CDCl₃, 200MHz): δ 7.91 (s, 1H), 7.78 (d, J = 8.2 Hz, 1H), 6.26 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.06 (t, J = 9.4 Hz, 1H), 3.95-3.67 (m, 5H), 2.47-2.05 (m, 4H), 1.83-1.54 (m, 6H), 0.83-0.78 (m, 3H). Mp: hygroscopic
58		¹HNMR (CDCl₃, 200MHz): δ 7.92 (s, 1H), 7.85 (d, J = 8.2 Hz, 1H), 7.45 (d, J = 8.8 Hz, 1H), 6.40-6.07 (m, 3H), 5.75 (d, J = 10.4 Hz, 1H), 4.89 (hump, 1H), 4.56 (t, J = 7.8 Hz,

WO 02/051819

PCT/IN01/00227

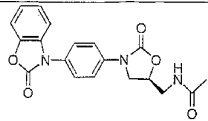
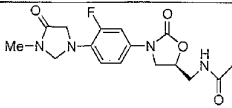
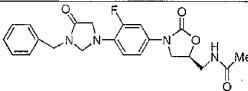
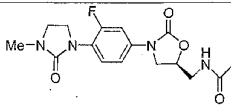
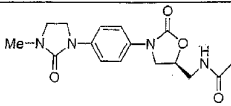
87

		2H), 4.13 (t, J = 9.2 Hz, 1H), 3.98-3.78 (m, 5H). Mp: 191 °C
59		¹ HNMR (CDCl ₃ , 200MHz): δ 7.65-7.41 (m, 2H), 7.23 (d, J = 7.2 Hz, 1H), 6.12 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.47-4.00 (m, 3H), 3.81-3.59 (m, 3H), 2.05 (s, 3H). Mp: 120 °C
60		¹ HNMR (CDCl ₃ , 200MHz): δ 7.27 (d, J = 9.8 Hz, 2H), 6.01 (hump, 1H), 4.80 (hump, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.06-3.67 (m, 6H), 2.03 (s, 3H). Mp: 219 °C
61		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.32-7.26 (m, 2H), 7.09 (hump, 1H), 4.81 (hump, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.05-3.62 (m, 6H), 2.25-2.18 (m, 2H), 1.11 (t, J = 7.8 Hz, 3H). Mp: 224 °C
62		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.64 (s, 2H), 7.55 (s, 2H), 7.09-7.25 (m, 1H), 4.70-4.85 (m, 1H), 4.46 (t, 2H), 4.13-3.81 (m, 4H), 3.57 (bs, 2H), 1.96 (s, 3H). Mp: 231 °C

WO 02/051819

PCT/IN01/00227

88

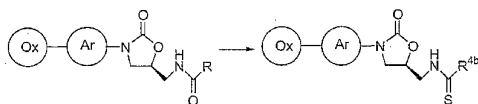
63		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (d, J = 8.8 Hz, 2H), 7.54 (d, J = 8.8 Hz, 2H), 7.24-6.99 (m, 4H), 6.19 (bs, 1H), 4.80 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 3.85 (t, J = 7.0 Hz, 1H), 3.69-3.63 (m, 2H), 2.02 (s, 3H). Mp: 229 °C
64		¹ HNMR (CDCl ₃ , 200MHz): δ 7.10 (d, 1H), 6.6 (t, 1H), 6.0 (m, 1H), 4.90 (s, 2H), 4.9 (m, 1H), 4.0 (s, 3H), 3.80 (m, 3H), 3.0 (s, 3H), 2.0 (s, 3H). Mp: 230 °C
65		¹ HNMR (CDCl ₃ , 200MHz): δ 7.26-7.46 (m, 6H), 7.01 (d, 1H), 6.63 (t, 1H), 6.05 (s, 1H), 4.71-4.89 (m, 2H), 4.77 (s, 1H), 4.60 (s, 2H), 3.94-4.04 (m, 3H), 3.61-3.76 (m, 3H), 2.01 (s, 3H).
66		¹ HNMR (CDCl ₃ , 200MHz): δ 7.50 (m, 2H), 7.10 (d, J = 8.4 Hz, 1H), 6.18 (t, 1H), 4.7 (m, 1H), 4.0 (t, J = 9.4 Hz, 1H), 3.6 (m, 7H), 2.9 (s, 3H), 2.0 (s, 3H). Mp: 182 °C
67		¹ HNMR (CDCl ₃ , 200MHz): δ 2.0 (s, 3H), 2.8 (s, 3H), 4.0 (t, 1H), 3.4-3.8 (m, 5H), 4.8 (m, 1H), 6.2 (m, 1H), 7.6 (m, 4H).

WO 02/051819

PCT/IN01/00227

89

		Mp: 217 °C
68		¹HNMR (CDCl ₃ , 200MHz): δ 7.6-7.3 (m, 9H), 6.2 (bt, 1H), 4.8-4.7 (m, 1H), 4.5 (s, 2H), 4.06 (t, J=9.3 Hz, 1H), 3.90-3.3 (m, 6H), 2.0 (s, 3H). Mp: 204 °C
69		¹HNMR (CDCl ₃ , 200MHz): δ 7.70-7.50 (m, 4H), 7.40-7.30 (t, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 1H), 4.80 (m, 5H), 4.0 (m, 5 H), 3.8 (m, 1H), 3.6 (m, 2H), 2.0 (s, 3H). Mp: 182 °C
70		¹HNMR (CDCl ₃ , 200MHz): δ 8.3 (m, 1H), 7.6 (m, 4H), 7.3 (m, 1H), 7.2 (t, 2H), 4.7 (m, 1H), 4.1 (t, 1H), 3.8-4.0 (m, 4H), 3.7 (t, 1H), 3.0 (m, 2H), 1.8 (s, 3H). Mp: 194 °C

F. General procedure for the conversion of

- where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4b} represents (C₁-C₆)alkyl,

WO 02/051819

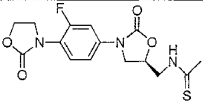
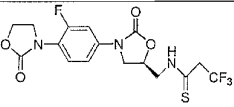
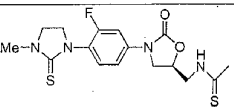
PCT/IN01/00227

90

halo(C₁-C₆)alkyl, -C(=O)-(C₁-C₆)alkoxy, -C(=O)-aryloxy, -C(=S)-(C₁-C₆)alkyl or -C(=S)-aryl.

A solution of the amide (1 eq) and Lawesson's reagent (0.6 eq) in dry dioxane was heated to 55 to 90 °C over 3 to 10 h (TLC control). The reaction mixture was allowed to cool to room temperature and diluted with ethyl acetate. The resultant mixture was washed with water (4 times) followed by brine and dried. The residue obtained upon evaporation of solvent was passed through column of silica gel to afford the respective thioacetate.

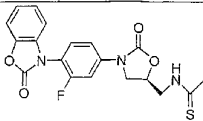
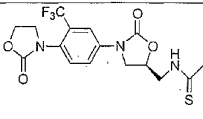
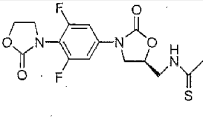
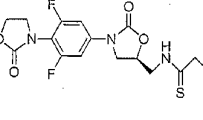
10 Examples 71-80 have been prepared according to the general procedure F

Example No.	Structure	Analytical Data
71		¹ HNMR (CDCl ₃ , 200MHz): δ 7.94 (bs, 1H), 7.66-7.52 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 5.20-4.85 (m, 1H), 4.54 (t, J = 7.8 Hz, 2H), 4.25-3.82 (m, 6H), 2.61 (s, 3H). Mp: 171 °C
72		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.51 (s, 1H), 7.64-7.47 (m, 2H), 7.16 (d, J = 8.8 Hz, 1H), 5.01 (bs, 1H), 4.53 (t, J = 7.2 Hz, 2H), 4.29-3.89 (m, 4H), 3.63 (q, J = 10.2 Hz, 2H). Mp: 165 °C
73		¹ HNMR (CDCl ₃ , 200MHz): δ 7.90 (bs, 1H), 7.61 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.50 (t, J = 8.2 Hz, 1H), 7.19 (dd, J = 2.4 Hz and 12.8

WO 02/051819

PCT/IN01/00227

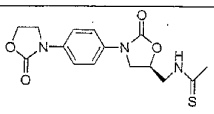
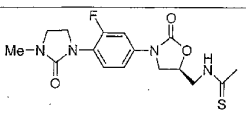
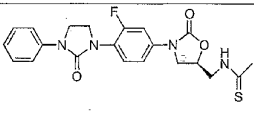
91

		1H), 7.19 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 5.0 (m, 1H), 4.25-3.74 (m, 8H), 3.24 (s, 3H), 2.6 (s, 3H). Mp: 111 °C
74		¹ HNMR (CDCl ₃ , 200MHz): δ 7.87-7.74 (m, 2H), 7.57 (t, J = 8.2 Hz, 1H), 7.39-7.18 (m, 4H), 6.87-6.85 (m, 1H), 5.08-5.05 (m, 1H), 4.37-4.27 (m, 1H), 4.23-4.06 (m, 2H), 3.94 (t, J = 6.8 Hz, 1H), 2.62 (s, 3H). Mp: 137 °C
75		¹ HNMR (CDCl ₃ , 200MHz): δ 8.1 (s, 1H), 7.9 (s, 1H), 7.8 (d, J = 8.7 Hz, 1H), 7.4 (d, J = 8.79, 1H), 5.0 (s, 1H), 4.6 (t, 2H), 4.0 (m, 6H), 2.6 (s, 3H). Mp: 154 °C
76		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.37 (bs, 1H), 7.50 (d, J = 10.8 Hz, 2H), 4.98(bs, 1H), 4.55 (t, J = 7.8 Hz, 2H), 4.23-3.78 (m, 6H), 2.50 (s, 3H). Mp: 108 °C
77		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (bt, 1H), 7.28 (d, J=9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J=7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J=7.4 Hz, 2H), 1.29 (t, J=7.8 Hz,

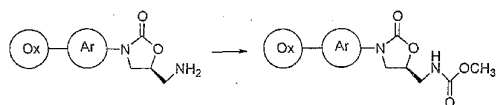
WO 02/051819

PCT/IN01/00227

92

		3H). Mp: 168 °C
78		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (hump, 1H), 7.25 (d, J = 9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J = 7.4 Hz, 2H), 1.29 (t, J = 7.8 Hz, 3H). Mp: 195 °C
79		¹ HNMR (CDCl ₃ , 200MHz): δ 8.4 (1H), 7.5 (m, 2H), 7.0 (d, J = 8.8 Hz, 2H), 4.9 (m, 1H), 3.9 (m, 6H), 3.5 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H), 2.5 (s, 3H). Mp: 168 °C
80		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.0 (t, 1H), 5.0 (m, 1H), 4.0 (m, 8H), 2.6 (s, 3H). Mp: 165 °C

G. General procedure for the conversion of



- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the

WO 02/051819

PCT/IN01/00227

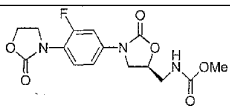
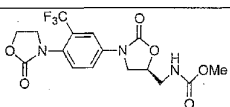
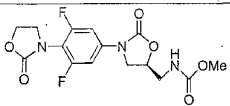
93

heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

- To a solution of the amine (1 eq), Et₃N (2.2 eq) in dry dichloromethane methyl chloroformate under argon was added at 0 °C (1.2 eq). The reaction mixture was stirred at room temperature overnight and worked up by diluting with dichloromethane followed by washing with water and brine. The residue obtained after evaporation of the dried organic layer was passed through column to afford the carbamate.

Examples 81-85 have been prepared according to the general procedure G

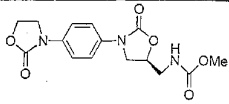
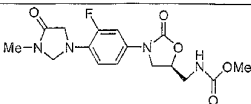
10

Example No.	Structure	Analytical Data
81		¹ HNMR (CDCl ₃ , 200MHz): δ 7.68-7.49 (m, 2H), 7.16 (d, J = 8.4 Hz, 1H), 5.16 (bs, 1H), 4.78 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.09-4.0 (m, 3H), 3.84-3.55 (m, 6H). Mp: 153 °C
82		¹ HNMR (CDCl ₃ , 200MHz): δ 7.9 (m, 2H), 7.4 (d, J = 8.3 Hz, 1H), 5.2 (s, 1H), 4.8 (s, 1H), 4.5 (t, 1H), 4.0 (m, 9H). Mp: 148 °C
83		¹ HNMR (CDCl ₃ , 200MHz): δ 7.27 (d, J = 6.8 Hz, 2H), 5.16 (bs, 1H), 4.84-4.80 (m, 1H), 4.58 (t, J = 7.2 Hz, 2H), 4.07-3.60 (m, 9H). Mp: 157 °C

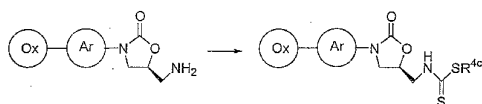
WO 02/051819

PCT/IN01/00227

94

84		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.57 (s, 4H), 6.98 (bs, 1H), 4.96-4.76 (m, 1H), 4.51 (t, J = 7.4 Hz, 2H), 4.47 (m, 3H), 3.91-3.84 (m, 1H), 3.65 (s, 1H), 3.51 (bs, 3H). Mp: 195 °C
85		¹ HNMR (CDCl ₃ , 200MHz): δ 3.0 (s, 3H), 3.8 (m, 6H), 4.8 (m, 1H), 4.9 (s, 2H), 5.1 (m, 1H), 6.6 (t, 1H). Mp: 226 °C

H. General procedure for the conversion of



- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4c} represents (C₁-C₆)alkyl group.
- 10 To an ice cold mixture of amine (1 eq), Et₃N (2 eq) and water (few drops) in EtOH CS₂ (1 eq) was added under argon. Stirred overnight at room temperature, Methyl iodide (MeI) (1.1 eq) in EtOH was added and the stirring was continued for 12 h. The volatiles were removed and the residue was taken up in ethyl acetate. The organic mixture was washed with saturated NaHCO₃, water, brine and dried. The residue
- 15 obtained was passed through column to afford the product.

Examples 86 & 87 have been prepared according to the general procedure H

WO 02/051819

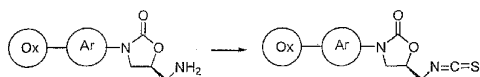
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95

Example No.	Structure	Analytical Data
86		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 9.98 (bt, 1H), 7.55 (s, 4H), 5.05-5.02 (m, 1H), 4.50 (t, J=7.8 Hz, 2H), 4.12-3.87 (m, 6H), 2.60 (s, 3H). Mp: 161 °C
87		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.26 (s, 1H), 6.15 (d, J = 10.2 Hz, 2H), 4.56-4.49 (m, 3H), 4.27-3.83 (m, 5H), 3.26-3.15 (m, 1H), 2.54 (s, 3H). Mp: 147 °C

I. General procedure for the conversion of

Step (i):



where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

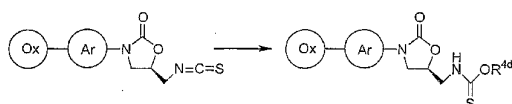
Thiophosgene (1.2 eq) was added drop wise to a solution of the amine (1 eq), Et₃N (2.4 eq) in dry dichloromethane at ice bath temperature under argon. The reaction mixture was warmed to room temperature over 3 h and then the volatiles were removed. The residue obtained was directly charged on to a column of silica gel to afford the product.

WO 02/051819

PCT/IN01/00227

96

Step (ii):



where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4d} represents (C₁-C₆)alkyl, cyclo(C₃-C₆)alkyl, --(C=O)-(C₁-C₆)alkyl group substituted with fluorine; aryl, halo(C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl or (C₂-C₆)alkenyl.

A solution of the isothiocyanate in the respective alcohol was heated to 80 to 100 °C while monitoring by TLC. At the complete consumption of starting material, the reaction mixture was allowed to cool to room temperature. The crystals formed were separated, washed with ether and dried at vacuum to yield the pure product.

Examples 88-129 have been prepared according to the general procedure I

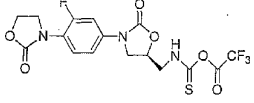
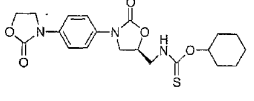
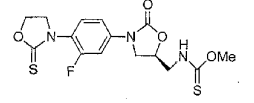
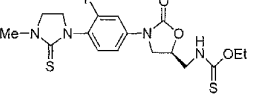
15

Example No.	Structure	Analytical Data
88		¹ HNMR (CDCl ₃ , 200MHz): δ 7.67-7.56 (m, 2H), 7.16 (d, J = 2.0 Hz, 1H), 6.72 (bs, 1H), 4.94 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.12-3.83 (m, 9H). Mp: 137 °C
89		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.50 (m, 2H), 7.15 (d, J = 7.4 Hz, 1H), 6.66 (hump, 1H), 4.94 (bs, 1H), 4.56-4.43 (m, 4H), 4.12-3.84 (m, 9H).

WO 02/051819

PCT/IN01/00227

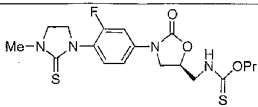
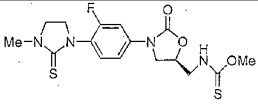
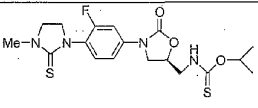
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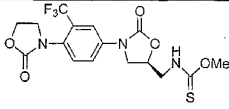
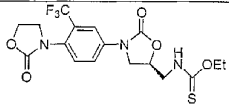
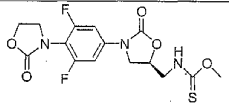
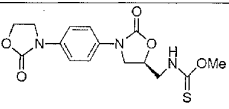
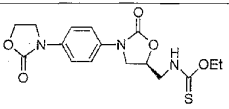
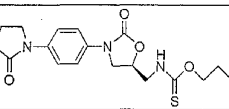
		4.56-4.43 (m, 4H), 4.12-3.84 (m, 6H), 1.32 (t, J = 6.8 Hz, 3H). Mp: 208 °C
90		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.45 (bs, 1H), 7.65-7.46 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.81 (bs, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09-3.99 (m, 3H), 3.84-3.55 (m, 3H), 3.13(q, J = 10.4 Hz, 2H). Mp: 184 °C
91		¹ HNMR (DMSO-d ₆ , 200MHz): δ 9.54 (m, 1H), 7.57 (s, 4H), 4.90-4.80 (m, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.21-4.01 (m, 4H), 3.88-3.77 (m, 3H), 3.56-3.53 (m, 1H), 1.23-0.97 (m, 6H). Mp: 153 °C
92		¹ HNMR (CDCl ₃ , 200MHz): δ 8.2 (m, 1H), 7.7 (d, J= 10.74 Hz, 1H), 7.5 (t, 1H), 7.3 (d, J = 8.79 Hz, 1H), 5.0 (m, 1H), 4.70 (t, 2H), 4.1 (m, 9H). Mp: 197 °C
93		¹ HNMR (CDCl ₃ , 200MHz): δ 7.02 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.49 (t, J = 8.8 Hz and 12.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 6.63 (bs, 1H), 4.93 (m, 1H),

WO 02/051819

PCT/IN01/00227

98

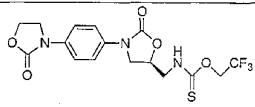
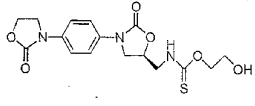
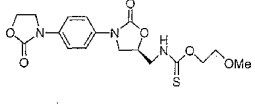
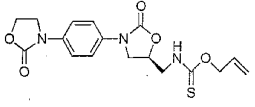
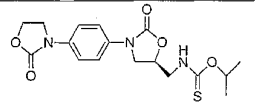
		4.54-4.44 (q, J = 7.4 Hz, 2H), 4.13-3.72 (m, 8H), 3.24 (s, 3H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 197 °C
94		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 6.65 (bs, 1H), 4.94 (m, 1H), 4.38 (t, J = 8.8 Hz, 2H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.78-1.63 (m, 2H), 0.99 (t, 3H). Mp: >200 °C
95		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 6.70 (bs, 1H), 4.94 (m, 1H), 4.13-3.72 (m, 11H), 3.24 (s, 3H). Mp: 179 °C
96		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 13.0 Hz, 1H), 6.55 (bs, 1H), 5.58-5.49 (heptet, 1H), 4.92 (m, 1H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.39-1.25 (m, 6H). Mp: 183 °C

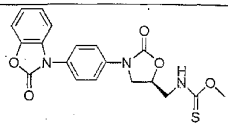
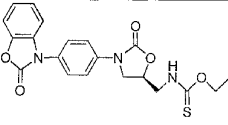
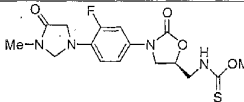
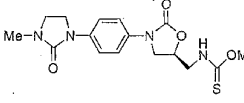
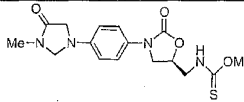
97		¹ HNMR (CDCl ₃ , 200MHz): δ 7.9 (m, 2H), 7.5 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (t, 2H), 4.0 (m, 9H). Mp: 146 °C
98		¹ HNMR (CDCl ₃ , 200MHz): δ 7.8 (m, 2H), 7.4 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (m, 3H). Mp: 157 °C
99		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29-7.24 (m, 2H), 6.73 (hump, 1H), 4.96 (hump, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.08-3.83 (m, 9H). Mp: 182 °C
100		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 6.81 (bs, 1H), 4.91 (hump, 1H), 4.49 (t, J = 7.8 Hz, 2H), 4.13-3.82 (m, 9H). Mp: 153 °C
101		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (s, 4H), 6.7 (s, 1H), 4.9 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (t, J = 6.8 Hz, 3H). Mp: 168 °C
102		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.7 (s, 1H), 4.9 (m, 1H), 4.4 (m, 4H), 4.0 (m, 6H), 1.7 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H).

WO 02/051819

PCT/IN01/00227

100

		0.95 (t, J = 7.4 Hz, 3H). Mp: 176 °C
103		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 7.26 (bs, 1H), 4.96-4.77 (m, 3H), 4.50 (t, J=7.2 Hz, 2H), 4.15-3.80 (m, 6H). Melting Point (°C): 181 °C
104		¹ HNMR (CDCl ₃ , 200MHz): δ 9.2-8.9 (m, 1H), 7.5 (s, 4H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.5 (m, 8H). Mp: 141 °C
105		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.81 (bt, 1H), 4.91 (m, 1H), 4.67-4.58 (m, 2H), 4.50 (t, J=7.2 Hz, 2H), 4.13-3.82 (m, 6H), 3.68-3.63 (m, 2H), 3.38 (s, 3H). Mp: 149 °C
106		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (s, 4H), 7.26 (s, 2H), 6.7 (s, 1H), 5.93 (m, 1H), 5.29 (m, 2H), 4.9 (m, 3H), 4.5 (t, J = 7.4 Hz, 2H), 4.0 (m, 6H). Mp: 150 °C
107		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.57 (s, 1H), 5.5 (m, 1H), 4.92 (m, 1H), 4.5 (t, J = 7.4 Hz, 2H), 4.0 (m, 6H), 1.31 (dd, J = 10.2 Hz

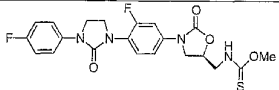
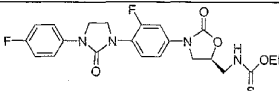
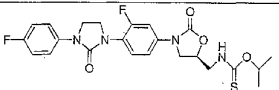
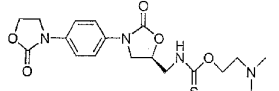
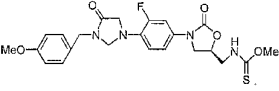
		and 13.8 Hz, 6H). Mp: 140 °C
108		¹ HNMR (CDCl ₃ , 200MHz): δ 7.72 (d, J = 9.2 Hz, 2H), 7.57 (d, J = 9.2 Hz, 2H), 7.31-7.01 (m, 4H), 6.77 (bs, 1H), 4.97-4.96 (m, 1H), 4.19-3.91 (m, 7H). Mp: 141 °C
109		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J = 8.8 Hz, 2H), 7.56 (d, J = 8.8 Hz, 2H), 7.31-7.01 (m, 4H), 6.70 (bs, 1H), 4.97 (m, 1H), 4.55-4.44 (q, J = 6.8 Hz, 2H), 4.19-3.92 (m, 4H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 147 °C
110		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 4.8 (t, 1H), 3.6 (m, 8H), 6.8 (t, 1H), 7.2 (d, 1H), 7.5 (dd, 1H). Mp: 218 °C
111		¹ HNMR (CDCl ₃ , 200MHz): δ 1.5 (s, 3H), 2.9 (s, 3H), 3.6 (t, 2H), 4.9 (m, 1H), 6.8 (m, 1H), 7.8 (d, 2H). Mp: 209 °C
112		¹ HNMR (DMSO-d ₆ , 200MHz): 9.5 (br, 1H), 7.4 (d, J=8.8 Hz, 2H), 6.6 (d, J=8.8 Hz, 2H), 4.90-4.80 (m, 1H), 4.7 (s, 2H), 4.2-3.4 (m, 9H), 2.9 (s, 3H).

		Mp: 205 °C
113		¹HNMR (CDCl ₃ , 200MHz): δ 7.5 (m, 2H), 7.1 (m, 1H), 6.9 (s, 1H), 4.9 (m, 1H), 3.8 (m, 9H), 3.4 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H). Mp: 146 °C
114		¹HNMR (CDCl ₃ , 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.5 (s, 2H), 4.2-3.6 (m, 9H), 3.4 (t, J=8.8 Hz, 2H). Mp: 170 °C
115		¹HNMR (CDCl ₃ , 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.6 (m, 6H), 3.7 (t, J=8.3 Hz, 2H), 1.3 (t, J=6.8 Hz, 3H). Mp: 160 °C
116		¹HNMR (CDCl ₃ , 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.4 (m, 3H), 7.0 (m, 1H), 4.9 (m, 1H), 4.2 (m, 1H), 3.8-4.0 (m, 7H), 3.3 (s, 3H). Mp: 174 °C
117		¹HNMR (CDCl ₃ , 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.3 (m, 3H), 7.1 (t, 1H), 4.8 (m, 1H), 4.4 (m, 2H), 4.2 (m, 1H), 3.7-4.1 (m, 5H), 3.5 (m, 2H), 1.2 (t, 3H). Mp: 195 °C

WO 02/051819

PCT/IN01/00227

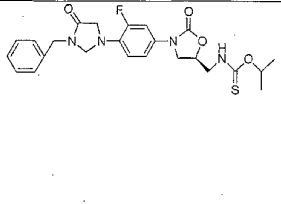
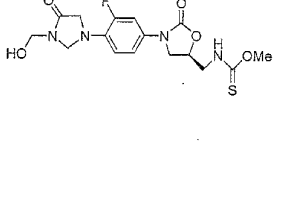
103

118		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 4H), 4.9 (m, 1H), 4.0 (1H). Mp: 208 °C
119		¹ H NMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.0-7.2 (m, 3H), 4.9 (m, 2H), 4.5 (m, 2H), 4.0 (m, 8H), 1.3 (t, 3H). Mp: 215 °C
120		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 3H), 5.5 (m, 1H), 4.9 (m, 1H), 4.0 (m, 8H), 1.3 (t, 6H). Mp: 220 °C
121		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 7.57 (s, 4H), 5.00-4.75 (m, 1H), 4.44-3.40 (m, 12H), 2.16 (s, 6H). Mp: 161 °C.
122		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.40 (dd, J = 17.6, 2.4 Hz, 1H), 7.24 (d, J = 9.7 Hz, 2H), 7.04 (d, J = 8.8 Hz, 1H), 6.89 (d, J = 8.8 Hz, 2H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.80 (m, 1H), 4.75 (s, 2H), 4.54 (s, 2H), 4.20-3.60 (m, 9H), 3.81 (s, 3H). Mp: 158 °C

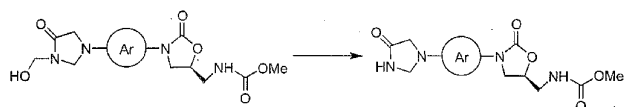
WO 02/051819

PCT/IN01/00227

104

123		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.50-9.35 (m, 1H), 7.60-6.60 (m, 8H), 5.50-5.30 (m, 1H), 4.95-4.70 (m, 1H), 4.74 (s, 2H), 4.55 (s, 2H), 4.20-3.25 (m, 6H), 1.40-1.10 (bd, 6H). Mp: 192 °C
124		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.55-9.35 (m, 1H), 7.45 (d, <i>J</i> = 18.1 Hz, 1H), 7.15 (d, <i>J</i> = 8.8 Hz, 1H), 6.90-6.80 (m, 1H), 6.09 (t, <i>J</i> = 6.8 Hz, 1H), 4.87 (s, 2H), 4.90-4.75 (m, 1H), 4.71 (d, <i>J</i> = 6.8 Hz, 2H), 4.20-3.10 (m, 9H). Mp: 184 °C

J. General procedure for the conversion of



where 'Ar' represents substituted or unsubstituted phenyl ring

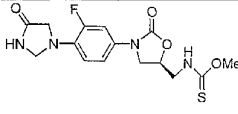
- 5 Sodium hydride (360 mg, 7.5 mmol) was added to a solution of starting material (300 mg, 0.75 mmol) in dry THF (30 mL) and the resultant suspension was stirred at room temperature overnight. The reaction mixture was diluted with ethyl acetate (150 mL) and washed with water, brine and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product as a colorless
- 10 solid (150 mg, 54% yield).

WO 02/051819

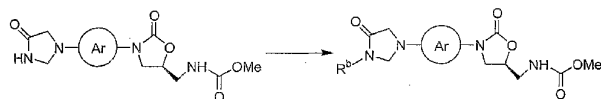
PCT/IN01/00227

105

Example 125 has been prepared according to the general procedure J

Example No.	Structure	Analytical Data
125		¹ H NMR (DMSO-d ⁶ , 200 MHz): δ 9.60-9.40 (m, 1H), 8.62 (s, 1H), 7.45 (d, J = 16.2 Hz, 1H), 7.16 (d, J = 8.6 Hz, 1H), 6.90-6.80 (m, 1H), 4.90-4.75 (m, 1H), 4.73 (s, 2H), 4.20-3.40 (m, 9H). Mp: 223 °C

K. General procedure for the conversion of



where 'Ar' represents substituted phenyl ring and R^b represents (C₁-C₆)alkyl or aralkyl.

To a solution of starting material (1 eq) in dry DMF was added NaH (1.2 eq) at 0 °C under argon followed by appropriate alkyl halide or aralkyl halide (1.2 eq). The reaction mixture was stirred for 2-6 h while monitoring by TLC. After the consumption of starting material, the reaction mixture was diluted with ethyl acetate and washed with water, brine and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product.

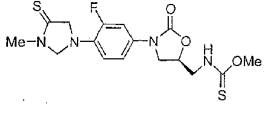
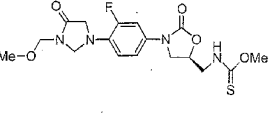
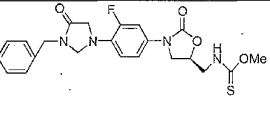
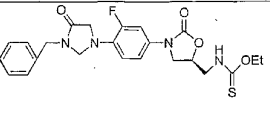
15

Example 126-129 have been prepared according to the general procedure K

WO 02/051819

PCT/IN01/00227

106

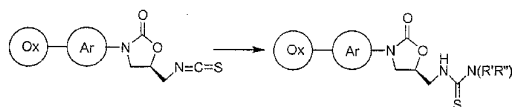
Example No.	Structure	Analytical Data
126		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 7.49 (dd, <i>J</i> = 15.6, 2.4 Hz, 1H), 7.18 (d, <i>J</i> = 9.1 Hz, 1H), 6.95-6.80 (m, 1H), 5.17 (s, 2H), 4.95-4.70 (m, 1H), 4.42 (s, 2H), 4.20-3.40 (m, 7H). Mp: 195 °C
127		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.46 (dd, <i>J</i> = 15.1, 2.4 Hz, 1H), 7.10 (d, <i>J</i> = 8.8 Hz, 1H), 6.77 (bt, 1H), 6.65-6.56 (m, 1H), 4.97 (s, 2H), 4.97-4.80 (m, 1H), 4.84 (s, 2H), 4.20-3.55 (m, 9H), 3.37 (s, 3H). Mp: 160 °C.
128		¹ H NMR (CDCl ₃ +DMSO-d ₆ , 200 MHz): δ 9.95-9.25 (m, 1H), 7.55-7.25 (m, 6H), 7.45 (d, <i>J</i> = 15.4 Hz, 1H), 6.63-6.54 (m, 1H), 5.00-4.80 (m, 1H), 4.77 (s, 2H), 4.60 (s, 2H), 4.20-3.75 (m, 9H). Mp: 176 °C
129		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.50-7.20 (m, 6H), 7.04 (d, <i>J</i> = 8.6 Hz, 1H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.35 (m, 7H), 4.20-3.60 (m, 6H), 1.31 (t, <i>J</i> = 7.0 Hz, 3H). Mp: 184 °C

WO 02/051819

PCT/IN01/00227

107

L. General procedure for the conversion of



- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring; R' represents hydrogen, (C₁-C₆)alkyl, (C₂-C₆)alkenyl, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy(C₁-C₆)alkyl and R'' represents hydrogen or alkyl or the two R' and R'' groups together form a 5 or 6 membered cyclic structure containing one or two hetero atoms.

Ammonia gas (or appropriate amine) was bubbled to a solution of isothiocyanate in THF at -10°C over 20 min. The resultant mixture was stirred at room temperature for 1 h and then diluted with ethyl acetate. The organic layer was washed with water (2 times), brine and dried. The residue obtained upon evaporation of the solvent was passed through a column of silica gel to afford the product.

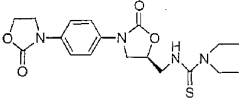
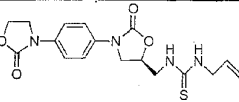
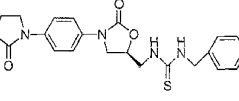
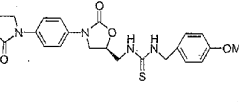
Examples 130-143 have been prepared according to the general procedure L

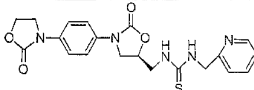
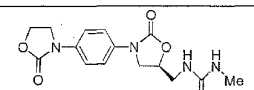
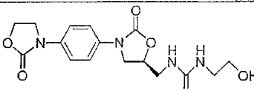
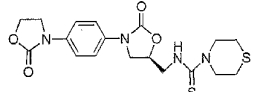
Example No.	Structure	Analytical Data
130		¹ HNMR (CDCl ₃ , 200MHz): δ 7.51 (s, 4H), 4.98-4.95 (m, 1H), 4.49 (t, J=7.8 Hz, 2H), 4.17-3.88 (m, 8H), 3.71-3.69 (m, 3H), 1.93-1.78 (m, 4H). Mp: 159 °C

WO 02/051819

PCT/IN01/00227

108

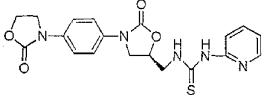
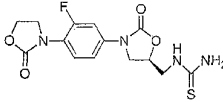
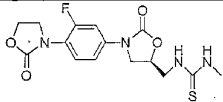
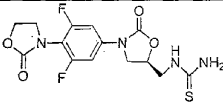
131		¹HNMR (DMSO-d₆, 200MHz): δ 7.63 (s, 1H), 7.57 (s, 4H), 4.94-4.91 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-3.75 (m, 6H), 3.66-3.56 (q, J=6.8 Hz, 4H), 1.07 (t, J=6.8 Hz, 6H). Mp: 103 °C
132		¹HNMR (DMSO-d₆, 200MHz): δ 7.79 (bs, 1H), 7.57 (s, 4H), 5.80-5.75 (m, 1H), 5.15-5.01 (m, 2H), 4.86 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-4.01 (m, 5H), 3.85 (m, 2H). Mp: 171 °C
133		¹HNMR (DMSO-d₆, 200MHz): δ 8.05 (bs, 1H), 7.86 (bs, 1H), 7.57 (s, 4H), 7.25 (s, 5H), 4.88-4.84 (m, 1H), 4.67 (s, 2H), 4.44 (t, J=7.8 Hz, 2H), 4.16-4.01 (m, 3H), 3.89-3.86 (m, 3H). Mp: 181 °C
134		¹HNMR (DMSO-d₆, 200MHz): δ 8.00 (bs, 1H), 7.80 (bs, 1H), 7.57 (s, 4H), 7.19-7.15 (d, J=8.4 Hz, 2H), 6.84-6.80 (d, J=8.2 Hz, 2H), 4.86 (bs, 1H), 4.57 (bs, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.08-4.01 (m, 3H), 3.88-3.85 (m, 3H), 3.70 (s, 3H). Mp: 169 °C

135		¹ HNMR (DMSO-d ₆ , 200MHz): δ 8.50-8.48 (d, J=3.8 Hz, 1H), 8.16 (m, 2H), 7.69 (t, J=7.8 Hz, 1H), 7.57 (s, 4H), 7.26-7.22 (d, J=7.8 Hz, 2H), 4.88 (m, 1H), 4.75 (bs, 2H), 4.44 (t, J=7.2 Hz, 2H), 4.18-4.01 (m, 3H), 3.89-3.82 (m, 3H). Mp: 165 °C
136		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.77 (bs, 1H), 7.57 (s, 5H), 4.86 (m, 1H), 4.44 (t, J=7.8 Hz, 2H), 4.17-4.01 (m, 3H), 3.81-3.33 (m, 3H), 2.83 (bs, 3H). Mp: 175 °C
137		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.86 (hump, 1H), 7.66 (hump, 1H), 7.57 (s, 4H), 4.78-4.68 (m, 2H), 4.43 (t, J=7.2 Hz, 2H), 4.12-4.01 (m, 3H), 3.83 (bs, 3H), 3.46-3.33 (m, 4H). Mp: 161 °C
138		¹ HNMR (DMSO-d ₆ , 200MHz): δ 8.05 (hump, 1H), 7.57 (s, 4H), 4.95 (m, 1H), 4.43 (t, J=7.2 Hz, 2H), 4.08-3.89 (m, 8H), 2.57 (s, 4H), 2.49 (s, 4H). Mp: 159 °C

WO 02/051819

PCT/IN01/00227

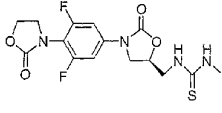
110

139		¹ HNMR (DMSO-d ₆ , 200MHz): δ 12.06 (bs, 1H), 10.76 (s, 1H), 8.14-8.11 (d, J=5.0 Hz, 1H), 7.77 (t, J=8.2 Hz, 1H), 7.52 (s, 4H), 7.17-7.13 (d, J=3.2 Hz, 1H), 7.04 (t, J=5.8 Hz, 1H), 5.05-5.03 (m, 1H), 4.43 (t, J=7.4 Hz, 2H), 4.22 (t, J=9.2 Hz, 1H), 4.07-3.84 (m, 5H). Mp: 189 °C
140		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.07 (bs, 1H), 7.62-7.40 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 6.65 (bs, 1H), 4.85 (bs, 1H), 4.48 (t, J = 8.0 Hz, 2H), 4.04-3.96 (m, 6H). Mp: 178 °C
141		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.68-7.19 (m, 5H), 4.92 (hump, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.08-3.98 (m, 6H), 3.10 (s, 3H). Mp: 144 °C
142		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.10 (bs, 1H), 7.35 (d, J = 8.4 Hz, 2H), 6.58 (bs, 1H), 4.91-4.89 (m, 1H), 4.58 (t, J = 7.8 Hz, 2H), 4.54-3.87 (m, 6H). Mp: 92 °C

WO 02/051819

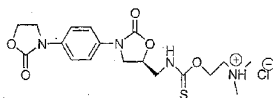
PCT/IN01/00227

111

143		¹ H NMR (CDCl ₃ , 200MHz): δ 7.26 (s, 2H), 6.39 (hump, 2H), 4.93 (hump, 1H), 4.60 (t, J = 7.4 Hz, 2H), 4.21-3.93 (m, 6H), 2.99 (d, J = 4.8 Hz, 3H). Mp: 113 °C

Example 144

N1-((5S)-3-(3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl)-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate hydrochloride



5

N1-((5S)-3-(3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl)-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate (obtained in example 121), was taken in methanol (100 mg) and was bubbled with HCl gas for 30 min. Then methanol was evaporated from the resultant mixture and washed with ether twice to obtain the title compound (Yield: 100%). Mp: 100 °C (hygroscopic).

10

¹H NMR (DMSO-d₆, 200 MHz): δ 10.60 (bs, 1H), 9.85-9.65 (m, 1H), 7.58 (s, 4H), 5.00-4.65 (m, 3H), 4.44 (t, J = 7.6 Hz, 2H), 4.25-3.40 (m, 8H), 2.81 (s, 3H), 2.79 (s, 3H).

In vitro Data:

15

Minimum Inhibitor Concentrations (MICs) were determined by broth microdilution technique as per the guidelines prescribed in the fifth edition of Approved Standards, NCCLS document M7-A5 Vol 20 - No 2, 2000 Villanova, PA.

Initial stock solution of the test compound was prepared in DMSO. Subsequent two fold dilutions were carried out in sterile Mueller Hinton Broth (Difco) (MHB).

20

WO 02/051819

PCT/IN01/00227

112

Frozen cultures stocks were inoculated into 50 ml sterile MHB in 250 ml Erlenmeyer flasks.

Composition of MHB is as follows:

Beef Extract Powder - 2.0 g/litre

5 Acid Digest of Casein - 17.5 g/ litre

Soluble Starch - 1.5 g/litre

Final pH 7.3 ± 0.1

Flasks were incubated for 4 to 5 h at 35 °C on a rotary shaker at 150 rpm.

Inoculum was prepared by diluting the culture in sterile MHB to obtain a turbidity of 0.5

10 McFarland standard. This corresponds to $1-2 \times 10^8$ CFU/ml. The stock was further diluted in sterile broth to obtain $1-2 \times 10^6$ CFU/ml. 50 µl of the above diluted inoculum was added from 1-10 wells. The plates were incubated overnight at 37 °C.

MIC is read as the lowest concentration of the compound that completely inhibits growth of the organism in the microdilution wells as detected by the unaided eye.

15

Organism	Culture No.	DRCC No.
<i>Staphylococcus aureus</i>	ATCC 33591	019
<i>Staphylococcus aureus</i>	ATCC 49951	213
<i>Staphylococcus aureus</i>	ATCC 29213	035
<i>Enterococcus faecalis</i>	ATCC 29212	034
<i>Enterococcus faecalis</i>	NCTC 12201	153
<i>Enterococcus faecium</i>	NCTC 12202	154
<i>Escherichia coli</i>	ATCC 25922	018

ATCC: American Type Culture Collection, USA

NCTC: National Collections of Type Cultures, Colindale, UK

DRCC: Dr. Reddy's Culture Collection, Hyderabad, India.

20

The *in vitro* antibacterial activity data is shown in TABLE 1.

WO 02/051819

PCT/IN01/00227

113

TABLE 1:*In vitro* Activity of Compounds against Gram positive and Gram negative bacteria

Example No.	Antimicrobial Screening (MIC) µg/ml						
	<i>Staphylococcus aureus</i>			<i>Enterococcus sp</i>			<i>E coli</i>
	019 MRSA	213 Smith S	035 S	034 S	153 R	154 R	18 S
40	8.0	4.0	8.0	16.0	8.0	8.0	32.0
62	2.0	1.0	4.0	-	8.0	8.0	32.0
76	2.0	2.0	4.0	4.0	4.0	4.0	>32.0
79	2.0	2.0	4.0	4.0	8.0	8.0	32.0
88	1.0	1.0	2.0	2.0	2.0	2.0	>32.0
89	4.0	4.0	4.0	8.0	8.0	8.0	>32.0
99	2.0	2.0	2.0	2.0	2.0	2.0	>32.0
100	0.5	0.5	0.5	1.0	1.0	1.0	32.0
107	2.0	4.0	4.0	8.0	4.0	4.0	32.0
110	0.5	0.5	0.5	1.0	1.0	1.0	32.0
113	2.0	4.0	4.0	4.0	4.0	8.0	32.0
124	0.25	0.25	0.5	0.5	0.25	0.5	-
125	0.25	0.25	0.5	0.5	0.25	0.5	-
127	0.5	1.0	1.0	1.0	1.0	1.0	-

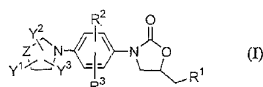
WO 02/051819

PCT/IN01/00227

114

Claims

1. A compound of the formula (I)



- wherein R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $N(R^4)_2$,
 5 where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from
 acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, (C_3-C_6) cycloalkoxythiocarbonyl, $(C_2-$
 $C_6)$ alkenylloxycarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxycarbonyl, $(C_1-$
 $C_6)$ alkoxythiocarbonyl, (C_2-C_6) alkenylthiocarbonyl, aryloxythiocarbonyl, $-C(=O)-$
 $C(=O)-$ alkyl, $-C(=O)-C(=O)-$ aryl, $-C(=O)-C(=O)-$ alkoxy, $-C(=O)-C(=O)-$ aryloxy, $-$
 10 $(C=S)-S-$ alkyl, $-(C=S)-NH_2$, $-(C=S)-NH-$ alkyl, $-(C=S)-N-(alkyl)_2$, $-(C=S)-NH-$ alkenyl,
 $(C=S)-(C=O)-$ alkoxy, $-(C=S)-(C=O)-$ aryloxy, $-(C=S)-O-(C=O)-$ alkyl, $C(=S)-C(=S)-$
 alkyl, $-C(=S)-C(=S)-$ aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2
 and R^3 are same or different and independently represent hydrogen, halogen atom, $(C_1-$
 $C_6)$ alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents
 15 substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O,
 $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl,
 (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, $(C_1-$
 $C_6)$ alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxycarbonyl; Y^1
 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen,
 20 cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted
 groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl,
 (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, $(C_1-$
 $C_6)$ alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, $(C_1-$
 $C_6)$ alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di $(C_1-$
 25 $C_6)$ alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl,
 heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent
 carbon atoms together also form a substituted or unsubstituted 5 or 6 membered

WO 02/051819

PCT/IN01/00227

115

aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates.

- 5 2. The compound according to claim 1, wherein the substituents on R⁴ are selected from halogen, hydroxy, amino, monoalkylamino, dialkylamino, cyano, nitro, alkoxy, aryl, hydroxyaryl, pyridyl, hydroxyalkyl, alkoxyaryl or carboxyl and its derivatives.
3. The compound according to claim 1, wherein the substituents on R⁵ are selected from hydroxy, halogen, pyrrolidinylthiocarbonyl, nitro, amino, alkoxy, carboxy or
- 10 cyano,
4. The compound according to claim 1, wherein the substituents on Y² and Y³ are selected from hydroxy, nitro, cyano, amino, *tert*-butyldimethylsilyloxy(TBSO), halogen, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₃-C₆)cycloalkyl, aryl, benzyloxy, acyl, carboxyl or acyloxy groups.
- 15 5. The compound according to claim 1, wherein the cyclic structure formed by Y² and Y³ is selected from substituted or unsubstituted benzene, pyridine, pyrrolidine, furan, thiophene, morpholine, piperazine or pyrrole.
6. A compound of the formula (I) as defined according to claim 1 which is selected from:
- 20 (5R)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-
- 25 2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 3-[2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl]-2,3-dihydrobenzo [d][1,3]oxazol-2-one or its salts;

WO 02/051819

PCT/IN01/00227

116

- 3-(2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl)-6-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 3-(2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl)-5-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 5 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3,5-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 10 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 3-{4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 15 (5R)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 20 (5R)-5-hydroxymethyl-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-hydroxymethyl-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5R)-3-[3-fluoro-4-(2-oxo-3-phenyl-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-{3-fluoro-4-[3-(fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

117

- (5R)-azidomethyl-3-(3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl)-1,3-oxazolan-2-one or its salts;
- (5R)-azidomethyl-3-(3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl)-1,3-oxazolan-2-one or its salts;
- 5 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-6-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;
- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-5-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;
- (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- 10 (5R)-5-azidomethyl-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-azidomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 15 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5R)-5-azidomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- 20 (5R)-5-azidomethyl-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-azidomethyl-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-1,3-oxazolan-2-one or its salts;
- 25 (5R)-aminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-aminomethyl-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

118

- (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 5 (5R)-5-aminomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-aminomethyl-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- N-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] methanamide or its salts;
- 10 N-[(5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] methanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] acetamide or its salts;
- 15 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] propanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] butanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] pentanamide or its salts;
- 20 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] heptanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] acrylamide or its salts;
- 25 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl]-2,2,2-trifluoroacetamide or its salts;
- Ethyl[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] carbamoylmethanoate or its salts;

- N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 5 N1-((5S)-2-oxo-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 10 N1-((5S)-3-[3-fluoro-4-(6-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(5-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 15 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) propanamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) heptanamide or its salts;
- 20 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) acrylamide or its salts;
- N1-((5S)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 25 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) propanamide or its salts;

WO 02/051819

PCT/IN01/00227

120

- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 10 N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- 15 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
- (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
- 20 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(3,3,3-trifluoro-1-thioxopropylaminomethyl)-1,3-oxazolan-2-one or its salts;
- (5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
- 25 3-{2-fluoro-4-[(5S)-2-oxo-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

121

- (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxopropylamino methyl)-1,3-oxazolan-2-one or its salts;
 5 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 10 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 15 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methyl carbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 20 (5S)-5-methylthioxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 25 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;

WO 02/051819

PCT/IN01/00227

122

- N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} trifluoroacetoxythiocarbamate or its salts;
 (5S)-5-cyclohexyloxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl}-1-propylthiocarbamate or its salts;
- 10 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl}-2-propylthiocarbamate or its salts;
- 15 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;
- 25 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl}-1-propylthiocarbamate or its salts;
 (5S)-5-[2,2,2-trifluoroethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

123

- (5S)-5-[2-hydroxyethyloxy (thio) methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-[2-methoxyethyloxy (thio) methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} allylthio carbamate or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthio carbamate or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;
- 25 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} ethylthiocarbamate or its salts;

WO 02/051819

PCT/IN01/00227

124

- N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- 5 N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-methoxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-{4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate or its salts;
- 15 N1-((5S)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)isopropylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-hydroxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 20 N1-((5S)-3-{3-fluoro-4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-(3-methyl-4-thioxo-1-imidazolidinyl)phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 25 (5S)-5-[(2S)-2-hydroxymethylazolan-1-yl(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-diethylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

WO 02/051819

PCT/IN01/00227

125

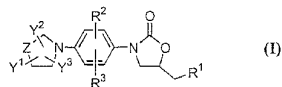
- (5S)-5-allylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-benzylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 5 (5S)-5-[4-methoxybenzylamino(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylmethylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-methylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 10 (5S)-5-[2-hydroxyethylamino (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[1,4-thiazinan-4-yl (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
- 15 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-amino(thioxo)methylaminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylamino methyl-1,3-oxazolan-2-one or its salts;
- 20 (5S)-5-amino(thioxo)methylaminomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylaminomethyl-1,3-oxazolan-2-one or its salts and
- 25 N1-((5S)-3-{4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate.hydrochloride.
7. A compound according to claims 1 or 6, wherein the pharmaceutically acceptable

WO 02/051819

PCT/IN01/00227

126

salt is selected from Li, Na, K, Ca, Mg, Fe, Cu, Zn, Mn; salts of organic bases, chiral bases, natural amino acids, unnatural amino acids, substituted amino acids, guanidine, substituted guanidine salts; ammonium, substituted ammonium salts, aluminum salts and acid addition salts. 8. A process for the preparation of the compound of formula (I)

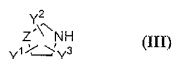


- 5 where R^1 represents NHR^4 , wherein R^4 represents hydrogen atom; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, =CH or NR^b
- 10 where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxycarbonyl; Y^1 represents =O or =S group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted
- 15 groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl,
- 20 heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable
- 25 solvates; which comprises:
- (i) reacting a compound of formula (III)

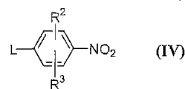
WO 02/051819

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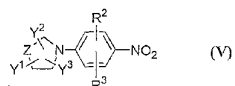
127



where Y¹, Y², Y³ and Z are as defined above, with a compound of formula (IV)

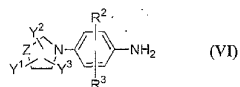


- where L represents a leaving group; R² and R³ are as defined above, to produce a compound of formula (V)



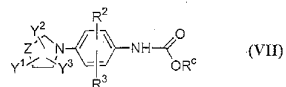
where Y¹, Y², Y³, R², R³ and Z are as defined above,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



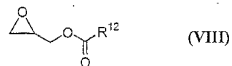
- 10 where Y¹, Y², Y³, R², R³ and Z are as defined above,

- (iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c represents (C₁-C₈)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above,

- 15 (iv) reacting the compound of formula (VII) with a compound of formula (VIII)

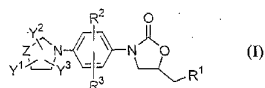


WO 02/051819

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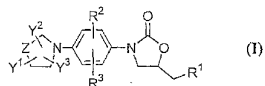
128

where R^{12} represents (C_1-C_3) alkyl group in the presence of a base to produce a compound of formula (I)



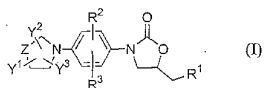
where R^1 represents hydroxy; Y^1, Y^2, Y^3, R^2, R^3 and Z are as defined above,

- 5 (v) reacting the compound of formula (I) with alkylsulfonyl chloride or aryl sulfonyl chloride to produce a compound of formula (I), where R^1 represents alkyl sulfonyl or aryl sulfonyl, and reacted with NaN_3 to produce compound of formula (I)



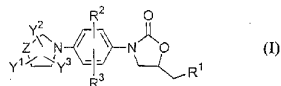
where R^1 represents azido group; Y^1, Y^2, Y^3, R^2, R^3 and Z are as defined above and

- 10 (vi) reducing the compound of formula (I) where R^1 represents azido group, to produce a compound of formula (I)



where R^1 represents NHR^4 wherein R^4 represents hydrogen atom; Y^1, Y^2, Y^3, R^2, R^3 and Z are as defined above.

- 15 9. A process for the preparation of compound of formula (I)



where R^1 represents hydroxy; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or

- 20 halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or

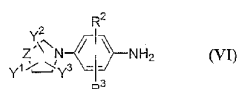
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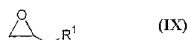
129

substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

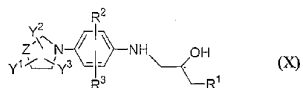
(i) reacting the compound of formula (VI)



where Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (IX)



where R¹ represents hydroxy, to produce a compound of formula (X)



where R¹ represents hydroxy; Y¹, Y², Y³, R², R³ and Z are as defined above, and

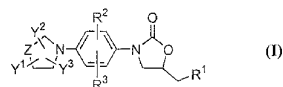
WO 02/051819

PCT/IN01/00227

130

(ii) carbonylating the compound of formula (X) with a carbonylating agent to produce the compound of formula (I) where R^1 represents hydroxy; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

10. A process for the preparation of compound of the formula (I)

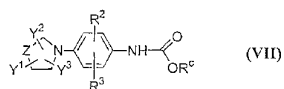


- where R^1 represents azido; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxy carbonyl; Y^1 represents =O or =S group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:
- (i) reacting a compound of formula (VII)

WO 02/051819

PCT/IN01/00227

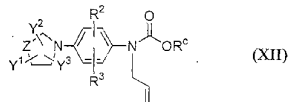
131



where R^2 represents (C_1-C_8) alkyl group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, with a compound of formula (XI)

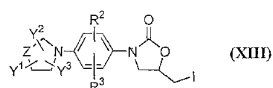


- 5 where L represents a leaving group; to produce a compound of formula (XII)



where R^C , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above,

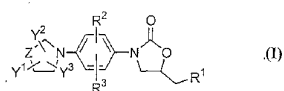
- (ii) converting the compound of formula (XII) defined above to a compound of formula (XIII)



10

where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, and

- (iii) converting the compound of formula (XIII) defined above to a compound of formula (I) by reacting with organic or inorganic azide



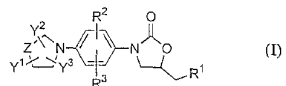
- 15 where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

WO 02/051819

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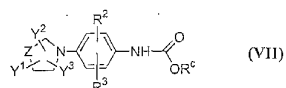
132

11. A process for the preparation of compound of formula (I)



where R¹ represents azido group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

(i) reacting a compound of formula (VII)



WO 02/051819

PCT/IN01/00227

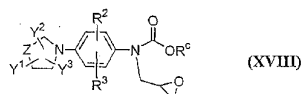
133

where R^2 represents (C₁-C₆)alkyl group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, with a compound of formula (XVII)



(XVII)

where L represents leaving group; to produce a compound of formula (XVIII)

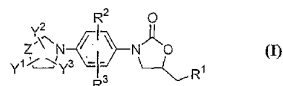


(XVIII)

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where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, and

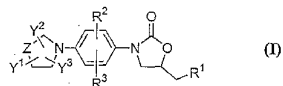
(ii) converting the compound of formula (XVIII) defined above to a compound of formula (I), by reacting with an organic or an inorganic azide,



(I)

10 where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

12. A process for the preparation of compound of formula (I)



(I)

where R^1 represents hydroxy group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro,

15 SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y^1 represents =O or =S group and Y^2 and Y^3

20 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl,

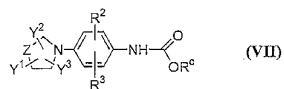
WO 02/051819

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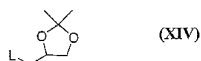
134

hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryl, aryl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

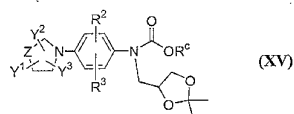
(i) reacting a compound of formula (VII)



where R^c represents (C₁-C₆)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (XIV)



where L represents a leaving group; to produce a compound of formula (XV)



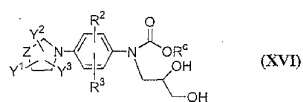
where R^c represents (C₁-C₆)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above,

(ii) hydrolysing the acetonide moiety in the compound of formula (XV) to produce a compound of formula (XVI)

WO 02/051819

PCT/IN01/00227

135

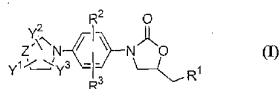


(XVI)

where R^1 , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, and

(iii) cyclising the compound of formula (XVI) with or without a base to a compound of formula (I), where R^1 represents hydroxy group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

13. A process for the preparation of compound of the formula (I)



(I)

where R^1 represents NHR^4 , wherein R^4 represents acetyl group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group,

10 halo (C_1-C_6) alkyl, cyano, nitro, SR^5 , NR^5 , OR^5 where R^5 represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b

where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxy carbonyl; Y^1

15 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero

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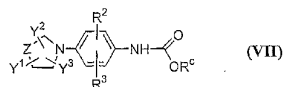
WO 02/051819

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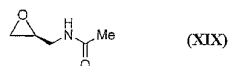
136

atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

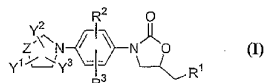
(i) reacting a compound of formula (VII)



5 where R² represents (C₁-C₈)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (XIX)

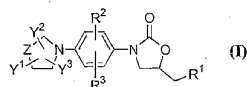


to produce a compound of formula (I)



10 where R¹ represents NHR⁴, wherein R⁴ represents acetyl group; Y¹, Y², Y³, R², R³ and Z are as defined above.

14. A process for the preparation of compound of formula (I)



15 where R¹ represents NHR⁴, wherein R⁴ represents formyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-

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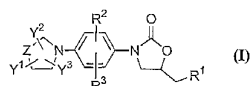
WO 02/051819

PCT/IN01/00227

137

C₆alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; which comprises: formylating the compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen and Y¹, Y², Y³, R², R³ and Z are as defined above, by using alkylformate.

15 15. A process for the preparation of compound of formula (I)



where R¹ represents NHR⁴, wherein R⁴ represents -C(=O)-R^{4a}, wherein R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxycarbonyl; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted

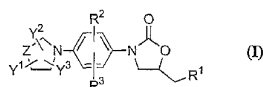
WO 02/051819

PCT/IN01/00227

138

groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; which comprise: acetylating the compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen; Y¹, Y², Y³, R², R³ and Z are as defined above, by using a halide.

16. A process for the preparation of compound of formula (I)



where R¹ represents NHR⁴, wherein R⁴ represents acetyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl,

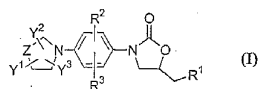
WO 02/051819

PCT/IN01/00227

139

heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting compound of formula (I) where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, with thioacetic acid.

17. A process for the preparation of compound of formula (I)



- 10 where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, $(C_1-C_6)alkyl$ group, $halo(C_1-C_6)alkyl$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-C_6)alkyl$ group, or $halo(C_1-C_6)alkyl$; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, $(C_1-C_6)cycloalkyl$, $(C_1-C_6)alkoxy$, aryl, aralkyl, aryloxy, $(C_1-C_6)alkylcarbonyl$, arylcarbonyl, $(C_1-C_6)alkoxycarbonyl$ or aryloxy carbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from $(C_1-C_6)alkyl$, hydroxy $(C_1-C_6)alkyl$, $(C_1-C_6)alkoxy(C_1-C_6)alkyl$, $(C_1-C_6)alkoxycarbonyl$, carboxy $(C_1-C_6)alkyl$, $(C_1-C_6)alkylsulfonyl$, $(C_1-C_6)alkylcarbonylamino(C_1-C_6)alkyl$, arylcarbonylamino $(C_1-C_6)alkyl$, $(C_1-C_6)alkylcarbonyloxy(C_1-C_6)alkyl$, amino $(C_1-C_6)alkyl$, mono $(C_1-C_6)alkylamino$, di $(C_1-C_6)alkylamino$, arylamino, $(C_1-C_6)alkoxy$, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two

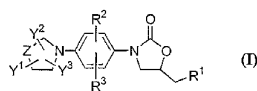
WO 02/051819

PCT/IN01/00227

140

hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where R¹ represents NHR⁴, wherein R⁴ represents -C(=O)-R^{4b}, wherein R^{4b} represents (C₁-C₆)alkyl, halo(C₁-C₆)alkyl, -C(=O)-(C₁-C₆)alkoxy, -C(=O)-aryloxy, -C(=S)-(C₁-C₆)alkyl or -C(=S)-aryl; Y¹, Y², Y³, R², R³ and Z are as defined above, with 2,4-bis(methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide (Lawesson's reagent).

18. A process for the preparation of compound of formula (I)



10 where R¹ represents NHR⁴, wherein R⁴ represents -C(=S)-SR^{4c} wherein (C₁-C₆)alkyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its

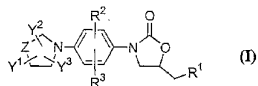
WO 02/051819

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141

polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents hydrogen; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, by reacting with carbondisulfide, with an appropriate alkylhalide and a base selected from Et_3N , diisopropylethylamine, K_2CO_3 , NaH or $KOt-Bu$.

19. A process for the preparation of compound of formula (I)



where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents (C₁-C₆)alkyl, cyclo(C₃-C₆)alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine, aryl, , halo(C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl or (C₂-C₆)alkenyl; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its

WO 02/051819

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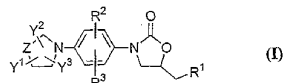
142

polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

- (i) converting compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents hydrogen atom; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, to a compound of formula (I) where R^1 represents isothiocyanate group and all other symbols are as defined above, by reacting with thiophosgene and

- (ii) converting compound of formula (I) where R^1 represents isothiocyanate group, to a compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine, aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl and all symbols are as defined above, by reacting with alcohol.

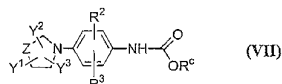
20. A process for the preparation of compound of formula (I)



- 15 where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, R' represents hydrogen, (C_1-C_6) alkyl, (C_2-C_6) alkenyl, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy (C_1-C_6) alkyl, R'' represents hydrogen or (C_1-C_6) alkyl or R' and R'' together form a 5 or 6 membered cyclic structures containing one or two hetero atoms; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxy carbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, $(C_1-$

C₆alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: converting compound of formula (I) where R¹ represents isothiocyanate group and all other symbols are as defined above by passing ammonia gas or by reacting with amine.

21. A novel intermediate of formula (VII)



15 where R^c represents (C₁-C₆)alkyl group ; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl,

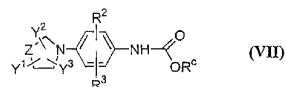
WO 02/051819

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144

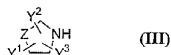
aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

- 5 22. A process for the preparation of compound of formula (VII), claimed in claim 21

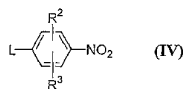


Y^1 , Y^2 , Y^3 , R^c , R^2 , R^3 and Z are as defined in claim 21, which comprises:

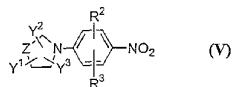
- (i) reacting a compound of formula (III)



- 10 where Y^1 , Y^2 , Y^3 and Z are as defined in claim 21, with a compound of formula (IV)

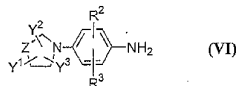


where L represents a leaving group; R^2 and R^3 are as defined in claim 21, to produce a compound of formula (V)



- 15 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined defined in claim 21,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



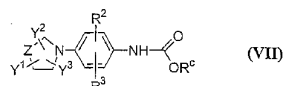
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined defined in claim 21,

WO 02/051819

PCT/IN01/00227

145

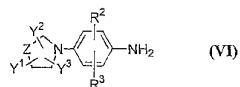
(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c represents (C₁-C₆)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined in claim

5 21.

23. A novel intermediate of formula (VI)



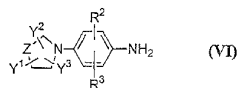
where R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where
 10 R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group; Y² and Y³ independently represent
 15 hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl,
 20 heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, containing one or two hetero atoms.

WO 02/051819

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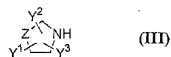
146

24. A process for the preparation of compound of formula (VI), claimed in claim 23



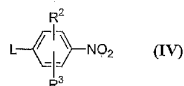
Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23, which comprises:

(i) reacting a compound of formula (III)

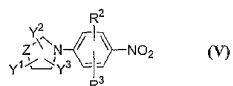


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where Y^1 , Y^2 , Y^3 and Z are as defined in claim 23, with a compound of formula (IV)



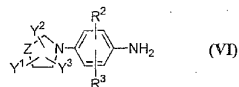
where L represents a leaving group; R^2 and R^3 are as defined in claim. 23, to produce a compound of formula (V)



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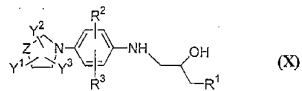
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23, and

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23.

15 25. A novel intermediate of formula (X)



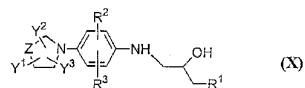
where R¹ represents halo, azido, isothiocyanate, thioalcohol, OR⁴, NHR⁴ or N(R⁴)₂, where R⁴ represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C₁-C₆)alkoxycarbonyl, (C₃-C₆)cycloalkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, (C₂-C₆)alkenylcarbonyl, aryloxythiocarbonyl, (C₁-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, aryloxythiocarbonyl, -C(=O)-C(=O)-alkyl, -C(=O)-C(=O)-aryl, -C(=O)-C(=O)-alkoxy, -C(=O)-C(=O)-aryloxy, -C(=S)-S-alkyl, -C(=S)-NH₂, -C(=S)-NH-alkyl, -C(=S)-N-(alkyl)₂, -C(=S)-NH-alkenyl, (C=S)-(C=O)-alkoxy, -C(=S)-(C=O)-aryloxy, -C(=S)-O-(C=O)-alkyl, C(=S)-C(=S)-alkyl, -C(=S)-C(=S)-aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxythiocarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

WO 02/051819

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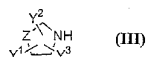
148

26. A process for the preparation of compound of formula (X), claimed in claim 25



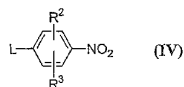
where R¹, Y¹, Y², Y³, R², R³ and Z are as defined in claim 25, which comprises:

(i) reacting a compound of formula (III)

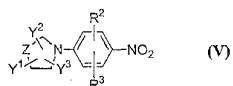


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where Y¹, Y², Y³ and Z are as defined in claim 25, with a compound of formula (IV)



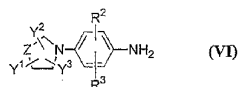
where L represents a leaving group; R² and R³ are as defined in claim 25, to produce a compound of formula (V)



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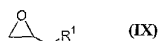
where Y¹, Y², Y³, R², R³ and Z are as defined in claim 25,

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



where Y¹, Y², Y³, R², R³ and Z are as defined in claim 25, and

15 (iii) reacting the compound of formula (VI) with a compound of formula (IX)



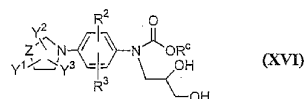
where R¹ is as defined in claim 25.

WO 02/051819

PCT/IN01/00227

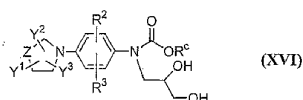
149

27. A novel intermediate of formula (XVI)



where R^c represents (C₁-C₈)alkyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

28. A process for the preparation of compound of formula (XVI), claimed in claim 27



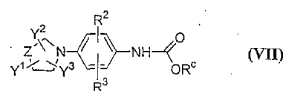
where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 27, which comprises:

(i) reacting a compound of formula (VII)

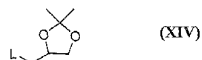
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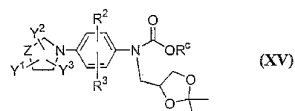
150



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27, with a compound of formula (XIV)

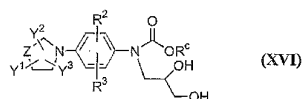


- 5 where L represents a leaving group; to produce a compound of formula (XV)



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27, and

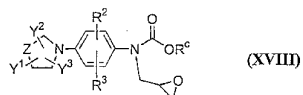
- (ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)



10

where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27.

29. A novel intermediate of formula (XVIII)



where R^c represents (C_1-C_6) alkyl group; R^2 and R^3 are same or different and

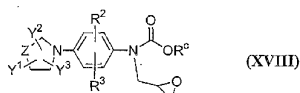
- 15 independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-$

WO 02/051819

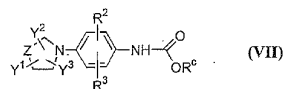
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151

- C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.
30. A process for the preparation of compound of formula (XVIII), claimed in claim 29



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 29, which comprises: reacting a compound of formula (VII)



- where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 29, with a compound of formula (XVII)

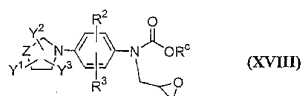


WO 02/051819

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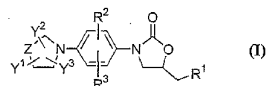
152

where L represents a leaving group; to produce a compound of formula (XVIII), where R^5 , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 29.



where R^5 , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 29.

- 5 31. A pharmaceutical composition comprising a compound of formula (I)



as claimed in claim 1 and a pharmaceutically acceptable carrier, diluent, excipient or solvate.

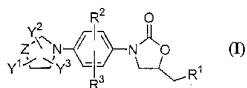
32. A pharmaceutical composition as claimed in claim 31, in the form of a tablet,
 10 capsule, powder, syrup, solution or suspension.
 33. A method of treating a bacterial infection comprising administering a compound
 of formula (I) as claimed in claim 1 to a patient in need thereof.
 34. A method of treating a bacterial infection comprising administering a
 pharmaceutical composition as claimed in claims 31 and 32 to a patient in need thereof.
 15 35. A pharmaceutical composition comprising a compound as claimed in claim 6 and
 a pharmaceutically acceptable carrier, diluent, excipient or solvate.
 36. A pharmaceutical composition as claimed in claim 35, in the form of a tablet,
 capsule, powder, syrup, solution or suspension.
 37. A method of treating a bacterial infection comprising administering a compound
 20 as claimed in claim 6 to a patient in need thereof.
 38. A method of treating a bacterial infection comprising administering a
 pharmaceutical composition as claimed in claims 35 and 36 to a patient in need thereof.

WO 02/051819

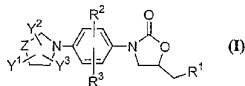
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153

39. A process for the preparation of compound of formula (I),



- where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents 'O' group, Y^2 and Y^3 independently represent hydrogen atom, R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $\text{N(R}^4)_2$ where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C₁-C₆)alkoxycarbonyl, (C₃-C₆)cycloalkoxythiocarbonyl, (C₂-C₆)alkenyloxy carbonyl, (C₂-C₆)alkenylcarbonyl, aryloxy carbonyl, (C₁-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, aryloxythiocarbonyl, -C(=O)-C(=O)-alkyl, -C(=O)-C(=O)-aryl, -C(=O)-C(=O)-alkoxy, -C(=O)-C(=O)-aryloxy, -C(=S)-S-alkyl, -C(=S)-NH₂, -C(=S)-NH-alkyl, -C(=S)-N-(alkyl)₂, -C(=S)-NH-alkenyl, (C=S)-(C=O)-alkoxy, -C(=S)-(C=O)-aryloxy, -C(=S)-O-(C=O)-alkyl, C(=S)-C(=S)-alkyl, -C(=S)-C(=S)-aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where Z represents NR^b wherein R^b represents (C₁-C₆)alkyl group substituted with hydroxy group at α -position, Y^1 represents 'O' group', Y^2 and Y^3 independently represent hydrogen atom and all other symbols are as defined above, with a base.

$$\text{Y}^1 \text{---} \text{N} \text{---} \text{Y}^2 \text{---} \text{C}_6\text{H}_2 \text{---} \text{N} \text{---} \text{C}(=\text{O}) \text{---} \text{O} \text{---} \text{C} \text{---} \text{R}^1 \quad (\text{I})$$


where Z represents NR^b wherein R^b represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$ or aralkyl, Y^1 represents 'O group', Y^2 and Y^3 independently represent hydrogen atom; R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $\text{N(R}^4)_2$ where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, $(\text{C}_1\text{-C}_6)\text{alkoxy carbonyl}$, $(\text{C}_2\text{-C}_6)\text{cycloalkoxythiocarbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenylalkoxy carbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenyl carbonyl}$, aryloxy carbonyl, $(\text{C}_1\text{-C}_6)\text{alkoxythiocarbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenylthio carbonyl}$, aryloxythiocarbonyl, $-\text{C(=O)-C(=O)-alkyl}$, $-\text{C(=O)-C(=O)-aryl}$, $-\text{C(=O)-C(=O)-alkoxy}$, $-\text{C(=O)-C(=O)-aryloxy}$, $-(\text{C}=\text{S})\text{-S-alkyl}$, $-(\text{C}=\text{S})\text{-NH}_2$, $-(\text{C}=\text{S})\text{-NH-alkyl}$, $-(\text{C}=\text{S})\text{-N-(alkyl)}_2$, $-(\text{C}=\text{S})\text{-NH-alkenyl}$, $(\text{C}=\text{S})\text{-(C=O)-alkoxy}$, $-(\text{C}=\text{S})\text{-(C=O)-aryloxy}$, $-(\text{C}=\text{S})\text{-O-(C=O)-alkyl}$, C(=S)-C(=S)-alkyl , $-\text{C(=S)-C(=S)-aryl}$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom, $(\text{C}_1\text{-C}_6)\text{alkyl}$ group, halo $(\text{C}_1\text{-C}_6)\text{alkyl}$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$ group, or halo $(\text{C}_1\text{-C}_6)\text{alkyl}$; Z represents S, O, $=\text{CH}$ or NR^b where R^b represents hydrogen or substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$, $(\text{C}_2\text{-C}_6)\text{alkenyl}$, $(\text{C}_1\text{-C}_6)\text{cycloalkyl}$, $(\text{C}_1\text{-C}_6)\text{alkoxy}$, aryl, aralkyl, aryloxy, $(\text{C}_1\text{-C}_6)\text{alkyl carbonyl}$, aryl carbonyl, $(\text{C}_1\text{-C}_6)\text{alkoxy carbonyl}$ or aryloxy carbonyl its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents 'O' group, Y^2 and Y^3 independently represent hydrogen atom and all other symbols are as defined above, with a base and alkyl halide.

41. The compound according to claim 1, wherein the substituents on R^a are selected from hydroxy, halogen, nitro, amino, alkoxy, carboxy or cyano.

WO 02/051819

PCT/IN01/00227

155

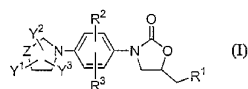
42. Pharmaceutically acceptable salt according to claim 7 wherein the salts of organic bases are selected from N,N'-diacetylenediamine, betaine, caffeine, 2-diethylaminoethanol, 2-dimethylaminoethanol, N-ethylmorpholine, N-ethylpiperidine, glucamine, glucosamine, hydrabamine, isopropylamine, methylglucamine, morpholine, 5 piperazine, piperidine, procaine, purines, theobromine, triethylamine, trimethylamine, tripropylamine, tromethamine, diethanolamine, meglumine, ethylenediamine, N,N'-diphenylethylenediamine, N,N'-dibenzylethylenediamine, N-benzyl phenylethylamine, choline, choline hydroxide, dicyclohexylamine, metformin, benzylamine, phenylethylamine, dialkylamine, trialkylamine, thiamine, aminopyrimidine, 10 aminopyridine, purine, spermidine.
43. Pharmaceutically acceptable salt according to claim 7 wherein the salts of chiral bases are selected from alkylphenylamine, glycinol, phenyl glycinol.
44. Pharmaceutically acceptable salt according to claim 7 wherein the salts of natural amino acids are selected from glycine, alanine, valine, leucine, isoleucine, norleucine, 15 tyrosine, cystine, cysteine, methionine, proline, hydroxy proline, histidine, ornithine, lysine, arginine, serine, threonine, phenylalanine.
45. Pharmaceutically acceptable salt according to claim 7 wherein the salts of unnatural amino acid, substituted amino acids are selected from D-isomers, guanidine, substituted guanidine wherein the substituents are selected from nitro, amino, alkyl such 20 as methyl, ethyl, propyl and the like; alkenyl such as ethenyl, propenyl, butenyl and the like; alkynyl such as ethynyl, propynyl.
46. Pharmaceutically acceptable salt according to claim 7 wherein the addition salts are selected from sulphates, nitrates, phosphates, perchlorates, borates, halides, acetates, tartrates, maleates, citrates, succinates, palmoates, methanesulphonates, benzoates, 25 salicylates, hydroxynaphthoates, benzenesulfonates, ascorbates, glycerophosphates, ketoglutarates.

WO 02/051819

PCT/IN01/00227

156

47. A process for the preparation of compound of formula (I),



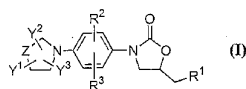
- where R¹ represents halogen atom; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms, its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting a compound of formula (I) where R¹ represents hydroxy group and all other symbols are as defined above, with tetrahalomethane group in the presence of PPh₃ or P(alkyl)₃.

WO 02/051819

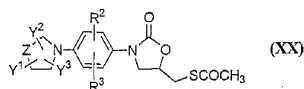
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157

48. A process for the preparation of compound of formula (I),



- where R¹ represents 'SH' group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms, its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:
- (i) reacting the compound of formula (I) where R¹ represents halogen atom, to produce a compound of formula (XX),



WO 02/051819

PCT/IN01/00227

158

where all symbols are as defined above, with a base and thioacetic acid,

(ii) reacting the compound of formula (XX), to produce a compound of formula (I) where R¹ represents 'SH' group and all other symbols are as defined earlier, with base.

49. Use of a compound of formula (I) for treating a bacterial infection comprising
5 administering a therapeutically effective amount of a compound of formula (I) as
claimed in claim 1 to a patient in need thereof.
50. Use of a compound for treating a bacterial infection comprising administering a
pharmaceutical composition as claimed in claims 31 and 32 to a patient in need thereof.
51. Use of a compound of formula (I) for treating a bacterial infection comprising
10 administering a therapeutically effective amount of a compound of formula (I) as as
claimed in claim 6 to a patient in need thereof.
52. Use of a compound for treating a bacterial infection comprising administering a
pharmaceutical composition as claimed in claims 35 and 36 to a patient in need thereof.

15

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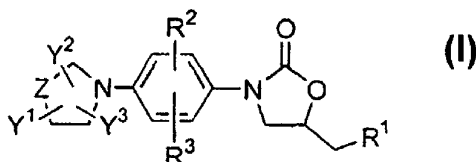
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(54) Title: HETEROCYCLIC COMPOUNDS HAVING ANTIBACTERIAL ACTIVITY, PROCESS FOR THEIR PREPARATION
AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM(57) Abstract: The present invention relates to novel oxazolidinone compounds of the general formula (I) where R¹, R², R³, Y¹, Y², Y³, and Z are as defined in the description; their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and pharmaceutical compositions containing them.

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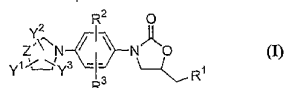
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AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM(57) Abstract: The present invention relates to novel oxazolidinone compounds of the general formula (I) where R¹, R², R³, Y¹,
Y², Y³, and Z are as defined in the description; their derivatives, their analogs, their tautomeric forms, their stereoisomers, their
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containing them.

1 HETEROCYCLIC COMPOUNDS HAVING ANTIBACTERIAL ACTIVITY, PROCESS FOR THEIR
PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

5 **Field of the Invention**

The present invention relates to novel oxazolidinone compounds, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and
10 pharmaceutical compositions containing them. More particularly, the present invention relates to novel oxazolidinones of the general formula (I).



their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable
15 solvates and pharmaceutical compositions containing them.

The present invention also relates to a process for the preparation of the above said novel compounds, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and pharmaceutical compositions containing them.

20 The present invention also relates to novel intermediates, methods for their preparation and their use in the preparation of compounds of formula (I).

Oxazolidinones are useful as antibacterials (*J. Med. Chem.*, 1996, 39, 673), antihistamines and anti allergic agents (EP 291,244), anticonvulsants (DE 3,915,184), treating cognition disorders, anti psychotics, anti platelet aggregators, antidepressants,
25 sedatives, hypnotics, monoamine oxidase inhibitors (WO 97/13768) and as chiral auxiliaries (*Aldrichimica Acta*, 1982, 15 23) in asymmetric synthesis.

Background of the Invention

Since the discovery of penicillin, pharmaceutical companies have produced more than one hundred antibacterial agents to combat a wide variety of bacterial infections. In the past several years, due to the misuse of these antibiotics there has been rapid emergence of bacterial resistance to several of these antibiotics. The multidrug resistance among these bacterial pathogens may also be due to mutation leading to more virulent clinical isolation, the most disturbing milestone has been the acquisition of resistance to vancomycin, an antibiotic generally regarded as the agent of last resort for serious Gram-positive infections. This growing multidrug resistance has recently rekindled interest in the search for new structural class of antibiotic that inhibit or kill these bacteria possibly by novel mechanisms.

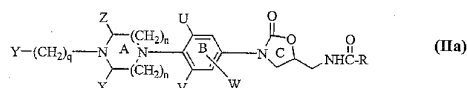
A problem of larger dimension is the increasing incidence of the more virulent, methicillin-resistant *Staphylococcus aureus* (MRSA) among clinical isolates found worldwide. As with vancomycin resistant organisms, many MRSA strains are resistant to most of the known antibiotics, but MRSA strains have remained sensitive to vancomycin. However, in view of the increasing reports of vancomycin resistant clinical isolates and growing problem of bacterial resistance, there is an urgent need for new molecular entities effective against the emerging and currently problematic Gram-positive organisms.

Recently, several oxazolidinones have been discovered, which inhibit protein synthesis by binding to the 50S-ribosomal subunit which is close to the site to which chloramphenicol and lincomycin bind but their mode of action is mechanistically distinct from these two antibiotics.

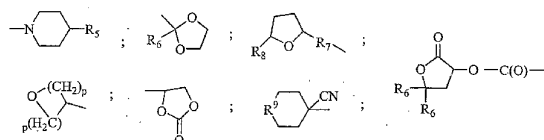
The new class of oxazolidinones of the present invention is useful for the treatment of a number of resistant and sensitive gram-positive strains both *in vitro* and *in vivo*. Some of the hitherto known compounds described in the prior art are outlined below:

- (i) International Patent Application WO 93/23384 discloses compounds of formula (IIa)

3



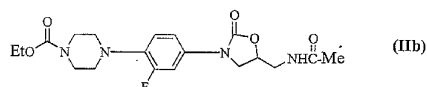
- where Y represents a hydrogen atom, (C₁-C₆)alkyl or aryl, OH, O(C₁-C₆)alkyl, O-vinyl, O-phenyl, O-C(=O)(C₁-C₆)alkyl, -O-C(=O)-phenyl (phenyl can be substituted with one to three F, Cl, OCH₃, OH, NH₂, or (C₁-C₄)alkyl) or O-C(=O)-O-CH₃, S-(C₁-C₆)alkyl, SO₂-(C₁-C₆)alkyl, -SO₂-N(R³)₂, (where R³ is independently hydrogen, (C₁-C₄)alkyl or phenyl which can be substituted with one to three F, Cl, OCH₃, OH, NH₂, or (C₁-C₄)alkyl); -C(=O)-(C₁-C₆)alkyl, -C(=O)-O-(C₁-C₆)alkyl, -C(=O)-N(R³)₂, -C(=O)-CH(R⁴)N(R³)₂, -C(=O)-CH(R⁴)-NH-C(NH)-NH₂ (where R⁴ is an amino acid side chain); -N(R³)₂, -N(CH₂)_m (where m is 2-6 and forms a cyclic structure with the nitrogen atom and where one or more carbon atoms can be replaced with S, O or NR³), -C(CH₃)=N-OR or Y represents any of the groups given below :



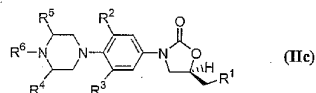
- where R⁵ is OH, OCH₃, CH₂OH, CH₂OCH₃, CO₂CH₃, CO₂C₂H₅, R⁶ represents CH₃ or hydrogen, R⁷ represents CH₂ or C(=O), R⁸ represents hydrogen or =O, p is 1 or 2, R⁹ represents O, S, S(O), SO₂, CH₂, NH, NCH₃, NC₂H₅, NCHO, NCOCH₃ or NCO₂CH₃, wherein each occurrence of said (C₁-C₆)alkyl may be substituted with one or more F, Cl, Br, I, OR¹, COOR¹, CN, SR¹ or R¹ (where R¹ is a hydrogen or (C₁-C₄)alkyl); X and Z are independently (C₁-C₆)alkyl, (C₃-C₁₂)cycloalkyl or hydrogen or X and Z form a (C₀-C₃) bridging group, preferably X and Z are hydrogen; U, V and W are independently (C₁-C₆)alkyl, F, Cl, Br, hydrogen or a (C₁-C₆)alkyl substituted with one or more of F, Cl, Br or I, preferably U and V are F and W is hydrogen; R is hydrogen, (C₁-C₁₂)alkyl, (C₃-

C₁₂)cycloalkyl, (C₁-C₆)alkoxy, (C₁-C₆)alkyl substituted with one or more F, Cl, Br, I or OH, n is 1 or 2; and q is 0-4 inclusive.

An example of this class of compounds is shown in formula (IIb)

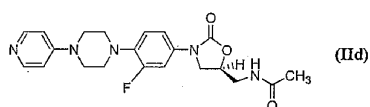


- 5 (iii) International Patent Application WO 98/01447 discloses compounds of formula (IIc)

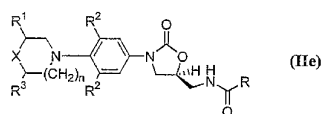


- wherein R¹ represents -NHC(=O)R^a wherein R^a represents (C₁-C₄)alkyl; R² and R³ represent hydrogen or fluoro; R⁴ and R⁵ are independently hydrogen or methyl; R⁶ represent pyridyl, optionally substituted by substituents selected from (C₁-C₄)alkyl (optionally substituted), halo, trifluoromethyl, (C₁-C₄)alkyl-S(O)_n (wherein n is 0, 1 or 2), (C₁-C₄)alkyl SO₂amino, (C₁-C₄)alkanoylamino, carboxy, hydroxy, amino, (C₁-C₄)alkylamino, di-(C₁-C₄)alkylamino, (C₁-C₄)alkoxycarbonyl, carbamoyl, N-(C₁-C₄)alkylcarbamoyl, di-(N-(C₁-C₄)alkyl)carbamoyl (wherein the (C₁-C₄)alkyl group on groups in the last two mentioned carbamoyl groups is optionally substituted by hydroxy, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl), (C₂-C₄)alkenyl (optionally substituted by carboxy or (C₁-C₄)alkoxycarbonyl), (C₁-C₄)alkoxy, cyano, or nitro groups.

An example of this class of compounds is shown in formula (IIId)

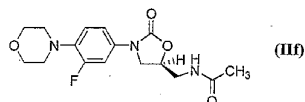


(iii) International Patent Application No. WO 95/07271 discloses compounds of formula (IIe)

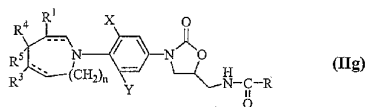


- wherein X represents O, S, SO, SO₂, SNR¹⁰ or SONR¹⁰; R represents hydrogen, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy or -OCH₂Ph or R represents (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino, (C₁-C₈)dialkylamino or (C₁-C₈)alkoxy; R¹ represents hydrogen except when X is O, then R¹ can be hydrogen, CH₃, cyano, -CO₂H, CO₂R or (CH₂)_mR¹¹ (m is 1 or 2); R² represents independently hydrogen, F or Cl; R³ represents hydrogen or CH₃;
 10 R¹⁰ independently represents hydrogen, (C₁-C₄)alkyl (optionally substituted with chloro, fluoro, hydroxy, (C₁-C₈)alkoxy, amino, (C₁-C₈)alkylamino, or (C₁-C₈)dialkylamino) or p-toluenesulfonyl; R¹¹ represents hydrogen, hydroxy, OR, OCOR, NH₂, NHCOR or N(R¹⁰)₂; and n is 0, 1 or 2.

An example of this class of compounds is shown in formula (III)



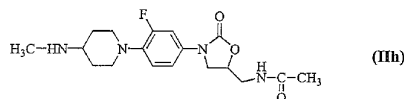
- 15 (iv) International Patent Application WO 95/25106 discloses compounds of formula (IIg)



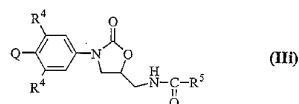
- where R is hydrogen atom, (C₁-C₈)alkyl, (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino,
 20 (C₁-C₈)dialkylamino, (C₁-C₈)alkoxy or (C₁-C₈)halogen alkyl; R¹ and R³ are each and

independently represents hydrogen atom, halogen atom, (C₁-C₈)alkyl, (C₁-C₆)cycloalkyl, -(CH₂)_m-OR¹¹ or -C(=O)-R⁴¹; X and Y are each and independently represents hydrogen atom, halogen atom; R⁴ and R⁵ are each and independently represents hydrogen atom, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, (C₁-C₈)alkylthio, -(CH₂)_m-OR⁵¹,
 5 -O-(CH₂)_m-OR⁵¹, -NR⁴²R⁵², -N=CH-NR⁴⁴R⁵⁵, -C(=O)-NR⁴²R⁵² or -(CH₂)_m-C(=A)-R⁴¹ or they may combine together to form =O, =NR⁴³, =S, =CR⁴⁴R⁵⁴ or an optionally substituted, unsaturated or saturated 5 or 6 membered hetero ring having 1-3 hetero atoms selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom; R¹¹ and R¹² are each and independently represents hydrogen atom, (C₁-C₈)alkyl or methoxymethyl; R⁴¹ is hydrogen atom, -(CH₂)_m-OH, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, -O-CH₂-O-C(=O)-R¹¹ or -(CH₂)_m-C(=O)-OR¹¹; R⁴² and R⁵² are each and independently represents hydrogen atom, -(CH₂)_m-OR¹¹, (C₁-C₈)alkyl, -C(=O)-R⁴¹ - C(=O)-NR¹¹R¹², -(CH₂)_p-phenyl, thiazol-2-yl or they may combine together to form a pyrrolidino group, a piperidino group, a piperazino group, a morpholino group or a
 15 thiomorpholino group, each of which may be substituted by (C₁-C₈)alkyl or -(CH₂)_m-OH; R⁴³ is hydrogen atom, -OR⁵¹, (C₁-C₈)alkyl, (C₁-C₈)alkoxy, -(CH₂)_p-phenyl, NR⁴²R⁵², -NH-C(=NH)-NH₂, [1,2,4]triazol-4-yl or cyano; R⁴⁴ and R⁵⁵ are each and independently represents hydrogen atom, (C₁-C₈)alkyl, -C(=O)-R⁴¹ or -(CH₂)_p-phenyl; R⁵¹ is hydrogen atom, (C₁-C₈)alkyl substituted by one or more hydroxy; (C₂-C₈)alkenyl, 20 (C₁-C₈)halogenalkyl, -(CH₂)_m-OR¹¹, -(CH₂)_m-C(=O)-R⁴¹, -C(=O)-(CH₂)_m-OR⁴ or tosyl; A is oxygen atom or ethyleneketal; --- is a double bond or a simple bond; m's are each and independently 0, 1 or 2; n is 0 or 1; p's are each and independently 1, 2, 3 or 4;

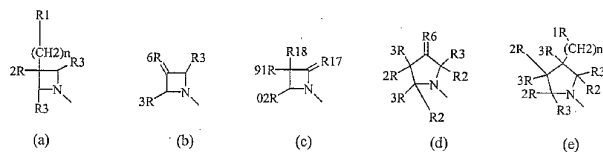
An example of this class of compounds is shown in formula (IIIh)



25 (v) International Patent Application WO 96/13502 discloses compounds of formula (III)



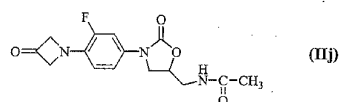
Q is selected from the structures (a), (b), (c), (d) and (e);



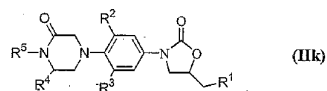
- R¹ is H or F, OR⁷, SR⁷, NR⁸R⁹, CN, (C₁-C₄)alkoxycarbonyl, carboxamide, (C₁-C₄)acyl optionally substituted with one or more of the following : fluorine, hydroxy, (C₁-C₄)alkoxy, (C₁-C₄)acyloxy; NHO(C₁-C₆)alkyl or NHOCH₂Ph, NSO₂R where R is (C₁-C₆)alkyl optionally substituted with one or more F, Cl, (C₁-C₆)alkoxy or phenyl; R² is independently selected from hydrogen or fluorine, hydroxy, OR where R is (C₁-C₆)alkyl; (C₁-C₄)alkyl or Ph; R³ is independently selected from H, phenyl, pyridyl or (C₁-C₃)alkyl which can be optionally substituted with F, Cl, hydroxy, (C₁-C₃)alkoxycarbonyl, (C₁-C₃)acyloxy, (C₁-C₃)alkoxy or N(C₁-C₄ alkyl)₂; R⁴ is independently H, OCH₃, F or Cl; R⁵ is hydrogen, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy; (C₃-C₆)cycloalkyl, amino, (C₁-C₈)alkylamino, (C₁-C₈)dialkylamino, (C₁-C₈)alkoxy; R⁶ is O, S, NR¹⁰, CR¹¹R¹², (OR)₂, where R is (C₁-C₆)alkyl; O(CH₂)_m O, (SR)₂ where R is (C₁-C₆)alkyl; S(CH₂)_mS; R⁷ is H, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, -CN, OH, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, (C₁-C₈)alkoxycarbonyl, phenyl; (C₁-C₈)acyl optionally substituted with one or more of the following : hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy; (C₁-C₈)alkoxycarbonyl, carboxamide optionally substituted with a (C₁-C₄)alkyl or phenyl on the carboxamide nitrogen; phenyl, optionally substituted with one or more of the following : halogen, CN, (C₁-C₃)alkoxy, (C₁-C₃)alkoxycarbonyl, (C₁-C₄)alkyl optionally substituted with one or more of F or (C₁-C₃) alkoxy; R⁸ and R⁹ are

- independently selected from H, (C₁-C₈)alkyl optionally substituted with one or more of the following : F, Cl, -CN, OH, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, (C₁-C₈)alkoxycarbonyl, phenyl; (C₁-C₈)acyl optionally substituted with one or more of the following : hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, amino, (C₁-C₄)acylamino, amino (C₁-C₄)acylamino;
- 5 benzoyl optionally substituted with one or more of the following F, Cl, hydroxy, (C₁-C₈)alkoxy, (C₁-C₈)acyloxy, amino, (C₁-C₄)acylamino, (C₁-C₄)alkoxycarbonylamino; (C₁-C₈)alkoxycarbonyl, benzyloxycarbonyl, tertbutoxycarbonyl; carboxamide optionally substituted with a (C₁-C₄)alkyl or phenyl on the carboxamide nitrogen; trifluoracetyl, CO(C₁-C₆ alkyl); R¹⁰ is H, OR⁷, NHR⁷, (C₁-C₈)alkyl optionally substituted with phenyl;
- 10 R¹¹ and R¹² are independently selected from H, F, (C₁-C₄)alkyl optionally substituted with halogen, hydroxy, (C₁-C₄)alkoxy, (C₁-C₄)alkoxycarbonyl, phenyl; (C₁-C₈)acyl, (C₁-C₄)alkoxycarbonyl, CN; R¹⁷ is O or S; R¹⁸ and R¹⁹ are independently selected from H, (C₁-C₄)alkyl optionally substituted with halogen, hydroxy, (C₁-C₄)alkoxy; OH, (C₁-C₄)alkoxy optionally substituted with hydroxy or (C₁-C₄)alkoxy; NR⁸R⁹, -OC(O) (C₁-C₄)alkyl; R²⁰ is H, CH₃; n is 0 or 1; m is 2 or 3;

An example of this class of compounds is shown in formula (IIj)



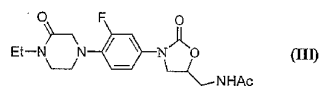
- (vi) International Patent Application WO 97/27188 discloses compounds of formula (II k)



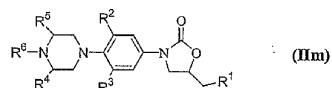
- 20 R¹ is of the formula -NHC(=O)(C₁-C₄)alkyl, -NHS(O)_n(C₁-C₄)alkyl, wherein n is 0, 1 or 2 or R¹ is hydroxy; R² and R³ are independently hydrogen or fluoro; R⁴ is hydrogen, methyl, ethyl or oxo; R⁵ is hydrogen, (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₂-C₆)alkynyl, or of
- 25 the formula R⁶(CH₂)_m wherein m is 1-4 and R⁶ is trifluoromethyl, difluoromethyl,

fluoromethyl, (C₁-C₄)alkoxy, (C₁-C₄)alkylS(O)_p, wherein p is 0, 1 or 2, (C₁-C₆)alkanoyloxy, di-(N-(C₁-C₄)alkyl)amino, N-((C₁-C₄)alkyl)(C₁-C₄)alkanoylamino, cyano, carboxy, (C₁-C₄)alkoxycarbonyl, carbamoyl, -di-(N-(C₁-C₄)alkyl)carbamoyl, N-((C₁-C₄)alkyl)(C₁-C₄)alkanesulphonamido, N¹-((C₁-C₄)alkyl)-di-(N³-(C₁-C₄)alkyl)ureido
 5 or of the formula -OC(=O)NR(R⁸) or N(R⁸)SO₂NR⁷(R⁸) wherein R⁷ and R⁸ are independently hydrogen or (C₁-C₄)alkyl and R⁹ is (C₁-C₄)alkyl; or m is 2-4 and R⁶ is hydroxy, (C₁-C₄)alkanoylamino, amino, (C₁-C₄)alkylamino, (C₁-C₄)alkanesulphonamido, ureido, di-(N³-(C₁-C₄)alkyl)ureido or of the formula NHSO₂NR⁷(R⁸);

10 An example of this compound is shown in fig (III)

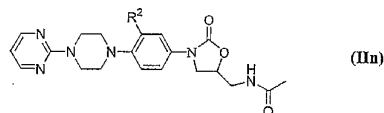


(vii) International Patent Application WO 98/01446 discloses compounds of formula (IIm)



15 R¹ is of the formula -NHC(=O)R¹ wherein R^a is (C₁-C₄)alkyl; R² and R³ are independently hydrogen or fluoro; R⁴ and R⁵ are independently hydrogen or methyl; R⁶ is a 6-membered heteroaryl ring containing 2 or 3 ring nitrogen atoms as the only ring heteroatoms and optionally substituted by substituents selected from (C₁-C₄)alkyl (optionally substituted), halo, trifluoromethyl, (C₁-C₄)alkylS(O)_n, (wherein n is 0, 1 or
 20 2), (C₁-C₄)alkylS(O)₂ amino, (C₁-C₄)alkanoylamino, carboxy, hydroxy, amino, (C₁-C₄)alkylamino, di(C₁-C₄)alkylamino, (C₁-C₄)alkoxycarbonyl, carbamoyl, N-(C₁-C₄)alkylcarbamoyl, -di-(N-(C₁-C₄)alkyl)carbamoyl, [wherein (C₁-C₄)alkyl group or groups in the last two mentioned carbamoyl substituents is optionally substituted by hydroxy, (C₁-C₄)alkoxy or (C₁-C₄)alkoxycarbonyl], (C₂-C₄)alkenyl (optionally
 25 substituted by carboxy or (C₁-C₄)alkoxycarbonyl), (C₁-C₄)alkoxy, cyano or nitro;

An example of this compound is shown in fig (IIIn)



Summary of the Invention

5 With an objective to develop novel compounds effective against a number of human and veterinary pathogens, including gram-positive aerobic bacteria such as MRSA, streptococci and enterococci as well as anaerobic organisms such as *Bacteroides* spp, *Clostridia* spp. species and acid-fast organisms such as *Mycobacterium tuberculosis*, *Mycobacterium avium* and *Mycobacterium* spp., we focussed our research
10 to develop new compounds effective against the above mentioned organisms. Efforts in this direction have led to the preparation of compounds having general formula (I) as defined above.

The present invention provides novel Oxazolidinones of the general formula (I) as defined above and their derivatives, their analogs, their tautomeric forms, their
15 stereoisomers, their polymorphs, their pharmaceutically acceptable salts, their pharmaceutically acceptable solvates and pharmaceutical compositions containing them, or their mixtures having enhanced activities, without toxic effect or with reduced toxic effect.

A process for the preparation of novel oxazolidinones of the formula (I) as
20 defined above and their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts and their pharmaceutically acceptable solvates is also described.

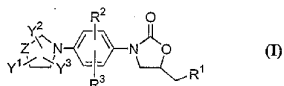
An aspect of the present invention is to provide pharmaceutical compositions containing compounds of the general formula (I), their analogs, their derivatives, their
25 tautomers, their stereoisomers, their polymorphs, their salts, solvates or their mixtures in

combination with suitable carriers, solvents, diluents and other media normally employed in preparing such compositions.

Novel intermediates of formulae , (VI), VII), (X), , (XVI) (XVIII), and a process for their preparation and their use in the preparation of compounds of formula (I) is also provided.

Detailed Description of the Invention

The present invention relates to compounds having the general formula (I),



- 10 where R¹ represents halo, azido, thioalcohol, isothiocyanate, OR⁴, NHR⁴ or N(R⁴)₂, where R⁴ represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C₁-C₆)alkoxycarbonyl, cyclo(C₃-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxycarbonyl, (C₂-C₆)alkenylcarbonyl, aryloxycarbonyl, (C₁-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, aryloxythiocarbonyl, -C(=O)-C(=O)- (C₁-C₆)alkyl, -C(=O)-C(=O)-aryl, -C(=O)-C(=O)- (C₁-C₆)alkoxy, -C(=O)-C(=O)-aryloxy, -(C=S)-S-(C₁-C₆)alkyl, -(C=S)-NH₂, -(C=S)-NH-(C₁-C₆)alkyl, -C(=S)-N-((C₁-C₆)alkyl)₂, -C(=S)-NH-(C₂-C₆)alkenyl, (C=S)-(C=O)-(C₁-C₆)alkoxy, -(C=S)-(C=O)-aryloxy, -C(=S)-O-(C=O)- (C₁-C₆)alkyl, C(=S)-C(=S)- (C₁-C₆)alkyl, -C(=S)-C(=S)-aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR⁴, NR⁴, OR⁴ where R⁴ represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted

groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates.

Suitable groups represented by R⁴ may be selected from hydrogen atom, (C₁-C₇)acyl group such as -C(=O)H, -C(=O)CH₃, -C(=O)CH₂CH₃, -C(=O)(CH₂)₂CH₃, -C(=O)(CH₂)₃CH₃, -C(=O)(CH₂)₄CH₃, -C(=O)(CH₂)₅CH₃, -C(=O)Ph and the like, the acyl group may be substituted; thio(C₁-C₇)acyl group such as -C(=S)H, -C(=S)CH₃, -C(=S)CH₂CH₃, -C(=S)Ph and the like, the thioacyl group may be substituted; (C₁-C₆)alkoxycarbonyl group containing (C₁-C₆)alkyl group which may be linear or branched such as methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl, isopropoxycarbonyl and the like, the (C₁-C₆)alkoxycarbonyl group may be substituted; cyclo(C₃-C₆)alkoxythiocarbonyl group such as cyclopropoxythiocarbonyl, cyclobutoxythiocarbonyl and the like, the cyclo(C₃-C₆)alkoxythiocarbonyl may be substituted; (C₂-C₆)alkenylcarbonyl such as ethenylcarbonyl, propenylcarbonyl, butenylcarbonyl and the like, the (C₂-C₆)alkenylcarbonyl may be substituted; (C₂-C₆)alkenyloxy carbonyl group such as ethenyloxy carbonyl, propenyloxy carbonyl, butenyloxy carbonyl and the like, the (C₂-C₆)alkenyloxy carbonyl may be substituted; aryloxy carbonyl group such as phenoxy carbonyl, benzyloxy carbonyl group and the like, the aryloxy carbonyl group may be substituted; (C₁-C₆)alkoxythiocarbonyl group such as CH₃O-C(=S)-, C₂H₅O-C(=S)-, C₃H₇O-C(=S)- and the like, which may be substituted; (C₂-C₆)alkenyloxythiocarbonyl group such as ethenyloxythiocarbonyl,

- propenyloxythiocarbonyl, butenyloxythiocarbonyl and the like, the (C₂-C₆)alkenyloxythiocarbonyl group may be substituted; aryloxythiocarbonyl group such as phenylO-C(=S)-, benzylO-C(=S)- and the like, which may be substituted; -C(=O)-C(=O)-(C₁-C₆)alkyl group such as -C(=O)-C(=O)methyl, -C(=O)-C(=O)ethyl, -C(=O)-C(=O)propyl and the like, which may be substituted; -C(=O)-C(=O)-aryl group such as -C(=O)-C(=O)phenyl, -C(=O)-C(=O)naphthyl and the like, which may be substituted; -C(=O)-C(=O)-(C₁-C₆)alkoxy group such as -C(=O)-C(=O)methoxy, -C(=O)-C(=O)ethoxy, -C(=O)-C(=O)propyloxy and the like, which may be substituted; -C(=O)-C(=O)-aryloxy group such as -C(=O)-C(=O)phenyloxy, -C(=O)-C(=O)benzyloxy, which may be substituted; -(C=S)-S-(C₁-C₆)alkyl such as -(C=S)-S-methyl, -(C=S)-S-ethyl, -(C=S)-S-propyl and the like, which may be substituted; -(C=S)-NH₂; -(C=S)-NH-(C₁-C₆)alkyl such as -(C=S)-NH-methyl, -(C=S)-NH-ethyl, -(C=S)-NH-propyl and the like, which may be substituted; -C(=S)-N-((C₁-C₆)alkyl)₂ such as -C(=S)-N-(methyl)₂, -C(=S)-N-(ethyl)₂, -C(=S)-N-(propyl)₂ and the like, which may be substituted; -C(=S)-NH-(C₂-C₆)alkenyl such as -C(=S)-NH-ethenyl, -C(=S)-NH-propenyl, -C(=S)-NH-butenyl and the like, which may be substituted; -(C=S)-(C=O)-(C₁-C₆)alkoxy such as -(C=S)-(C=O)-methoxy, -(C=S)-(C=O)-ethoxy, -(C=S)-(C=O)-propoxy and the like, which may be substituted; -(C=S)-(C=O)-aryloxy such as -(C=S)-(C=O)-phenyloxy, -(C=S)-(C=O)-naphthyloxy and the like, which may be substituted; -C(=S)-O-(C=O)-(C₁-C₆)alkyl such as -C(=S)-O-(C=O)-methyl, -C(=S)-O-(C=O)-ethyl, -C(=S)-O-(C=O)-propyl and the like, which may be substituted; -C(=S)-C(=S)-(C₁-C₆)alkyl group such as -C(=S)-C(=S)methyl, -C(=S)-C(=S)ethyl, -C(=S)-C(=S)propyl and the like, which may be substituted; -C(=S)-C(=S)aryl group such as -C(=S)-C(=S)phenyl, -C(=S)-C(=S)naphthyl and the like, which may be substituted; thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl.

When the groups represented by R⁴ are substituted, the substituents may be selected from halogen atom such as chlorine, fluorine, bromine and iodine; hydroxy, amino, mono(C₁-C₆)alkylamino such as methylamino, ethylamino, propylamino and the like, di(C₁-C₆)alkylamino such as dimethylamino, diethylamino, methylethylamino,

dipropylamino, ethylpropylamino and the like, cyano, nitro, alkoxy, aryl, hydroxyaryl, pyridyl, hydroxyalkyl, alkoxyaryl or carboxyl and its derivatives.

- Suitable groups represented by R^2 and R^3 may be selected from hydrogen, halogen atom such as fluorine, chlorine or bromine; (C₁-C₆)alkyl group such as methyl, ethyl, n-propyl, isopropyl, n-butyl, iso-butyl, t-butyl, n-pentyl, iso-pentyl, n-hexyl and the like; halo(C₁-C₆)alkyl group such as halomethyl, haloethyl, halopropyl, trihalomethyl and the like, wherein the halo group is selected from fluorine, chlorine, bromine or iodine; cyano; nitro; SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group such as methyl, ethyl, propyl, isopropyl and the like; halo(C₁-C₆)alkyl such as halomethyl, haloethyl, halopropyl, haloisopropyl and the like, where the halo group is selected from fluoro, chloro, bromo or iodo.

The substituents on R^a are selected from hydroxy, halogen, nitro, amino, alkoxy, carboxyl or cyano

- Suitable groups represented by Z may be selected from S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl such as methyl, ethyl, propyl and the like, which may be substituted; (C₂-C₆)alkenyl such as ethenyl, propenyl, butenyl and the like, which may be substituted; (C₁-C₆)cycloalkyl such as cyclopropyl, cyclobutyl and the like, which may be substituted; (C₁-C₆)alkoxy such as methoxy, propoxy, isopropoxy and the like, which may be substituted; aryl group such as phenyl, naphthyl and the like, which may be substituted; aralkyl such as benzyl, phenethyl and the like, which may be substituted; aryloxy such as phenyloxy, naphthyloxy and the like, which may be substituted; (C₁-C₆)alkylcarbonyl such as methylcarbonyl, ethylcarbonyl, propylcarbonyl and the like, which may be substituted; arylcarbonyl such as phenylcarbonyl, naphthylcarbonyl and the like, which may be substituted; (C₁-C₆)alkoxycarbonyl such as methoxycarbonyl, ethoxycarbonyl, propoxycarbonyl and the like, which may be substituted; or aryloxycarbonyl such as phenyloxycarbonyl, naphthyloxycarbonyl and the like, which may be substituted.

The substituents on R^b are selected from hydroxy, halogen, pyrrolidinylthiocarbonyl, nitro, amino, alkoxy, carboxyl or cyano.

Y¹ represents =O or =S group, Y² and Y³ are selected from hydrogen, halogen such as fluorine, chlorine, bromine or iodine; cyano, nitro, formyl, hydroxy, amino, =O, =S group, substituted or unsubstituted (C₁-C₆)alkyl such as methyl, ethyl, n-propyl, isopropyl, n-butyl, iso-butyl, t-butyl and the like; hydroxy(C₁-C₆)alkyl such as hydroxymethyl, hydroxyethyl, hydroxypropyl and the like, which may be substituted; (C₁-C₆)alkoxy(C₁-C₆)alkyl group such as methoxymethyl, methoxyethyl, ethoxyethyl, ethoxymethyl, methoxypropyl, propoxymethyl, propoxyethyl and the like, which may be substituted; (C₁-C₆)alkoxycarbonyl group such as methoxycarbonyl, ethoxycarbonyl and the like, which may be substituted; carboxy(C₁-C₆)alkyl such as CH₃-COOH, CH₃-CH₂-COOH and the like, which may be substituted; (C₁-C₆)alkylsulfonyl group such as methylsulfonyl, ethylsulfonyl and the like, which may be substituted; (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl groups such as methylcarbonylaminomethyl, ethylcarbonylaminomethyl, methylcarbonylaminoethyl, ethylcarbonylaminoethyl and the like, which may be substituted; arylcarbonylamino(C₁-C₆)alkyl such as phenylcarbonylaminomethyl, phenylcarbonylaminoethyl, naphthylcarbonylaminomethyl, naphthylcarbonylaminoethyl and the like, which may be substituted; (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl group such as methylcarbonyloxymethyl, ethylcarbonyloxymethyl, methylcarbonyloxyethyl, propylcarbonyloxymethyl, propylcarbonyloxyethyl, propylcarbonyloxypropyl and the like, which may be substituted; amino(C₁-C₆)alkyl such as aminomethyl, aminoethyl, aminopropyl and the like, which may be substituted; mono(C₁-C₆)alkylamino such as methylamino, ethylamino, propylamino and the like, which may be substituted; di(C₁-C₆)alkylamino such as dimethylamino, diethylamino, methylethylamino, dipropylamino, ethylpropylamino and the like, which may be substituted; arylamino such as phenylamino, benzylamino and the like, which may be substituted; (C₁-C₆)alkoxy group such as methoxy, ethoxy, propoxy, isopropoxy and the like, which may be substituted; aryl group such as phenyl, naphthyl and the like, which may be substituted; aryloxy group such as phenoxy, naphthoxy and the like, the aryloxy group may be substituted; aralkyl such as benzyl, phenethyl, C₆H₅CH₂CH₂CH₂, naphthylmethyl and the like, the

aralkyl group may be substituted; heteroaryl groups such as pyridyl, thienyl, furyl, pyrrolyl, oxazolyl, thiazolyl, pyrazolyl, imidazolyl, oxadiazolyl, tetrazolyl, benzopyranyl, benzofuranyl and the like, which may be substituted; heteroaralkyl such as imidazolemethyl, imidazoleethyl, pyridylmethyl, furyl methyl, oxazolemethyl, 5 imidazolyl and the like, which may be substituted; heterocyclyl group such as pyrrolidinyl, piperidinyl, morpholinyl, piperazinyl and the like; heterocycloalkyl groups such as pyrrolidinemethyl, piperidinemethyl, morpholinemethyl, piperazinemethyl and the like, which may be substituted.

When the groups represented by Y^2 and Y^3 are substituted, the substituents may be selected from hydroxy, nitro, cyano, amino, (*tert*-butyldimethylsilyloxy) TBSO, 10 halogen atom, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₃-C₆)cycloalkyl, aryl group such as phenyl, naphthyl and the like, benzyloxy, acyl group such as formyl, acetyl, and the like, carboxyl or acyloxy group such as formyloxy, acetyloxy and the like..

Suitable cyclic structure formed by Y^2 and Y^3 when present on adjacent carbon 15 atoms which they are attached may be selected from substituted or unsubstituted benzene, pyridine, pyrrolidine, furan, thiophene, morpholine, piperazine, pyrrole and the like.

Pharmaceutically acceptable salts forming part of this invention include salts derived from inorganic bases such as Li, Na, K, Ca, Mg, Fe, Cu, Zn, Mn; salts of organic 20 bases such as N,N'-diacetylenediamine, betaine, caffeine, 2-diethylaminoethanol, 2-dimethylaminoethanol, N-ethylmorpholine, N-ethylpiperidine, glucamine, glucosamine, hydrabamine, isopropylamine, methylglucamine, morpholine, piperazine, piperidine, procaine, purines, theobromine, triethylamine, trimethylamine, tripropylamine, tromethamine, diethanolamine, meglumine, ethylenediamine, N,N'-diphenylethylenediamine, N,N'-dibenzylethylenediamine, N-benzyl phenylethylamine, 25 choline, choline hydroxide, dicyclohexylamine, metformin, benzylamine, phenylethylamine, dialkylamine, trialkylamine, thiamine, aminopyrimidine, aminopyridine, purine, spermidine, and the like; chiral bases like alkylphenylamine, glycinol, phenyl glycinol and the like, salts of natural amino acids such as glycine,

- alanine, valine, leucine, isoleucine, norleucine, tyrosine, cystine, cysteine, methionine, proline, hydroxy proline, histidine, ornithine, lysine, arginine, serine, threonine, phenylalanine; unnatural amino acids such as D-isomers or substituted amino acids; guanidine, substituted guanidine wherein the substituents are selected from nitro, amino, alkyl such as methyl, ethyl, propyl and the like; alkenyl such as ethenyl, propenyl, butenyl and the like; alkynyl such as ethynyl, propynyl and the like; ammonium or substituted ammonium salts and aluminum salts. Salts may include acid addition salts where appropriate which are, sulphates, nitrates, phosphates, perchlorates, borates, halides, acetates, tartrates, maleates, citrates, succinates, palmoates, methanesulphonates, benzoates, salicylates, hydroxynaphthoates, benzenesulfonates, ascorbates, glycerophosphates, ketoglutarates and the like. Pharmaceutically acceptable solvates may be hydrates or comprising other solvents of crystallization such as alcohols.
- Particularly useful compounds according to this invention include:
- (5R)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- (5R)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-6-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-5-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;

- (5R)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-[3,5-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 5 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
3-{4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
(5R)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 10 (5R)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 15 (5R)-5-hydroxymethyl-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
(5R)-5-hydroxymethyl-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
(5R)-3-[3-fluoro-4-(2-oxo-3-phenyl-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 20 (5R)-3-{3-fluoro-4-[3-(fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-azidomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5R)-azidomethyl-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-6-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;

- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-5-methyl-2,3-dihydro benzo[d][1,3]oxazol-2-one or its salts;
 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- 5 (5R)-5-azidomethyl-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-azidomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 10 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
 (5R)-5-azidomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- 15 (5R)-5-azidomethyl-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-azidomethyl-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-1,3-oxazolan-2-one or its salts;
 (5R)-aminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 20 (5R)-aminomethyl-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5R)-5-aminomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;

- (5R)-5-aminomethyl-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
N-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methanamide or its salts;
5 N-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methanamide or its salts;
N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) propanamide or its salts;
10 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) butanamide or its salts;
N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) pentanamide or its salts;
15 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) heptanamide or its salts;
N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acrylamide or its salts;
N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2,2,2-trifluoroacetamide or its salts;
20 Ethyl((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) carbamoylmethanoate or its salts;
N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
25 N1-((5S)-2-oxo-3-[4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;
N1-((5S)-2-oxo-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) acetamide or its salts;

- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(6-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(5-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)propanamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)heptanamide or its salts;
- 15 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)acrylamide or its salts;
- N1-((5S)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 20 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)propanamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- 25 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;

- N1-((5S)-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 5 N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 10 N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)acetamide or its salts;
 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 15 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(3,3,3-trifluoro-1-thioxopropylaminomethyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 3-{2-fluoro-4-[(5S)-2-oxo-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
 20 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 25 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxopropylaminomethyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;

- (5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
- 10 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methyl carbamate or its salts;
- 15 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 (5S)-5-methylthioxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 20 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 15 (5S)-5-cyclohexyloxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;

- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propylthiocarbamate or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
- N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methyl thiocarbamate or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethyl thiocarbamate or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propyl thiocarbamate or its salts;
- 20 (5S)-5-[2,2,2-trifluoroethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-[2-hydroxyethyloxy (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5S)-5-[2-methoxyethyloxy (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) allylthio carbamate or its salts;

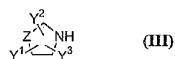
- N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthio carbamate or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 5 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-[4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 25 N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;

- N1-((5S)-3-{3-fluoro-4-[3-methoxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 5 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-{4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)isopropylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-hydroxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 15 N1-((5S)-3-{3-fluoro-4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-methyl-4-thioxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- (5S)-5-[(2S)-2-hydroxymethylazolan-1-yl(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 20 (5S)-5-diethylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-allylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 15 (5S)-5-benzylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-[4-methoxybenzylamino(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylmethylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-methylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 5 (5S)-5-[2-hydroxyethylamino (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[1,4-thiazinan-4-yl (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 10 (5S)-5-amino(thioxo)methylaminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylaminomethyl-1,3-oxazolan-2-one or its salts;
 15 (5S)-5-amino(thioxo)methylaminomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylaminomethyl-1,3-oxazolan-2-one or its salts and
 N1-((5S)-3-[4-[4-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate.hydrochloride.
 20

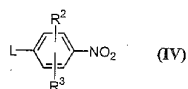
The present invention also relates to a process for the preparation of the compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents hydrogen atom and all other symbols are as defined earlier, which comprises:

- 25 (i) reacting a compound of formula (III)

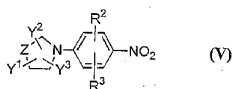


where all the symbols are as defined earlier, with a compound of formula (IV)

28

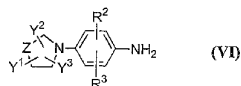


where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)



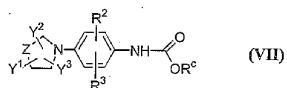
5 where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



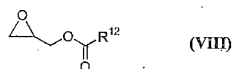
where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a
10 compound of formula (VII)



where R^c represents (C₁-C₃)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; Y¹, Y², Y³, R², R³ and Z are as defined earlier,

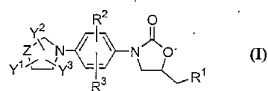
(iv) reacting the compound of formula (VII) with a compound of formula (VIII)



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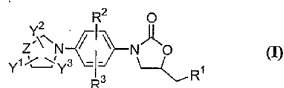
where R¹² represents a (C₁-C₃)alkyl group such as methyl, ethyl or propyl in the presence of a base to produce a compound of formula (I)

29



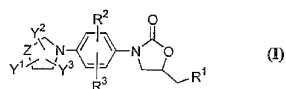
where R¹ represents hydroxy; Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- (v) reacting the compound of formula (I) with alkylsulfonyl chloride or aryl sulfonyl chloride to produce a compound of formula (I), where R¹ represents alkyl sulfonyl or aryl sulfonyl, which in turn was reacted with NaN₃ to produce compound of formula (I)



where R¹ represents azido; Y¹, Y², Y³, R², R³ and Z are as defined earlier and

- (vi) reducing the compound of formula (I) wherein R¹ represents azido group, to produce compound of formula (I)



- 10 where R¹ represents NHR⁴ wherein R⁴ represents hydrogen atom; Y¹, Y², Y³, R², R³ and Z are as defined earlier.

- The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K₂CO₃, Na₂CO₃, NaH, KH, triethylamine, diisopropylethyl amine and the like. The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a temperature in the range of ambient-80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature in the range of 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

The conversion of compound of formula (VI) to compound of formula (VII) may be carried out with alkylchloroformates such as methylchloroformate, ethylchloroformate, propylchloroformate, benzylchloroformate and the like. The solvent of the reaction may be selected from water, acetone, tetrahydrofuran (THF), acetonitrile, dichloromethane (DCM) and the like or mixtures thereof. The reaction may be carried out in the presence of base such as K₂CO₃, Na₂CO₃, NaH, KOH, triethylamine and the like. The temperature of the reaction may be carried out in the presence of 0 to 60 °C, preferably at 0 °C to room temperature. The time of the reaction is maintained in the range of 1-12h, preferably in the range of 1-4h.

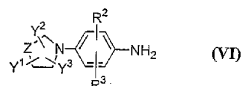
The reaction of a compound of formula (VII) with a compound of formula (VIII) to produce a compound of formula (I), where R¹ represents hydroxy group, defined above may be carried out in the presence of a base such as alkali metal hydrides like NaH or KH or organolithiums like CH₃Li, BuLi, LDA and the like or alkoxides such as NaOMe, NaOEt, t-BuOK. The reaction may be carried out in the presence of a solvent such as THF, dioxane, DMF, DMSO, DME and the like or mixtures thereof. Hexamethylphosphamide (HMPA) may be used as a cosolvent. The reaction temperature may range from -78 to 150 °C, preferably at a temperature in the range of -78 to 30 °C. The duration of the reaction may range from 3 to 12 h.

- The compound of formula (I) where R^1 represents OH is converted to compound of formula (I) where R^1 represents alkylsulfonyl or arylsulfonyl by treating with alkylsulfonylchloride or arylsulfonylchloride such as methanesulfonyl chloride, p-toluenesulfonyl chloride and the like. The reaction may be carried out in the presence of chloroform, dichloromethane, THF, dioxane and the like or mixtures thereof. The base used in the reaction may be selected from Et_3N , diisopropyl ethylamine, Na_2CO_3 , K_2CO_3 and the like. The temperature of the reaction is maintained in the range of 0 to 50 °C, preferably in the range of 0 to room temperature. The time of the reaction should be maintained in the range of 1-12h, preferably in the range of 1-4h. The compound of formula (I) where R^1 represents alkylsulfonyl or arylsulfonyl is converted to compound of formula (I) where R^1 represents azido group, by treating with NaN_3 . The solvent used in the reaction may be selected from dimethylformamide (DMF), dimethyl sulfoxide (DMSO), methylcyanide and the like. The temperature of the reaction is maintained in the range of room temperature to 120 °C, preferably room temperature to 80 °C. The time of the reaction is maintained in the range of 1-12h, preferably 1-4h.
- The reduction of a compound of formula (I) where R^1 represents azido group, to produce a compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature in the range of 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing PPh_3 in water.

In still another embodiment of the present invention there is provided another process for the preparation of compound of formula (I) where R^1 represents hydroxy and all the symbols are as defined earlier, which comprises:

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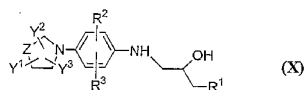
- (i) reacting the compound of formula (VI)



where all the symbols are as defined earlier, with a compound of formula (IX)



- 5 where R¹ represents hydroxy, to produce a compound of formula (X)



where R¹ represents hydroxy; Y¹, Y², Y³, R², R³ and Z are as defined earlier, and

- (ii) carbonylating the compound of formula (X) with a suitable carbonylating agent to produce the compound of formula (I) where R¹ represents hydroxy and all other symbols are as defined above.

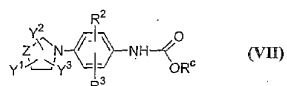
10 The reaction of a compound of formula (VI) defined above with a compound of formula (IX) defined above to produce a compound of formula (X) may be carried out in the presence or absence of a base such as K₂CO₃, NaH, t-BuOK and the like or mixtures thereof. The reaction may be carried out in the presence of a solvent such as DMF, 15 toluene, THF, CH₃CN, and the like or mixtures thereof. The reaction may also be carried out in the presence of Lewis acids such as BF₃·OEt₂, ZnCl₂, Ti(OiPr)₄, lanthanide metal complexes and the like in the presence of DCE, DMF, THF and the like or mixtures thereof. The reaction temperature may be in the range of 0 to 120 °C, preferably at a temperature in the range of 0 to 100 °C. The reaction time may range from 3 to 24 h, 20 preferably from 4 to 12 h.

The conversion of compound of formula (X) to a compound of formula (I) may be carried out using a carbonylating agent such as dialkyl carbonate, dihalo carbonyl, 1,1'-carbonyldiimidazole and the like in the presence or absence of a base. The base may be selected from triethylamine, tributylamine, diisopropylethylamine, 1,4-

diazabicyclo[2.2.2]octane (DABCO), 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), 1,1,5-diazabicyclo[4.3.0]non-5-ene (DBN), alkoxides like NaOMe, NaOEt and the like or the inorganic base such as NaOH, KOH and the like. The reaction may be carried out in the presence of a solvent such as dichloromethane, THF, DMF, ethyl acetate and the like or mixtures thereof. The reaction temperature may be in the range of -20 to 135 °C, preferably at a temperature in the range of 15 to 80 °C. The reaction time may range from 2 to 72 h, preferably from 2 to 50 h.

In still another embodiment of the present invention there is provided yet another process for the preparation of compound of the formula (I) where R¹ represents azido and all other symbols are as defined earlier, which comprises:

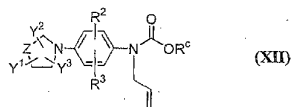
(i) reacting a compound of formula (VII)



where R^c represents (C₁-C₈)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; and all other symbols are as defined earlier, with a compound of formula (XI)



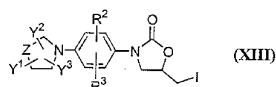
where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier,

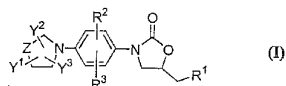
(ii) converting the compound of formula (XII) defined above to a compound of formula (XIII)

34



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) converting the compound of formula (XIII) defined above to a compound of formula (I) by reacting with organic or inorganic azide,



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where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier.

The reaction of a compound of formula (VII) with a compound of formula (XI) may be carried out in the presence of base such as NaH, KH, K_2CO_3 , t-BuOK, LDA, NaOMe, with or without phase transfer catalyst such as tetrabutylammonium halide and the like. The reaction may be carried out in the presence of a suitable solvent such as THF, DMF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 120 °C, preferably at -78 to 60 °C. The reaction time may range from 2 to 20 h, preferably from 4 to 10 h.

The conversion of a compound of formula (XII) to a compound of formula (XIII) defined above may be carried in the presence of reagents such as I_2 , KI, or NaI. The reaction may be carried out in the presence of a solvent such as $CHCl_3$, CH_2Cl_2 , THF, DMF, DMSO, acetonitrile and the like or mixtures thereof. The reaction temperature may be in the range of

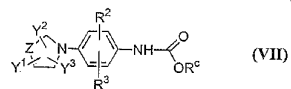
0 to 100 °C, preferably at ambient temperature. The reaction time may range from 2 to 24 h, preferably from 2 to 12 h.

The conversion of a compound of formula (XIII) to a compound of formula (I) where R^1 represents azido group, may be carried out in the presence of one or more equivalents of metal azide such as LiN_3 , NaN_3 or trialkyl silylazide. The reaction may be carried out in the presence of solvent such as THF, acetone, DMF, DMSO and the like

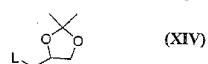
or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using N₂ or Ar. The reaction may be carried out at a temperature in the range of ambient temperature to reflux temperature of the solvent, preferably at a temperature in the range of 50 to 80 °C. The reaction time may range from 0.5 to 18 h, preferably 1 to 4 h.

In yet another embodiment of the present invention, there is provided a process for the preparation of compound of formula (I), where R¹ represents hydroxy group and all other symbols are as defined earlier, which comprises:

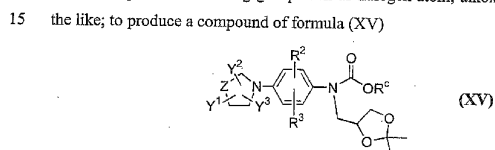
- 10 (i) reacting a compound of formula (VII)



where all the symbols are as defined earlier, with a compound of formula (XIV)



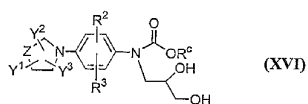
where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XV)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier,

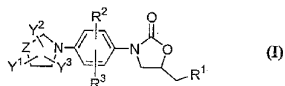
- (ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)

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where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) cyclising the compound of formula (XVI) with or without a base to a compound of formula (I)



where R^1 represents hydroxy group and all other symbols are as defined earlier.

The reaction of a compound of formula (VII) with a compound of formula (XIV) to produce a compound of formula (XV) may be carried out in the presence of a base. The base employed may be selected from K_2CO_3 , NaH, t-BuOK, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, EtOH and the like. The reaction may be carried at a temperature in the range of -78 to 120 °C, preferably at a temperature in the range of -78 to 100 °C. The reaction time may range from 2 to 24 h, preferably from 2 to 20 h.

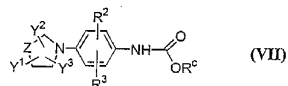
The hydrolysis of a compound of formula (XV) to produce a compound of formula (XVI) may be carried out using dilute mineral acid such as HCl, H_2SO_4 and the like, organic acids such as aqueous acetic acid, p-toluene sulfonic acid, camphorsulfonic acid, trifluoro acetic acid and the like. The reaction may be carried out in the presence of suitable solvent such as water, methanol, THF, dioxane and the like or mixtures thereof. The reaction may be carried at a temperature in the range of 30 to 100 °C, preferably at a temperature in the range of 30 to 60 °C. The reaction time may range from 10 min to 5 h, preferably from 30 min to 2.5 h.

The conversion of a compound of formula (XVI) to a compound of formula (I) where R^1 represents hydroxy group, may be carried out by using a base such as NaOMe, K_2CO_3 , NaH and the like, in presence of the a solvent such as MeOH, DMF, THF, and

the like. The duration and temperature of the reaction are maintained in the range of 2 to 4 h and room temperature to 150 °C respectively.

- In still another embodiment of the present invention there is provided a process for the preparation of compounds of formula (I) where R¹ represents azido group and all other symbols are as defined earlier, which comprises:

- (i) reacting a compound of formula (VII)

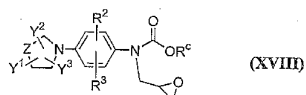


where all the symbols are as defined earlier, with a compound of formula (XVII)



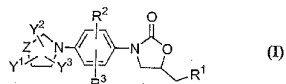
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where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XVIII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier, and

- 15 (ii) converting the compound of formula (XVIII) defined above to a compound of formula (I) by reacting with an organic or an inorganic azide,



where R¹ represents azido group; Y¹, Y², Y³, R², R³ and Z are as defined earlier,

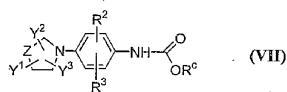
- The reaction of a compound of formula (VII) defined above with a compound of formula (XVII) defined above may be carried out in the presence of a base such as NaH, NaOMe, K₂CO₃, n-BuLi, LDA and the like. The reaction may be carried out in the
- 20

presence of a solvent such as DMF, THF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 70 °C preferably at a temperature in the range of -78 to 50 °C. The reaction time may range from 1 to 15 h preferably 1 to 10 h.

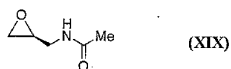
5 The conversion of a compound of formula (XVIII) to a compound of formula (I) where R^1 represents azido group, may be carried out in the presence of one or more equivalent of metal azide such as LiN_3 , NaN_3 or trialkyl silylazide. The reaction may be carried out in the presence of solvent such as THF, acetone, DMF, DMSO and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained by using N_2 or Ar. The reaction may be carried out at a temperature in the range of ambient temperature to reflux temperature of the solvent, preferably at a temperature in the range of 50 to 80 °C. The reaction time may range from 0.5 to 18 h, preferably 1 to 4 h.

15 In still another embodiment of the present invention there is provided yet another process for the preparation of compound of the formula (I), where R^1 represents NHR^4 , wherein R^4 represents acetyl group and all other symbols are as defined earlier, which comprises:

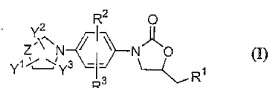
(i) reacting a compound of formula (VII)



20 where all the symbols are as defined earlier, with a compound of formula (XIX)



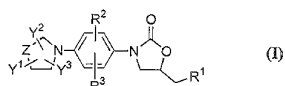
to produce a compound of formula (I)



where R^1 represents NHR^4 , where R^4 represents acetyl group; and Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier.

5 The compound of formula (VII) defined above may be converted to a compound of formula (I) defined above, by reacting with compound of formula (XIX) in presence of a base such as NaH , LDA , $BuLi$ and the like. The reaction may be carried out at a temperature in the range of -78 to 100 $^{\circ}C$, preferably in the range of -78 to 80 $^{\circ}C$. The reaction time may range from 3 to 10 h.

10 In yet another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents formyl group; from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom,

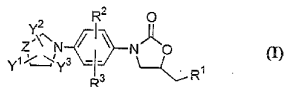


15 where all other symbols are as defined earlier.

The reaction of compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, to produce a compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents formyl group, may be carried out in presence of alkyl formates such as methyl formate, ethyl formate and the like. The duration of the reaction
20 may range from 4 to 48 h, preferably 12 to 24 h. The reaction may be carried out at a temperature in the range of 60 to 120 $^{\circ}C$, preferably at reflux temperature.

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4

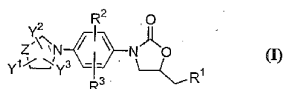
represents $-C(=O)-R^{4a}$, where R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl; from a compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom,



where all other symbols are as defined earlier.

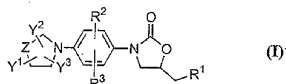
The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4a}$, R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl, may be prepared from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, by treating with appropriate halide such as acetyl chloride like acetyl chloride, propionyl chloride and the like; alkylchloroformate like methylchloroformate, ethylchloroformate and the like; aralkylchloroformate like benzylchloroformate and the like. The reaction may be carried out in the presence of a solvent such as CH_2Cl_2 , $CHCl_3$, toluene, THF and the like or mixtures thereof. The reaction may be carried out in the presence of a base like Et_3N , diisopropyl ethylamine, K_2CO_3 , NaH , $KOt-Bu$ and the like. The reaction may be carried at a temperature in the range of -20 to 60 °C, preferably at a temperature in the range of 0 to room temperature. The reaction time may range from 1 to 12 h, preferably from 1 to 4 h.

Alternatively, the compound of formula (I), where R^1 represents NHR^4 wherein R^4 represents acetyl group, may be prepared by reacting compound of formula (I) where R^1 represents azido group, by treating with thioacetic acid.



The compound of formula (I) where R^1 represents azido group may be converted to a compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents acetyl group by using thioacetic acid, with or without using a solvent such as THF, DMF, toluene and the like. The reaction may be carried out at a temperature in the range of 25 to 40 °C, preferably at room temperature. The reaction may range from 3 to 24 h, preferably from 4 to 12 h.

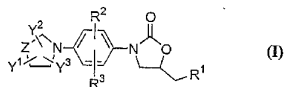
In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; from compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$.



where all symbols are as defined earlier.

Conversion of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; to a compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; may be carried out by taking a solution of the amide and Lawesson's reagent (2,4-bis(methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide) in dry dioxane, toluene, THF, DMF and the like. The reaction may be carried at a temperature in the range of room temperature to 130 °C, preferably at a temperature in the range of 55 to 90 °C. The reaction time may range from 3 to 24 h, preferably from 3 to 10 h.

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-SR^{4c}$, wherein R^{4c} represents (C_1-C_6) alkyl group; from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom,

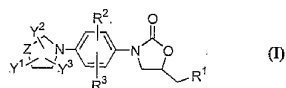


where all other symbols are as defined earlier.

The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-SR^{4c}$, wherein R^{4c} represents (C_1-C_6) alkyl group, may be prepared from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, by using CS_2 in the presence of a base such as Et_3N , diisopropyl ethylamine, K_2CO_3 , NaH , $KOt-Bu$ and the like, followed by the appropriate alkylhalide such as methyl iodide, ethylbromide, propylbromide and the like. The reaction may be carried out in the presence of a solvent such as water, ethanol, methanol, isopropanol, CH_3CN and the like, or mixtures thereof. The reaction may be carried at a temperature in the range of room temperature to $60^\circ C$, preferably at room temperature. The reaction time may range from 6 to 24 h.

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine; aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl, which comprises:

(i) converting the compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, to a compound of formula (I) where R^1 represents isothiocyanate group,



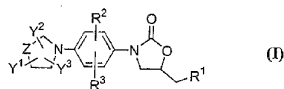
where all other symbols are as defined earlier,

- (ii) converting the compound of formula (I) where R^1 represents isothiocyanate group, to a compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents $(C_1-C_6)alkyl$, $cyclo(C_3-C_6)alkyl$, $-(C=O)-(C_1-C_6)alkyl$ group substituted with fluorine; aryl, halo(C_1-C_6)alkyl, hydroxy(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)alkyl or (C_2-C_6)alkenyl group and all other symbols are as defined earlier.

- The compound of formula (I) where R^1 represents isothiocyanate group, may be prepared from compound of formula (I) where R^1 represents NHR^4 wherein R^4 represents hydrogen atom, by using thiophosgene, in the presence of a base such as Et_3N , K_2CO_3 , $NaOH$ and the like. The reaction may be carried out in the presence of a solvent such as ethanol, methanol, isopropanol, CH_2Cl_2 , CH_3CN and the like. The reaction may be carried at a temperature in the range of 0 to 60 °C, preferably at 0 °C.
- The reaction may be carried out in an inert atmosphere using argon or any other inert gas. The reaction time may range from 3 to 24 h.

- The compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents $(C_1-C_6)alkyl$, $cyclo(C_3-C_6)alkyl$, $-(C=O)-(C_1-C_6)alkyl$ group substituted with fluorine; aryl, halo(C_1-C_6)alkyl, hydroxy(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)alkyl or (C_2-C_6)alkenyl, is prepared from the compound of formula (I) where R^1 represents isothiocyanate group, by using respective alcohol such as methanol, ethanol, propanol, cyclohexanol and the like, in the presence of a base such as NaH , KH and the like. The reaction may be carried out in the presence of a solvent such as THF, toluene, DMF and the like. The reaction may be carried at a temperature in the range of room temperature to 130 °C, preferably at reflux temperature of the solvent used. The reaction time may range from 6 to 24 h.

In another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, wherein R' represents hydrogen, $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy $(C_1-C_6)alkyl$, R'' represents hydrogen or $(C_1-C_6)alkyl$ or the two R' and R'' groups together form a 5 or 6 membered cyclic structures containing one or two hetero atoms; from a compound of formula (I) where R^1 represents isothiocyanate group,

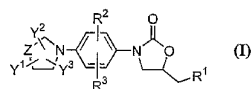


where all other symbols are as defined earlier.

The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, where in R' and R'' independently represent hydrogen, is prepared by passing ammonia gas into a solution of compound of formula (I) where R^1 represents isothiocyanate group, by using a solvent such as THF, toluene, and the like. The reaction may be carried at a temperature in the range of $-10^\circ C$ to room temperature, preferably at $-10^\circ C$. The reaction time may range from 20 min to 4 h, preferably 30 min.

The compound of formula (I), where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, R' represents hydrogen, $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy $(C_1-C_6)alkyl$, R'' represents hydrogen or $(C_1-C_6)alkyl$ or R' and R'' groups together form a 5 or 6 membered cyclic structures containing one or two hetero atoms, is prepared by treating compound of formula (I) where R^1 represents isothiocyanate group, by using appropriate amine such as methylamine, ethylamine, dimethylamine, diethylamine, benzylamine, aniline, proline, morpholine, thiomorpholine, pyridylmethylamine and the like, in the presence of a solvent such as THF, DMF, toluene, and the like. The reaction may be carried at a temperature in the range of room temperature to $140^\circ C$, preferably at 60 to $100^\circ C$. The reaction time may range from 1 to 24 h, preferably 4 to 12 h.

In yet another embodiment of the present invention there is provided a process for the preparation of compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) where Z represents NR^b wherein R^b represents $(\text{C}_1\text{-C}_6)\text{alkyl}$ group substituted with hydroxy group, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom,

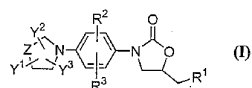


where all other symbols are as defined earlier.

The compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) wherein Z represents NR^b wherein R^b represents $(\text{C}_1\text{-C}_6)\text{alkyl}$ group substituted with hydroxy group at the α -position, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom, may be prepared by treating with a base such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine, piperidine, 4-dimethylaminopyridine (DMAP), 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na_2CO_3 , K_2CO_3 , NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like. The solvents used in the reaction may be selected from THF, ether, dioxane, toluene, benzene, DMF, DMSO, methylcyanide and the like. The temperature of the reaction may be maintained in the range of -20 to 150°C , preferably in the range of -10 to 100°C . The duration of the reaction may be in the range of 0.2 to 64 h, preferably in the range of 1 to 48 h.

In still another embodiment of the present invention there is provided a process for the preparation of compound of formula (I), where Z represents NR^b wherein R^b represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$ or aralkyl, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom; from a compound of formula (I)

where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom,

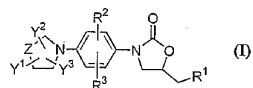


where all other symbols are as defined earlier.

- 5 The compound of formula (I), wherein Z represents NR^b wherein R^b represents substituted or unsubstituted (C_1 - C_6)alkyl or aralkyl, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, from a compound of formula (I) wherein Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom, may be carried out in the presence of a base
- 10 such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine, piperidine, DMAP, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na_2CO_3 , K_2CO_3 , NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like, followed by reacting with alkyl halide
- 15 such as methyl iodide, methoxymethylchloride, allylbromide, benzylbromide and the like. The solvent used in the reaction may be selected from DMF, DMSO, THF, dioxane, benzene, toluene and the like. The temperature of the reaction may be maintained in the range of -5 to 150 °C, preferably in the range of 0 °C to reflux temperature of the solvent. The duration of the reaction may be in the range of 0.2 to 48 h, preferably in the range of 0.5 to 24 h.

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In another embodiment of the present invention there is provided a process for the preparation of a compound of formula (I) where R^1 represents halogen, from compound of formula (I) where R^1 represents hydroxy group,

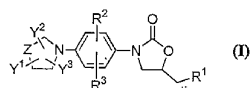


where all other symbols are as defined above.

- The compound of formula (I) where R¹ represents halogen is prepared from compound of formula (I) where R¹ represents hydroxy group may be carried out by treating with tetrahalomethane group such as CBr₄, CCl₄ and the like, in the presence of PPh₃, P(alkyl)₃ and the like. The reaction may be carried out in the presence of a solvent such as dry dichloromethane, chloroform, tetrachloromethane, benzene, DMF, DMSO, THF and the like. The temperature of the reaction may be maintained in the range of 0 to 60 °C, preferably at room temperature. The duration of the reaction may be in the range of 2 to 24 h, preferably 8 to 13h.

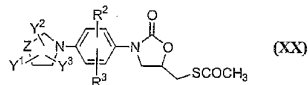
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In another embodiment of the present invention there is provided a process for the preparation of a compound of formula (I) where R¹ represents 'SH', from compound of formula (I) where R¹ represents halogen atom,



- where all other symbols are as defined above, which comprises

(i) reacting the compound of formula (I) where R¹ represents halogen atom, to produce a compound of formula (XX),



where all other symbols are as defined earlier, with a base and thioacetic acid,

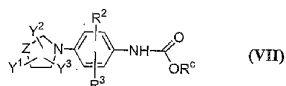
- (ii) reacting the compound of formula (XX), to produce a compound of formula (I) where R¹ represents 'SH' group and all other symbols are as defined earlier, with base.

The compound of formula (XX) is prepared from compound of formula (I) where R¹ represents hydroxy group is prepared by using thioacetic acid in the presence of a base such as triethylamine, di-isopropylamine, di-isopropylethylamine, pyridine,

piperidine, DMAP, 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), lithium diisopropylamide (LDA), potassium bis-(trimethyl silyl)amide, BuLi, Na₂CO₃, K₂CO₃, NaOH, KOH, NaOMe, NaOEt, NaOiPr, t-BuOK, NaH, KH and the like. The solvent used in the reaction may be selected from THF, benzene, dioxane and the like. The temperature of the reaction is maintained in the range of room temperature to reflux temperature, preferably at reflux temperature. The duration of the reaction is maintained in the range of 2 to 24 h, preferably 6h.

The compound of formula (I), where R¹ represents 'SH' group is prepared from compound of formula (XX) by reacting with a base such as K₂CO₃, NaOH, KOH, BuLi and the like. The reaction may be carried out at a temperature in the range of room temperature to reflux temperature. The duration of the reaction may be in the range of 1 to 24h.

In still another embodiment of the present invention there is provided a novel intermediate of the formula (VII)

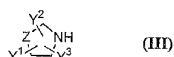


wherein R^c represents (C₁-C₆)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, -CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group; Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-

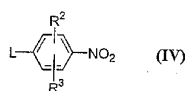
- 5 C₆alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

- The novel intermediate of formula (VII) may be prepared by a process, which comprises:

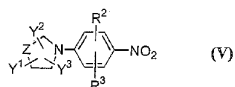
- (i) reacting a compound of formula (III)



where all the symbols are as defined earlier, with a compound of formula (IV)

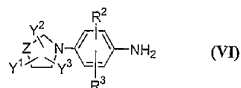


- 15 where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)



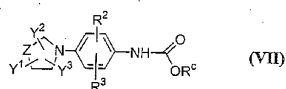
where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



- 20 where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined above,

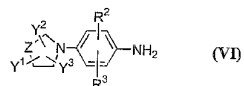
5 The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K₂CO₃, Na₂CO₃, NaH, KH, triethylamine, diisopropylethyl amine and the like. The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert
10 atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a temperature in the range of ambient to 80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula
15 (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be
20 carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

The conversion of compound of formula (VI) to compound of formula (VII) may be carried out with an alkylchloroformate such as methychloroformate,
5 ethylchloroformate, propylchloroformate, benzylchloroformate and the like. The solvent of the reaction may be selected from water, acetone, tetrahydrofuran (THF), acetonitrile, dichloromethane (DCM) and the like or mixtures thereof. The reaction may be carried

out in the presence of base such as K_2CO_3 , Na_2CO_3 , NAH , KOH , triethylamine and the like. The temperature of the reaction may be carried out in the presence of 0 to 60 °C, preferably at 0 °C to room temperature. The time of the reaction is maintained in the range of 1-12h, preferably in the range of 1-4h.

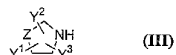
In still another embodiment of the present invention there is provided a novel intermediate of formula (VI)



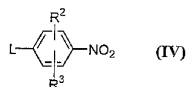
- where R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxy carbonyl; Y^1 represents =O or =S group; Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; any two of Y^2 and Y^3 when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

The novel intermediate of formula (VI) may be prepared by a process, which comprises:

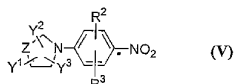
- (i) reacting a compound of formula (III)



- 5 where all the symbols are as defined earlier, with a compound of formula (IV)

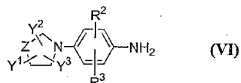


where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)



- 10 where Y¹, Y², Y³, R², R³ and Z are as defined earlier, and

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



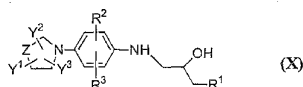
where Y¹, Y², Y³, R², R³ and Z are as defined earlier,

- 15 The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K₂CO₃, Na₂CO₃, NaH, KH, triethylamine, diisopropylethyl amine and the like. The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction
- 20 may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a

temperature in the range of ambient-80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such as Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (X)



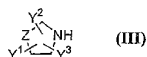
wherein R¹ represents halo, azido, thioalcohol, isothiocyanate, OR⁴, NHR⁴ or N(R⁴)₂, where R⁴ represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C₁-C₆)alkoxycarbonyl, (C₃-C₆)cycloalkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, (C₂-C₆)alkenylcarbonyl, aryloxythiocarbonyl, (C₁-C₆)alkoxythiocarbonyl, (C₂-C₆)alkenyloxythiocarbonyl, aryloxythiocarbonyl, -C(=O)-C(=O)-alkyl, -C(=O)-C(=O)-aryl, -C(=O)-C(=O)-alkoxy, -C(=O)-C(=O)-aryloxy, -C(=S)-S-alkyl, -C(=S)-NH₂, -C(=S)-NH-alkyl, -C(=S)-N-(alkyl)₂, -C(=S)-NH-alkenyl, (C=S)-(C=O)-alkoxy, -(C=S)-(C=O)-aryloxy, -C(=S)-O-(C=O)-alkyl, C(=S)-C(=S)-alkyl, -C(=S)-C(=S)-aryl, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O,

=CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² or Y³ represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

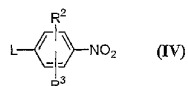
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The novel intermediate of formula (X) may be prepared by a process, which comprises:

(i) reacting a compound of formula (III)

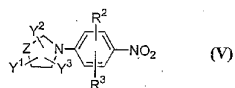


20 where all the symbols are as defined earlier, with a compound of formula (IV)



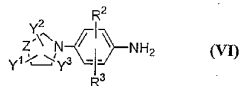
where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; R² and R³ are as defined earlier, to produce a compound of formula (V)

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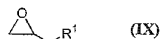
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier,

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)

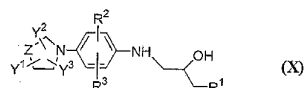


5 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined earlier, and

(iii) reacting the compound of formula (VI) with a compound of formula (IX)



where R^1 represents NHR^4 or $N(R^4)_2$, where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, (C_3-C_6) cycloalkoxythiocarbonyl, (C_2-C_6) alkenyloxycarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxycarbonyl, (C_1-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-C(=O)-C(=O)-alkyl$, $-C(=O)-C(=O)-aryl$, $-C(=O)-C(=O)-alkoxy$, $-C(=O)-C(=O)-aryloxy$, $-(C=S)-S-alkyl$, $-(C=S)-NH_2$, $-(C=S)-NH-alkyl$, $-C(=S)-N-(alkyl)_2$, $-C(=S)-NH-alkenyl$, $(C=S)-(C=O)-alkoxy$, $-(C=S)-(C=O)-aryloxy$, $-C(=S)-O-(C=O)-alkyl$, $C(=S)-C(=S)-alkyl$, $-C(=S)-C(=S)-aryl$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl, to produce a compound of formula (X)



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

The reaction of a compound of formula (III) with a compound of formula (IV) to produce a compound of formula (V) may be carried out using a base such as KOH, NaOH, K_2CO_3 , Na_2CO_3 , NaH, KH, triethylamine, diisopropylethyl amine and the like.

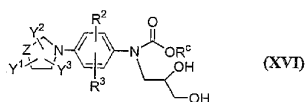
The reaction may be carried out using a solvent such as DMSO, DMF, THF, acetonitrile, chloroform and the like or mixtures thereof. The reaction may be carried out in inert atmosphere, which may be maintained using inert gases such as N₂ or Ar. The reaction may be carried out at a temperature in the range of 20 °C-100 °C, preferably at a temperature in the range of ambient to 80 °C. The reaction time may range from 1 to 15 h, preferably from 6 to 12 h.

The reduction of a compound of formula (V) to produce a compound of formula (VI) may be carried out in the presence of gaseous hydrogen and a catalyst such as Ru, Pd, Rh, Pt, Ni on solid beads such as charcoal, alumina, asbestos and the like. The reduction may be conducted in the presence of a solvent such as dioxane, acetic acid, ethyl acetate, THF, alcohol such as methanol, ethanol and the like or mixtures thereof. A pressure between atmospheric pressure to 60 psi may be used. The reaction may be carried out at a temperature from 25 to 60 °C, preferably at room temperature. The reaction time ranges from 2 to 48 h. The reduction may also be carried out by employing metal in mineral acids such Sn/HCl, Fe/HCl, Zn/HCl, Zn/CH₃CO₂H and the like.

The reaction of a compound of formula (VI) defined above with a compound of formula (IX) defined above to produce a compound of formula (X) may be carried out in the presence or absence of a base such as K₂CO₃, NaH, t-BuOK and the like or mixtures thereof. The reaction may be carried out in the presence of a solvent such as toluene, DMF, THF, CH₃CN. The reaction may also be carried out in the presence of Lewis acids such as BF₃·OEt₂, ZnCl₂, Ti(OiPr)₄, lanthanide metal complexes and the like in the presence of DCE, DMF, THF or the like or mixtures thereof. The reaction temperature may be in the range of 0 to 120 °C, preferably at a temperature in the range of 0 to 100 °C. The reaction time may range from 3 to 24 h, preferably from 4 to 12 h.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (XVI)

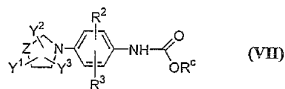
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- where R^c represents (C₁-C₆)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² or Y³ represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

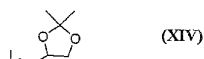
The novel intermediate of formula (XVI) may be prepared by a process, which comprises:

- (i) reacting a compound of formula (VII)

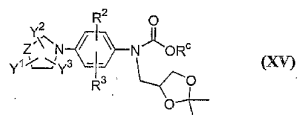


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where all the symbols are as defined earlier, with a compound of formula (XIV)



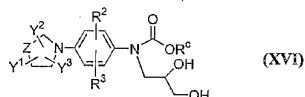
where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XV)



5

where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier and

(ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)



10 where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier.

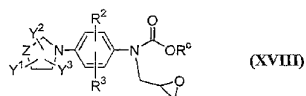
The reaction of a compound of formula (VII) with a compound of formula (XIV) to produce a compound of formula (XV) may be carried out in the presence of a base. The base employed may be selected from K₂CO₃, NaH, t-BuOK, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, EtOH and the like. The reaction may be carried at a temperature in the range of -78 to 120 °C, preferably at a temperature in the range of -78 to 100 °C. The reaction time may range from 2 to 24 h, preferably from 2 to 20 h.

The hydrolysis of a compound of formula (XV) to produce a compound of formula (XVI) may be carried out using dilute mineral acid such as HCl, H₂SO₄ and the like, organic acids such as aqueous acetic acid, p-toluene sulfonic acid, camphor sulfonic acid, trifluoro acetic acid and the like. The reaction may be carried out in the presence of suitable solvent such as water, methanol, THF, dioxane and the like or mixtures thereof.

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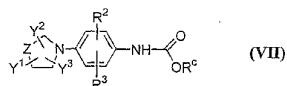
The reaction may be carried at a temperature in the range of 30 to 100 °C, preferably at a temperature in the range of 30 to 60 °C. The reaction time may range from 10 min to 5 h, preferably from 30 min to 2.5 h.

In yet another embodiment of the present invention there is provided a novel intermediate of formula (XVIII)



wherein R² represents (C₁-C₈)alkyl group such as methyl, ethyl, propyl, benzyl, allyl group and the like; R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² or Y³ represents hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together may also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

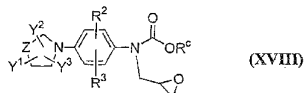
The novel intermediate of formula (XVIII) may be prepared by a process, which comprises: reacting a compound of formula (VII)



where all the symbols are as defined earlier, with a compound of formula (XVII)



where L represents a leaving group such as halogen atom, alkoxy, sulfonyl groups and the like; to produce a compound of formula (XVIII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined earlier.

- 10 The reaction of a compound of formula (VII) defined above with a compound of formula (XVII) defined above may be carried out in the presence of a base such as NaH, NaOMe, K₂CO₃, n-BuLi, LDA and the like. The reaction may be carried out in the presence of a solvent such as DMF, THF, DMSO, benzene and the like or mixtures thereof. The reaction may be carried out at a temperature in the range of -78 to 70 °C
- 15 preferably at a temperature in the range of -78 to 50 °C. The reaction time may range from 1 to 15 h preferably 1 to 10 h.

- It is appreciated that in any of the above-mentioned reactions, any reactive group in the substrate molecule may be protected according to conventional chemical practice. Suitable protecting groups in any of the above mentioned reactions are
- 20 tertiarybutyldimethylsilyl, methoxymethyl, triphenyl methyl, benzyloxycarbonyl, tetrahydropyran(THP) etc, to protect hydroxyl or phenolic hydroxy group; N-tert-butoxycarbonyl (N-Boc), N-benzyloxycarbonyl (N-Cbz), N-9-fluorenyl methoxy carbonyl (N-FMOC), benzophenoneimine, propargyloxy carbonyl (POC) etc, for

protection of amino or anilino group, acetal protection for aldehyde, ketal protection for ketone and the like. The methods of formation and removal of such protecting groups are those conventional methods appropriate to the molecule being protected.

The enantiomers may be prepared by using reactants in their single enantiomeric form in the process wherever applicable or by conducting the reaction in the presence of reagents or catalysts in their single enantiomeric form. The single enantiomers may also be prepared by resolving the racemic mixture by conventional methods. The stereoisomers of the compounds forming part of this invention may be prepared by using reactants in their single enantiomeric form in the process wherever possible or by conducting the reaction in the presence of reagents or catalysts in their single enantiomer form or by resolving the mixture of stereoisomers by conventional methods. Some of the preferred methods include use of microbial resolution, resolving the diastereomeric salts formed with chiral acids such as mandelic acid, camphorsulfonic acid, tartaric acid, lactic acid, and the like wherever applicable or chiral bases such as brucine, cinchona alkaloids and their derivatives and the like. Commonly used methods are compiled by Jaques et al in "Enantiomers, Racemates and Resolution" (Wiley Interscience, 1981). Where appropriate the compounds of formula (I) may be resolved by treating with chiral amines, aminoacids, aminoalcohols derived from aminoacids; conventional reaction conditions may be employed to convert acid into an amide; the diastereomers may be separated either by fractional crystallization or chromatography and the stereoisomers of compound of formula (I) may be prepared by hydrolyzing the pure diastereomeric amide.

The pharmaceutically acceptable salts are prepared by reacting the compounds of formula (I) wherever applicable with 1 to 4 equivalents of a base such as sodium hydroxide, sodium methoxide, sodium hydride, potassium t-butoxide, calcium hydroxide, magnesium hydroxide and the like, in solvent like ether, THF, methanol, t-butanol, dioxane, isopropanol, ethanol and the like. Mixture of solvents may be used. Organic bases like lysine, arginine, diethanolamine, choline, tromethamine, guanidine and their derivatives etc. may also be used. Alternatively, acid addition salts wherever

applicable are prepared by treatment with acids such as hydrochloric acid, hydrobromic acid, nitric acid, sulfuric acid, phosphoric acid, p-toluenesulphonic acid, methanesulfonic acid, acetic acid, citric acid, maleic acid, salicylic acid, hydroxynaphthoic acid, ascorbic acid, palmitic acid, succinic acid, benzoic acid, 5 benzenesulfonic acid, tartaric acid and the like in solvents like ethyl acetate, ether, alcohols, acetone, THF, dioxane etc. Mixture of solvents may also be used. The salts of amino acid groups and other groups may be prepared by reacting the compounds of formula (I) with the respective groups in solvent like alcohols, ketones, ether and the like. Mixture of solvents may be used.

10 Various polymorphs of a compound of general formula (I) forming part of this invention may be prepared by crystallization of compound of formula (I) under different conditions. For example, using different solvents commonly used or their mixtures for recrystallization; crystallizations at different temperatures; various modes of cooling, ranging from very fast to very slow cooling during crystallizations. Heating or melting 15 the compound followed by gradual or fast cooling may also obtain polymorphs. The presence of polymorphs may be determined by solid probe nmr spectroscopy, IR spectroscopy, differential scanning calorimetry, powder X-ray diffraction or such other techniques.

The present invention also provides pharmaceutical compositions, containing 20 compounds of the general formula (I), as defined above, their derivatives, their analogs, their tautomeric forms, their stereoisomers, their polymorphs, their pharmaceutically acceptable salts or their pharmaceutically acceptable solvates in combination with the usual pharmaceutically employed carriers, diluents and the like. The pharmaceutical compositions according to this invention can be used for the treatment of bacterial 25 infections. They can also be used for the treatment of bacterial infections associated with multidrug resistance.

Pharmaceutically acceptable solvates of compound of formula (I) forming part of this invention may be prepared by conventional methods such as dissolving the

compounds of formula (I) in solvents such as water, methanol, ethanol etc., preferably water and recrystallizing by using different crystallization techniques.

The pharmaceutical compositions may be in the forms normally employed, such as tablets, capsules, powders, syrups, solutions, suspensions and the like, may contain
5 flavorants, sweeteners etc. in suitable solid or liquid carriers or diluents, or in suitable sterile media to form injectable solutions or suspensions. Such compositions typically contain from 1 to 20 %, preferably 1 to 10 % by weight of active compound, the remainder of the composition being pharmaceutically acceptable carriers, diluents or solvents.

10 Suitable pharmaceutically acceptable carriers include solid fillers or diluents and sterile aqueous or organic solutions. The active compounds will be present in such pharmaceutical compositions in the amounts sufficient to provide the desired dosage in the range as described above. Thus, for oral administration, the compounds can be combined with a suitable solid, liquid carrier or diluent to form capsules, tablets,
15 powders, syrups, solutions, suspensions and the like. The pharmaceutical compositions, may, if desired, contain additional components such as flavorants, sweeteners, excipients and the like. For parenteral administration, the compounds can be combined with sterile aqueous or organic media to form injectable solutions or suspensions. For example, solutions in sesame or peanut oil, aqueous propylene glycol and the like can be used, as
20 well as aqueous solutions of water-soluble pharmaceutically-acceptable acid addition salts or salts with base of the compounds. The injectable solutions prepared in this manner can then be administered intravenously, intraperitoneally, subcutaneously, or intramuscularly, with intramuscular administration being preferred in humans.

In addition to the compounds of formula (I) the pharmaceutical compositions of
25 the present invention may also contain or be co-administered with one or more known drugs selected from other clinically useful antibacterial agents such as β -lactams or aminoglycosides. These may include penicillins such as oxacillin or flucloxacillin and carbapenems such as meropenem or imipenem to broaden the therapeutic effectiveness against, for example, methicillin-resistant staphylococci. Compounds of the formula (I)

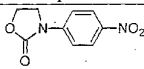
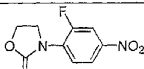
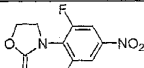
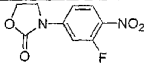
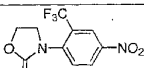
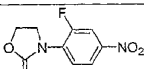
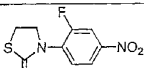
of the present invention may also contain or be co-administered with bactericidal/permeability-increasing protein product (BPI) or efflux pump inhibitors to improve activity against gram negative bacteria and bacteria resistant to antimicrobial agents.

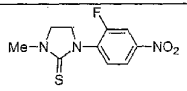
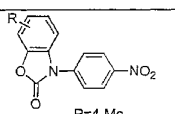
5 The compounds of the formula (I) as defined above are clinically administered to mammals, including human beings, via either oral or parenteral routes. Administration by the oral route is preferred, being more convenient and avoiding the possible pain and irritation of injection. However, in circumstances where the patient cannot swallow the medication, or absorption following oral administration is impaired, as by disease or
10 other abnormality, it is essential that the drug be administered parenterally. By either route, the dosage is in the range of about 5 mg/kg to about 20 mg / kg body weight of the subject per day administered singly or as a divided dose. However, the optimum dosage for the individual subject being treated will be determined by the person responsible for treatment, generally smaller doses being administered initially and thereafter increments
15 made to determine the most suitable dosage.

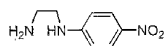
The invention is explained in detail in the examples given below which are provided by way of illustration only and therefore should not be construed to limit the scope of the invention.

20 **General procedure for preparations 1-9:**

A mixture of appropriate nitro compound such as 4-fluoronitrobenzene and the like, a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group, (1.1 eq) and
25 anhydrous K_2CO_3 (2.0 eq) in dry DMF was stirred at temperature ranging from 0 to 100 °C (depending on the substrate) overnight. Cold water was added to the reaction mixture and the solid formed was filtered. The filtered solids were dried to yield pure compound. Yield: 50-85%.

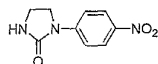
S.No.	Preparation	Analytical data
1		¹ HNMR (CDCl ₃ , 200MHz): δ 8.25 (d, J=9.2 Hz, 2H), 7.72 (d, J=9.2 Hz, 2H), 4.57 (t, J=7.3 Hz, 2H), 4.18 (t, J=7.3 Hz, 2H). Mass (CI method): 209.
2		¹ HNMR (CDCl ₃ , 200MHz): δ 8.12-7.93 (m, 3H), 4.56 (t, J=7.3 Hz, 2H), 4.23 (t, J=7.3 Hz, 2H). Mass (CI method): 227.
3		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92 (d, J=7.8 Hz, 2H), 4.64 (t, J=7.4 Hz, 2H), 4.07 (t, J=7.4 Hz, 2H). Mass (CI method): 245, 215.
4		¹ HNMR (CDCl ₃ , 200MHz): δ 8.00 (m, 1H), 7.15 (m, 2H), 4.56 (t, J=7.4 Hz, 2H), 4.06 (t, J=7.4 Hz, 2H). Mass (CI method): 226, 180, 164, 152, 135, 109, 94.
5		¹ HNMR (CDCl ₃ , 200MHz): δ 8.64-8.48 (m, 2H), 7.69 (d, J=8.8 Hz, 1H), 4.60 (t, J=7.3 Hz, 2H), 4.01 (t, J=7.3 Hz, 2H). Mass (CI method): 276, 232, 217, 171, 144.
6		¹ HNMR (CDCl ₃ , 200MHz): δ 8.14-8.04 (m, 2H), 7.90 (t, J=7.6 Hz, 1H), 4.76 (t, J=8.4 Hz, 2H), 4.23 (t, J=8.4 Hz, 2H). Mass (CI method): 242, 223, 167, 121, 94.
7		¹ HNMR (CDCl ₃ , 200MHz): δ 8.14-8.07 (m, 2H), 7.72 (t, J=7.6 Hz, 1H), 4.43 (t, J=7.6 Hz, 2H), 3.57 (t, J=7.6 Hz, 2H).

		Mass (CI method): 258, 239, 212, 193, 108.
8		¹ H NMR (CDCl ₃ , 200MHz): δ 8.11-8.02 (m, 2H), 7.96 (t, J=7.8 Hz, 1H), 4.09-3.83 (2t, 4H), 3.27 (s, 2H). Mass (CI method): 255, 236, 209, 190.
9		¹ H NMR (CDCl ₃ , 200MHz): δ 8.23 (m, 2H), 7.81 (t, J=7.4 Hz, 1H), 7.22 (t, J=7.4 Hz, 1H), 7.03 (d, J=8.4 Hz, 1H). Mass (CI method): 288, 258, 243, 197, 94.

Preparation 10: N1-(2-aminoethyl)-4-nitroaniline

A solution of 4-fluoronitrobenzene (5 g, 35.4 mmol) in CH₃CN (250 ml) was stirred at room temperature under argon overnight. The reaction mixture was filtered and the filtrate was concentrated. The residue obtained was suspended in pet. ether and filtered. The solids were collected to afford the nitro compound (4.1 g, 64 %) as yellow crystals.

¹H NMR (DMSO+CDCl₃, 200 MHz): δ 7.97 (d, J=9.3 Hz, 2H), 7.09 (bs, 1H), 6.62 (d, J=9.3 Hz, 2H), 2.80-3.40 (m, 6H). Mass(CI method): 181, 152, 135, 105.

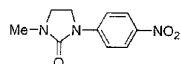
Preparation 11: 1-(4-Nitrophenyl)-2-imidazolidinone

A solution of phosgene (20 % in toluene, 13 ml, 26.5 mmol) in toluene was added drop wise to a solution of the diamine (4 g, 22 mmol) (obtained in preparation 10) and Et₃N (7.6 ml, 55 mmol) in dichloromethane (100 ml) at 0 °C under argon. After being stirred at same temperature for 1 h, the reaction mixture was poured in water and extracted with dichloromethane (4x150 ml). The combined organic extracts were

washed with water, brine and dried. The residue obtained upon evaporation of the solvents was passed through a column of silica gel to afford the product (3 g, 66 %) as yellow solid.

¹H NMR (CDCl₃, 200 MHz): δ 8.17 (d, J=9.3 Hz, 2H), 7.75 (d, J=9.2 Hz, 2H), 7.07 (bs, 1H), 4.00 (t, J=8.8 Hz, 2H), 3.59 (t, J=8.8 Hz, 2H). Mass(CI method): 207, 151, 105.

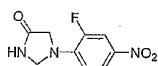
Preparation 12: 1-Methyl-3-(4-nitrophenyl)-2-imidazolidinone



Sodium hydride (60 % in oil, 138 mg, 5.3 mmol) was added portion wise to a solution of the nitro compound (1 g, 4.8 mmol) (obtained in preparation 11) in dry DMF (15 ml) under argon at 0 °C. Stirred the reaction mixture at the same temperature for 15 min. Methyl iodide (MeI) (0.68 g, 4.8 mmol) was added and the reaction mixture was stirred for 1 h. Ice pieces were added to the reaction mixture and the solid formed was filtered to afford the product (900 mg, 84 %) as yellow crystals.

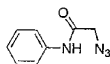
¹H NMR (CDCl₃, 200 MHz): δ 8.19 (d, J=9.3 Hz, 2H), 7.70 (d, J=9.3 Hz, 2H), 3.88 (t, J=8.8 Hz, 2H), 3.54 (t, J=8.8 Hz, 2H), 2.93 (s, 3H). Mass(CI method): 222.

Preparation 13: 1-(3-Fluoro-4-nitrophenyl)-4-imidazolidinone

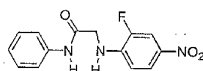


A solution of 4-imidazolidinone (9.5 g, 110.5 mmol), 3,4-difluoro nitrobenzene (12.2 ml, 110.5 mmol) and diisopropyl ethylamine (28.6 ml, 165 mmol) in dry DMF (80 ml) was heated to 60 °C overnight under argon. The reaction mixture was allowed to cool to room temperature and ice pieces were added. The solid formed was filtered and washed with water. The solid was dried under air to yield the nitro compound (19.5 g, 78.5 %) as yellow crystals.

¹H NMR (DMSO, 200 MHz): δ 8.81 (bs, 1H), 8.07-7.96 (m, 2H), 6.82 (t, J=8.8 Hz, 1H), 4.97 (s, 2H), 4.06 (s, 2H). Mass (CI method): 226, 185, 152.

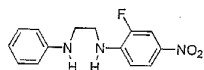
Preparation 14: N1-phenyl-2-azidoacetamide

Chloroacetyl chloride (5.1 ml, 64.5 mmol) was added drop wise to a solution of aniline (5 g, 53.7 mmol) and Et₃N (18.7 ml, 134.3 mmol) in dichloromethane (150 ml) at 0°C under argon. After the completion of reaction (TLC control), the reaction mixture was diluted with dichloromethane (300 ml). The resultant mixture was washed with water, brine and dried. The residue obtained upon evaporation of solvent was taken up in dry DMF (40 ml), added NaN₃ (6.15 g, 94.6 mmol) and the resultant mixture was stirred at 80 °C for 2 h. The reaction mixture was diluted with ethyl acetate and washed with water, brine and dried. The residue obtained upon evaporation of the solvent was chromatographed over silica gel to afford the azide (6 g, 63%).

Preparation 15: N1-phenyl-2-(2-fluoro-4-nitroanilino)acetamide

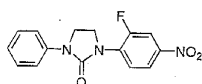
A solution of the azide (6 g, 34 mmol) obtained in preparation 14 was taken in MeOH (60 ml) and the resultant solution was hydrogenated over 10% Pd on charcoal (2.5 g) overnight. The reaction mixture was filtered on a celite pad and the filtrate was concentrated. To this residue dry DMF (40 ml) was added followed by diisopropyl ethyl amine (16.7 ml, 93.8 mmol) and 3,4-difluoronitro benzene (3.8 ml, 37.5 mmol). The resultant solution was kept at 80°C overnight with continuous monitoring by TLC. Ice-cold water was added to the reaction mixture and the solid separated was filtered to afford the nitro compound as a yellow solid (6 g, 61 %).

¹H NMR (DMSO-CDCl₃, 200 MHz): 8.9.74 (bs, 1H), 7.84-8.00 (m, 2H), 7.58 (d, J=8.3 Hz, 2H), 7.30 (d, J=8.3 Hz, 2H), 7.08 (m, 1H), 6.66 (t, J=8.8 Hz, 1H), 6.45 (bs, 1H), 4.09 (d, J=5.4 Hz, 2H). Mass (CI Method): 290.

Preparation 16: N1-(2-anilinoethyl)-2-fluoro-4-nitroaniline

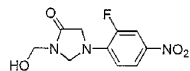
A 1 M solution of BH_3 .THF (45 ml, 45 mmol) was added drop wise to a solution of the nitro compound (4.5 g, 15.5 mmol) (obtained in preparation 15) in dry THF (30 ml) at 0 °C under argon. The reaction mixture was stirred overnight at room temperature and then water was added cautiously to quench the excess borane. The volatiles were removed from the reaction mixture under vacuum and the residue was taken up in ethyl acetate (400 ml). The organic layer was washed with water, brine and dried. The residue obtained upon evaporation of the solvent was passed through column to afford the product (4 g, 93 %).

^1H NMR (CDCl_3 , 200 MHz): δ 8.02-7.86 (m, 2H), 7.26-7.18 (m, 2H), 6.82-6.62 (m, 4H), 4.94 (bs, 1H), 3.83 (bs, 1H), 3.51 (s, 4H). Mass (CI method): 274.

Preparation 17: 1-(2-Fluoro-4-nitrophenyl)-3-phenyl-2-imidazolidinone

A solution of phosgene (20 % in toluene, 7.4 ml, 14.7 mmol) was added drop wise to a solution of the diamine (4 g, 14.5 mmol) (obtained in preparation 16) and Et_3N (5.6 ml, 40.4 mmol) in dichloromethane (50 ml) at 0 °C under argon. Stirred for 2 h at the same temperature the reaction mixture was diluted with dichloromethane (300 ml) and washed with water, brine and dried. The crystals obtained upon evaporation of the solvents were suspended in petroleum ether and filtered. The product was isolated as yellow crystals (4 g, 91.4 %).

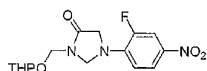
^1H NMR (CDCl_3 , 200 MHz): δ 8.10-7.11 (m, 8H), 4.22-4.00 (m, 4H). Mass (CI Method): 302, 106.

Preparation 18: 1-(2-Fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone

A mixture of 1-(3-fluoro-4-nitrophenyl)-4-imidazolidinone (9 g, 40 mmol) (obtained in preparation 13) and 40% solution of formaldehyde (100 mL) was heated to reflux for 4 h. The reaction mixture was allowed to cool to room temperature and ice water mixture was added. The precipitated solid was filtered and dried to give the product as yellow solid (8.5 g, 83% yield).

¹H NMR (DMSO-d₆, 200MHz): δ 8.10-7.95 (m, 2H), 6.90-6.80 (m, 1H), 6.20 (t, J = 6.8 Hz, 1H), 5.13 (d, J = 2.9 Hz, 2H), 4.77 (d, J = 7.3 Hz, 2H), 4.19 (s, 2H).

10 Mass (CI method): 226.

Preparation 19: 1-(2-Fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone

A solution of 1-(2-fluoro-4-nitrophenyl)-3-hydroxymethyl-4-imidazolidinone (6.7 g, 26.2 mmol) (obtained in preparation 18), pyridinium p-toluenesulphonate (PPTS) (65 mg, 0.39 mmol) and 3,4-dihydro-2H-pyran (3.6 mL, 39.4 mmol) in dichloromethane (100 mL) was stirred at room temperature under argon overnight. The reaction mixture was diluted with dichloromethane (400 mL), washed with half-saturated brine (2×100 mL) and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product as yellow solid (7 g, 79%).

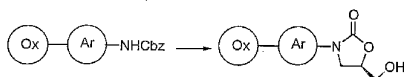
20 ¹H NMR (CDCl₃, 200MHz): δ 8.05-7.85 (m, 2H), 6.60-6.45 (m, 1H), 5.30-4.70 (m, 5H), 4.17 (s, 2H), 4.20-3.30 (m, 4H), 2.00-1.40 (m, 6H).

Mass (CI method): 340, 256, 237.

Preparation 20: General procedure for the conversion of

- where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring

A solution of the nitro compound in THF was hydrogenated over 10% Pd on charcoal (catalytic amount) overnight. After the complete consumption of starting material, a 5% solution of Na_2CO_3 (2.2 eq) in water was added followed benzyl chloroformate (1.2 eq) at 0 °C. After stirring the reaction mixture for 3 h at room temperature, it was filtered over celite bed and washed with ethyl acetate. The organic layer was separated from the filtrate and washed with water twice followed by brine. The organic extract was dried, evaporated and purified on a column of silica gel.

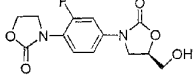
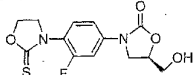
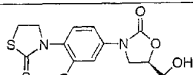
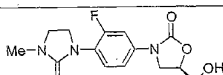
Examples:**A. General procedure for the conversion of**

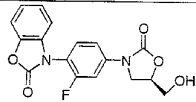
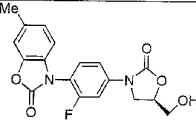
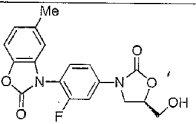
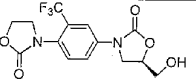
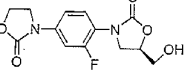
- where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

To a solution of the starting material in dry THF at -78 °C under argon was added 1.6M BuLi (1.2 eq) drop wise. The reaction mixture was stirred for 45 min at the same temperature and then R-glycidyl butyrate (1.2 eq) was added. Stirred for 1 h at -78 °C. Then the cold bath was removed while monitoring with TLC. After 3-12 h, the reaction mixture was quenched with saturated NH_4Cl solution and extracted with ethyl

acetate. The combined organic extracts were washed with water, brine and dried. The residue obtained upon evaporation of solvents was chromatographed over silica gel to afford the product.

5 Examples 1-19 have been prepared according to the general procedure A

Example No.	Structure	Analytical Data
1		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.68-7.50 (m, 2H), 7.38 (d, J=8.8 Hz, 1H), 5.23 (t, J=5.8 Hz, 1H), 4.73-4.72 (m, 1H), 4.47 (t, J=7.4 Hz, 2H), 4.14-3.80 (m, 4H), 3.68-3.56 (m, 2H).
2		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J=11.6 Hz, 1H), 7.52 (t, J=8.8 Hz, 1H), 7.29 (d, J=8.8 Hz, 1H), 4.89 (bs, 1H), 4.76 (t, J=2H), 4.17 (t, J=8.8 Hz, 2H), 3.93-3.68 (m, 4H).
3		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (dd, J=12.7 Hz and 2.2 Hz, 1H), 7.44-7.26 (m, 2H), 4.75-4.68 (m, 2H), 4.37 (t, J=7.8 Hz, 2H), 4.04-3.56 (m, 4H), 3.48 (t, J=7.8 Hz, 2H).
4		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J=2.4 Hz and 12.7 Hz, 1H), 7.47 (t, J=8.4 Hz, 1H), 7.24-7.20 (m, 1H), 4.77-4.69 (m, 1H), 4.10-3.81 (m, 5H), 3.77-3.68 (m, 4H), 3.23 (s, 3H).

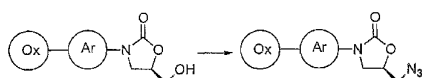
5		¹ HNMR (CDCl ₃ , 200MHz): δ 7.85-7.79 (m, 1H), 7.58 (t, J = 8.0 Hz, 1H), 7.46-7.42 (m, 1H), 7.30-7.18 (m, 4H), 6.90-6.87 (m, 1H), 4.90-4.75 (m, 1H), 4.15-4.07 (m, 3H), 3.87-3.81 (m, 1H).
6		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J = 2.4 Hz and 12.2 Hz, 1H), 7.53-7.26 (m, 2H), 7.11 (s, 1H), 6.97 (d, J = 8.4 Hz, 1H), 6.72 (d, J = 7.8 Hz, 1H), 4.81-4.65 (m, 1H), 4.09-3.8 (m, 4H), 2.41 (s, 3H), 2.09 (hump, 1H).
7		¹ HNMR (CDCl ₃ , 200MHz): δ 7.77 (d, J = 10.4 Hz, 1H), 7.57-7.26 (m, 3H), 6.96 (d, J = 7.8 Hz, 1H), 6.64 (s, 1H), 4.82-4.71 (m, 1H), 4.14-4.05 (m, 3H), 3.84-3.78 (m, 2H), 2.35 (s, 3H).
8		¹ HNMR (CDCl ₃ , 200MHz): δ 7.92-7.89 (m, 2H), 7.44 (d, J = 7.8 Hz, 1H), 7.80-7.71 (m, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.08-3.89 (m, 6H), 2.16 (s, 1H).
9		¹ HNMR (CDCl ₃ , 200MHz): δ 7.69-7.48 (m, 2H), 7.23 (d, J = 8.8 Hz, 1H), 4.81-4.72 (m, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.13-3.69 (m, 6H).

10		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29 (d, J = 10.8 Hz, 2H), 4.80-4.73 (m, 1H), 4.57 (t, J = 15.6 Hz, 2H), 4.00-3.73 (m, 8H).
11		¹ HNMR (CDCl ₃ , 200MHz): δ 7.59 (s, 4H), 5.24 (t, J = 5.4 Hz, 1H), 4.67 (bs, 1H), 4.45 (t, J = 7.4 Hz, 2H), 4.13-4.02 (m, 3H), 3.88-3.54 (m, 3H).
12		¹ HNMR (CDCl ₃ , 200MHz): δ 7.79 (d, J = 9.2 Hz, 2H), 7.72 (d, J = 9.2 Hz, 2H), 7.59-7.03 (m, 4H), 5.18 (t, J = 5.8 Hz, 1H), 4.80-4.71 (m, 1H), 4.18-4.02 (m, 2H), 3.98-3.68 (m, 2H).
13		¹ HNMR (CDCl ₃ , 200MHz): δ 2.9 (s, 3H), 4.1 (t, 1H), 3.9 (m, 6H), 4.7 (m, 1H), 4.8 (s, 2H), 6.8 (t, 1H), 7.2 (d, 1H).
14		¹ HNMR (CDCl ₃ , 200MHz): δ 7.4 (dd, J = 2 Hz and 15.4 Hz, 1H), 7.2 (d, J = 8.8 Hz, 2H), 7.0 (d, J = 9.4 Hz, 1H), 6.85 (d, J = 8.4 Hz, 2H), 6.5 (t, J = 9.2 Hz, 1H), 4.75 (s, 3H), 4.50 (s, 2H), 3.95 (m, 6H), 3.8 (s, 3H).
15		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (dd, J = 2.4 Hz and 13.4 Hz, 1H), 7.45 (t, J = 8.8 Hz, 1H), 7.10 (dd, J = 2.2 Hz and 13.0 Hz, 1H), 4.66 (m, 1H), 3.81 (m, 6H), 3.47 (t, 2H), 2.8 (s, 3H).

75

16		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 3.4 (m, 3H), 4.7 (m, 1H), 7.5 (m, 4H).
17		¹ HNMR (CDCl ₃ , 200MHz): δ 7.7-7.2 (m, 9H), 4.8-4.6 (m, 1H), 4.5 (s, 2H), 4.1-3.7 (m, 6H), 3.4 (t, J=8.8 Hz, 2H).
18		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.7 (m, 4H), 7.3-7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 4H), 4.7 (m, 1H), 3.9-4.1 (m, 6H), 3.9 (s, 1H), 3.7 (m, 1H).
19		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.7 (m, 2H), 4.0 (m, 7H), 3.8 (m, 1H).

B. General procedure for the conversion of

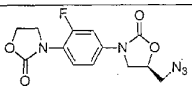
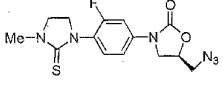
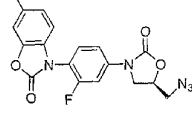


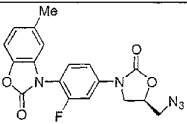
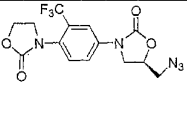
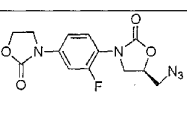
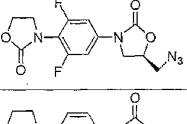
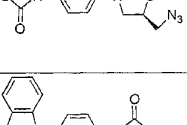
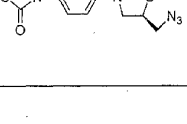
where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

To a solution of the alcohol, triethylamine (2.2 eq) in dry dichloromethane, methane sulfonylchloride (1.1 eq) was added at 0 °C under argon. The reaction mixture was warmed to room temperature over 2 h and then diluted with dichloromethane. The organic layer was washed with water, brine and dried. The residue obtained upon

evaporation of the solvent was taken up in dry DMF and then NaN_3 (1.5 eq) was added at room temperature. The resultant mixture was heated to 80 °C for 2-5 h while monitoring by TLC. Allowed the reaction mixture to attain room temperature, water was added and extracted with ethyl acetate. The combined organic extracts were washed with water (3 times), brine and dried. The residue obtained upon evaporation of the solvent was passed through column to obtain the azide.

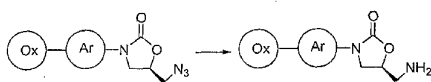
Examples 20-31 have been prepared according to the general procedure B

Example No.	Structure	Analytical Data
20		$^1\text{H NMR}$ ($\text{DMSO}-d_6$, 200MHz): δ 7.67-7.52 (m, 2H), 7.38 (d, $J=8.8$ Hz, 1H), 4.95-4.88 (m, 1H), 4.47 (t, $J=7.2$ Hz, 2H), 4.16 (t, $J=9.4$ Hz, 1H), 4.02-3.64 (m, 5H).
21		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.62 (dd, $J=2.4$ Hz and 12.7 Hz, 1H), 7.48 (t, $J=8.4$ Hz, 1H), 7.22-7.17 (m, 1H), 4.85-4.73 (m, 1H), 4.16-3.52 (m, 8H), 3.22 (s, 3H).
22		$^1\text{H NMR}$ (CDCl_3 , 200MHz): δ 7.75 (dd, $J=2.0$ Hz and 12.2 Hz, 1H), 7.54 (t, $J=8.8$ Hz, 1H), 7.40-7.26 (m, 1H), 7.10 (s, 1H), 6.97 (d, $J=7.8$ Hz, 1H), 6.71 (d, $J=6.8$ Hz, 1H), 4.87-4.79 (m, 1H), 4.17-3.57 (m, 4H), 2.41 (s, 3H).

23		¹ HNMR (CDCl ₃ , 200MHz): δ 7.81 (d, 1H), 7.54 (t, 1H), 7.45-7.01 (m, 3H), 6.67 (s, 1H), 4.91-4.79 (m, 1H), 3.95-3.47 (m, 4H), 2.38 (s, 3H).
24		¹ HNMR (CDCl ₃ , 200MHz): δ 7.89 (d, J = 7.4 Hz, 2H), 7.43 (d, J = 9.4 Hz, 1H), 4.87-4.80 (m, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.12 (t, J = 8.8 Hz, 2H), 3.97-3.55 (m, 4H).
25		¹ HNMR (CDCl ₃ , 200MHz): δ 7.71-7.50 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.89-4.75 (m, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.47-3.55 (m, 6H).
26		¹ HNMR (CDCl ₃ , 200MHz): δ 7.31 (s, 2H), 4.83-4.81 (m, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.09-3.55 (m, 6H).
27		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.64 (s, 4H), 4.98-4.89 (m, 1H), 4.50 (t, J = 7.4 Hz, 2H), 4.25-4.07 (m, 4H), 3.88-3.70 (m, 2H).
28		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75 (d, J = 9.2 Hz, 2H), 7.59 (d, J = 9.2 Hz, 2H), 7.48-7.03 (m, 4H), 4.89-4.81 (m, 1H), 4.16 (t, J = 9.2 Hz, 1H), 3.98-3.58 (m, 3H).

29		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5-7.4 (dd, 1H), 7.1 (dd, 1H), 6.5 (t, 1H), 4.9 (s, 2H), 4.8-4.7 (m, 1H), 4.1-3.5 (m, 6H), 3.0 (s, 3H).
30		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.35 (t, 2H), 7.0-7.2 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.7 (m, 2H).
31		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.2 (m, 1H), 7.0 (m, 2H), 4.8 (m, 1H), 4.1 (m, 1H), 4.0 (s, 4H), 3.9 (m, 1H), 3.6 (m, 2H).

C. General procedure for the conversion of



where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

Procedure (i):

A solution of the azide in THF: MeOH (1:3) was hydrogenated over 10% Pd on charcoal overnight. The reaction mixture was filtered and the filtrate was concentrated. The residue was crystallized in MeOH to afford the amine.

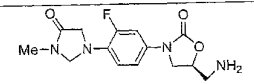
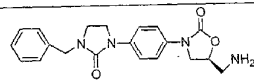
Procedure (ii):

Triphenyl phosphine (1.3 eq) was added portion wise to a solution of the azide in dry THF and the resultant mixture was stirred at room temperature for 6 h. Water (few drops) was added and the reaction mixture was heated to 60 °C overnight. The solvent

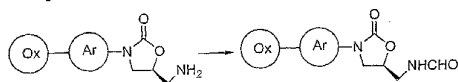
was evaporated and the residue was passed through a column of silica gel to afford the amine.

Examples 32-37 have been prepared according to the general procedure C

Example No.	Structure	Analytical Data
32		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.66-7.50 (m, 2H), 7.37 (d, J = 9.4 Hz, 1H), 4.66-4.60 (m, 1H), 4.47 (t, J = 7.8 Hz, 2 H), 4.12-3.83 (m, 6 H), 2.91-2.80 (m, 2 H). Mp: 147 °C
33		¹ HNMR (CDCl ₃ , 200MHz): δ 7.63-7.55 (dd, J = 2.0 Hz and 13.0 Hz, 1H), 7.49-7.22 (m, 2H), 4.63-4.60 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 4.03-3.73 (m, 4H), 3.32 (m, 3H), 3.08 (s, 3H).
34		¹ HNMR (CDCl ₃ , 200MHz): δ 8.02 (s, 2H), 7.87-7.83 (m, 2H), 7.64 (s, 1H), 7.50 (d, J = 8.2 Hz, 1H), 4.84 (s, 1H), 4.54 (t, J = 7.4 Hz, 2H), 4.20-3.90 (m, 6H).
35		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.57 (s, 4H), 4.63-4.61 (m, 1H), 4.44 (t, J=7.2 Hz, 2H), 4.08-3.82 (m, 4H), 2.86-2.82 (m, 2H).

36		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6-7.4 (dd, 1H), 7.1 (dd, 1H), 6.6 (t, 1H), 4.9 (s, 2H), 4.6 (m, 1H), 4.1-3.7 (m, 4H), 3.2-2.8 (m, 4H).
37		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62-7.40 (m, 3H), 7.3 (s, 5H), 4.7 (m, 1H), 4.5 (s, 2H), 4.1 (t, 1H), 3.9-3.8 (m, 4H), 3.4 (t, 2H).

D. General procedure for the conversion of



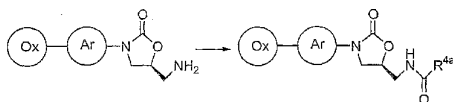
- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

- 10 A solution of amine in methyl formate was heated to 80 °C overnight. The volatiles were removed under low pressure and the residue obtained was passed through column to yield formate in very pure form.

Examples 38 & 39 have been prepared according to the general procedure D

Example No.	Structure	Analytical Data
38		¹ HNMR (CDCl ₃ , 200MHz): δ 8.28 (s, 1H), 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 6.15 (bs, 1H), 4.82 (m, 1H), 4.52 (t, J = 7.4 Hz, 2H), 4.48-4.02 (m, 3H).
39		¹ HNMR (CDCl ₃ , 200MHz): δ 8.27 (s, 1H), 7.26-7.23 (m, 2H), 6.32 (bs, 1H), 4.82 (bs, 1H), 4.58 (t, J = 7.2 Hz, 2H), 4.214-3.68 (m, 6H).

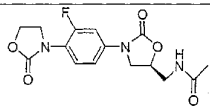
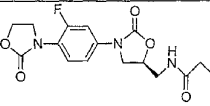
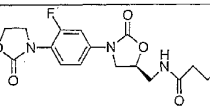
E. General procedure for the conversion of

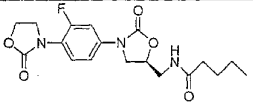
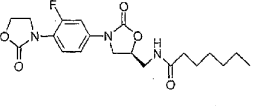
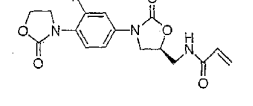
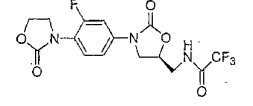


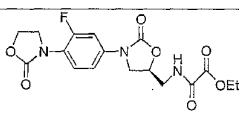
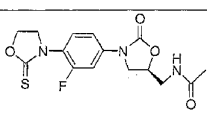
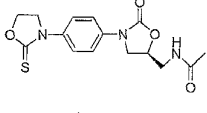
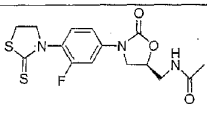
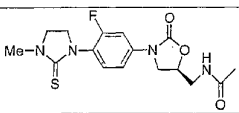
where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxy carbonyl.

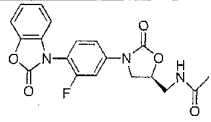
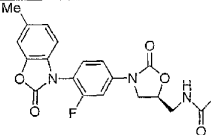
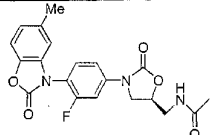
To a solution of the amine (1 eq) in dry dichloromethane at 0 °C under argon was added Et₃N (2.5 eq) followed by respective acid chloride (1.2 eq) drop wise. After being stirred at room temperature for 1 to 6 h (TLC control), the reaction mixture was diluted with dichloromethane and washed with water twice followed by brine. The organic extract was dried, evaporated and was passed through column to afford the acylated product.

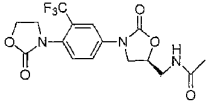
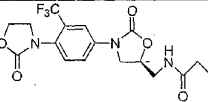
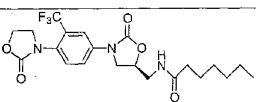
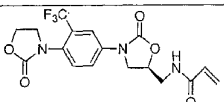
Examples 40-70 have been prepared according to the general procedure E

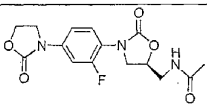
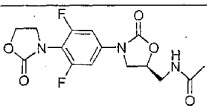
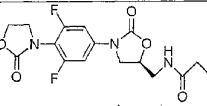
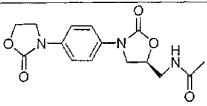
Example No.	Structure	Analytical Data
40		¹ HNMR (CDCl ₃ , 200MHz): δ 7.62 (dd, J = 2.60 Hz and 13.4 Hz, 1H), 7.52 (d, J = 8.60 Hz, 1H), 7.13-7.17 (m, 1H), 5.96-5.99 (m, 1H), 4.82-4.76 (m, 1H), 4.52 (t, J = 7.40 Hz, 2H), 4.01-4.09 (m, 3H), 3.62-3.81 (m, 3H), 2.02 (s, 3H).
41		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.16 (d, J = 8.8 Hz, 1H), 6.03 (bs, 1H), 4.82-4.78 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.0 (m, 3H), 3.83-3.65 (m, 3H), 2.24 (q, J = 7.8 Hz, 2H), 1.13 (t, J = 7.8 Hz, 3H). Mp: 203 °C
42		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2 H), 7.15 (d, J = 8.8 Hz, 1H), 6.01 (bs, 1H), 4.81-4.75 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.01 (m, 3H), 3.83-3.65 (m, 3H), 2.19 (t, J = 7.4 Hz, 2H), 1.65-1.58 (m, 2H), 0.98 (t, J = 7.4 Hz, 3H). Mp: 211°C

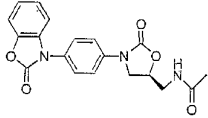
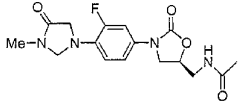
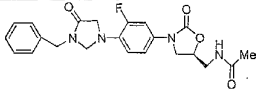
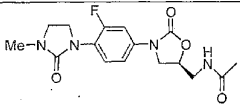
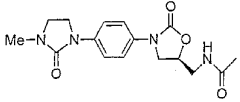
43		¹HNMR (CDCl₃, 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 4.82-4.76 (m, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.09-4.01 (m, 2H), 3.83-3.65 (m, 3H), 2.21 (t, J = 7.4 Hz, 2H), 1.57-1.49 (m, 2H), 1.38-1.20 (m, 2H), 0.89 (t, 3H). Mp: 187 °C
44		¹HNMR (CDCl₃, 200MHz): δ 7.68-7.52 (m, 2H), 7.17 (d, 8.6 Hz, 1H), 5.96 (hump, 1H), 4.81 (hump, 1H), 4.54 (t, J = 7.2 Hz, 2H), 4.11-3.67 (m, 6H), 2.22 (t, J = 7.4 Hz, 2H), 1.60 (bs, 8H), 0.87 (s, 3H). Mp: 131 °C
45		¹HNMR (CDCl₃+DMSO-d₆, 200MHz): δ 7.97 (bs, 1H), 7.6-7.40 (m, 2H), 7.10 (d, J = 8.8 Hz, 1H), 6.35-6.15 (m, 2H), 5.63 (dd, J = 4.0 Hz and 8.3 Hz, 1H), 4.79-4.86 (m, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.05 (t, J = 6.8 Hz, 2H), 3.89-3.56 (m, 4H). Mp: 196 °C
46		¹HNMR (CDCl₃+DMSO-d₆, 200MHz): δ 9.38 (bs, 1H) 7.67-7.5(m, 2H), 7.20 (d, J = 8.8 Hz, 1H), 4.88-4.87 (m, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.16-4.02 (m, 3H), 3.89-

		3.70 (m, 1H), 3.67-3.65 (m, 2H). Mp: 194 °C
47		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.49 (m, 2H), 7.15 (d, J = 8.8 Hz, 1H), 4.85-4.83 (m, 1H), 5.55-4.47 (m, 2H), 4.37-4.31 (m, 2H), 4.14-3.90 (m, 3H), 3.88-3.60 (m, 3H), 1.42 (t, 3H). Mp: 160 °C
48		¹ HNMR (CDCl ₃ , 200MHz): δ 7.75-7.05 (m, 3H), 6.05 (bs, 1H), 4.95-4.62 (m, 2H), 4.52 (t, 1H), 4.30-3.32 (m, 6H), 2.023 (s, 3H).
49		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (d, J = 7.81 Hz, 2H), 7.3 (d, J = 7.81 Hz, 2e H), 4.8 (s, 1H), 4.4 (s, 4H), 4.1 (t, 1H), 3.8 (t, 1H), 3.5 (s, 1H), 32.3 (s, 1H), 2.0 (s, 3H).
50		¹ HNMR (CDCl ₃ , 200MHz): δ 7.99 (hump, 1H), 7.73 (d, J = 13.0 Hz, 1H), 7.43 (d, J = 8.0 Hz, 1H), 7.31 (d, J = 8.8 Hz, 1H), 4.83 (hump, 1H), 4.42 (t, J = 7.6 Hz, 2H), 4.15-3.89 (m, 3H), 3.62-3.55 (m, 4H), 2.0 (s, 3H). Mp: 220 °C
51		¹ HNMR (CDCl ₃ , 200MHz): δ 7.61 (dd, J = 2.6 Hz and 12.7 Hz, 1H), 7.48 (t, J = 8.4 Hz, 1H), 7.19 (dd, J = 2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J =

		2.6 Hz and 8.8 Hz, 1H), 6.15 (t, J = 8.4 Hz, 1H), 4.79-4.77 (m, 1H), 4.05 (t, J = 8.8 Hz, 1H), 3.97-3.88 (m, 2H), 3.81-3.74 (m, 3H), 3.69-3.61 (m, 2H), 3.23 (s, 3H), 2.03 (s, 3H). Mp: 171 °C
52		¹ HNMR (CDCl ₃ , 200MHz): δ 7.76 (dd, J = 2.2 Hz and 12.0 Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.37-7.14 (m, 4H), 6.82 (t, J = 3.4 Hz, 1H), 6.03 (t, J = 5.4 Hz, 1H), 4.83-4.80 (m, 1H), 4.10 (t, J = 9.0 Hz, 1H), 3.88-3.80 (m, 1H), 3.71-3.66 (m, 2H), 2.04 (s, 3H).
53		¹ HNMR (CDCl ₃ , 200MHz): δ 7.74 (dd, J = 2.6 Hz and 12.2Hz, 1H), 7.53 (t, J = 8.4 Hz, 1H), 7.49-7.26 (m, 2H), 7.10-6.95 (m, 2H), 6.72-6.68 (m, 1H), 6.09-6.01 (m, 1H), 4.84 (bs, 1H), 4.10 (t, J = 8.8 Hz, 1H), 3.88-3.66 (m, 3H), 2.41 (s, 3H), 2.04 (s, 3H). Mp: 213 °C
54		¹ HNMR (CDCl ₃ , 200MHz): δ 7.80-6.94 (m, 4H), 6.63 (s, 1H), 6.0 (bs, 1H), 4.82-4.90 (m, 1H), 4.11 (t, J = 9.2 Hz, 1H), 3.89-3.66 (m, 3H), 2.35 (s, 3H), 2.09 (s, 3H). Mp: 202 °C

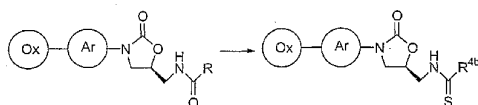
55		¹HNMR (CDCl ₃ , 200MHz): δ 7.93 (s, 1H), 7.76 (d, J = 8.8 Hz, 1H), 7.42 (d, J = 8.8 Hz, 1H), 6.57 (bs, 1H), 4.79 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.11-3.60 (m, 6H), 1.99 (s, 3H). Mp: 143 °C.
56		¹HNMR (CDCl ₃ , 200MHz): δ 7.93-7.79 (m, 2H), 7.43 (d, J = 8.8 Hz, 1H), 6.12 (bs, 1H), 4.82-4.78 (m, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09 (t, J = 9.4 Hz, 1H), 3.96-3.66 (m, 5H), 2.30-2.17 (m, 2H), 1.20 (t, J = 9.4 Hz, 3H). Mp: 143 °C
57		¹HNMR (CDCl ₃ , 200MHz): δ 7.91 (s, 1H), 7.78 (d, J = 8.2 Hz, 1H), 6.26 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.06 (t, J = 9.4 Hz, 1H), 3.95-3.67 (m, 5H), 2.47-2.05 (m, 4H), 1.83-1.54 (m, 6H), 0.83-0.78 (m, 3H). Mp: hygroscopic
58		¹HNMR (CDCl ₃ , 200MHz): δ 7.92 (s, 1H), 7.85 (d, J = 8.2 Hz, 1H), 7.45 (d, J = 8.8 Hz, 1H), 6.40-6.07 (m, 3H), 5.75 (d, J = 10.4 Hz, 1H), 4.89 (hump, 1H), 4.56 (t, J = 7.8 Hz,

		2H), 4.13 (t, J = 9.2 Hz, 1H), 3.98-3.78 (m, 5H). Mp: 191°C
59		¹ HNMR (CDCl ₃ , 200MHz): δ 7.65-7.41 (m, 2H), 7.23 (d, J = 7.2 Hz, 1H), 6.12 (bs, 1H), 4.80 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.47-4.00 (m, 3H), 3.81-3.59 (m, 3H), 2.05 (s, 3H). Mp: 120 °C
60		¹ HNMR (CDCl ₃ , 200MHz): δ 7.27 (d, J = 9.8 Hz, 2H), 6.01 (hump, 1H), 4.80 (hump, 1H), 4.57 (t, J = 7.8 Hz, 2H), 4.06-3.67 (m, 6H), 2.03 (s, 3H). Mp: 219 °C
61		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.32-7.26 (m, 2H), 7.09 (hump, 1H), 4.81 (hump, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.05-3.62 (m, 6H), 2.25-2.18 (m, 2H), 1.11 (t, J = 7.8 Hz, 3H). Mp: 224 °C
62		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.64 (s, 2H), 7.55 (s, 2H), 7.09-7.25 (m, 1H), 4.70-4.85 (m, 1H), 4.46 (t, 2H), 4.13-3.81 (m, 4H), 3.57 (bs, 2H), 1.96 (s, 3H). Mp: 231 °C

63		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70 (d, J = 8.8 Hz, 2H), 7.54 (d, J = 8.8 Hz, 2H), 7.24-6.99 (m, 4H), 6.19 (bs, 1H), 4.80 (m, 1H), 4.09 (t, J = 8.8 Hz, 1H), 3.85 (t, J = 7.0 Hz, 1H), 3.69-3.63 (m, 2H), 2.02 (s, 3H). Mp: 229 °C
64		¹ HNMR (CDCl ₃ , 200MHz): δ 7.10 (d, 1H), 6.6 (t, 1H), 6.0 (m, 1H), 4.90 (s, 2H), 4.9 (m, 1H), 4.0 (s, 3H), 3.80 (m, 3H), 3.0 (s, 3H), 2.0 (s, 3H). Mp: 230 °C
65		¹ HNMR (CDCl ₃ , 200MHz): δ 7.26-7.46 (m, 6H), 7.01 (d, 1H), 6.63 (t, 1H), 6.05 (s, 1H), 4.71-4.89 (m, 2H), 4.77 (s, 1H), 4.60 (s, 2H), 3.94-4.04 (m, 3H), 3.61-3.76 (m, 3H), 2.01 (s, 3H).
66		¹ HNMR (CDCl ₃ , 200MHz): δ 7.50 (m, 2H), 7.10 (d, J = 8.4 Hz, 1H), 6.18 (t, 1H), 4.7 (m, 1H), 4.0 (t, J = 9.4 Hz, 1H), 3.6 (m, 7H), 2.9 (s, 3H), 2.0 (s, 3H). Mp: 182 °C
67		¹ HNMR (CDCl ₃ , 200MHz): δ 2.0 (s, 3H), 2.8 (s, 3H), 4.0 (t, 1H), 3.4-3.8 (m, 5H), 4.8 (m, 1H), 6.2 (m, 1H), 7.6 (m, 4H).

68		Mp: 217 °C ¹ HNMR (CDCl ₃ , 200MHz): δ 7.6-7.3 (m, 9H), 6.2 (bt, 1H), 4.8-4.7 (m, 1H), 4.5 (s, 2H), 4.06 (t, J=9.3 Hz, 1H), 3.90-3.3 (m, 6H), 2.0 (s, 3H). Mp: 204 °C
69		¹ HNMR (CDCl ₃ , 200MHz): δ 7.70-7.50 (m, 4H), 7.40-7.30 (t, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.1 (t, 1H), 4.80 (m, 5H), 4.0 (m, 5 H), 3.8 (m, 1H), 3.6 (m, 2H), 2.0 (s, 3H). Mp: 182 °C
70		¹ HNMR (CDCl ₃ , 200MHz): δ 8.3 (m, 1H), 7.6 (m, 4H), 7.3 (m, 1H), 7.2 (t, 2H), 4.7 (m, 1H), 4.1 (t, 1H), 3.8-4.0 (m, 4H), 3.7 (t, 1H), 3.0 (m, 2H), 1.8 (s, 3H). Mp: 194 °C

F. General procedure for the conversion of



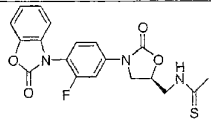
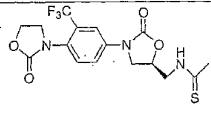
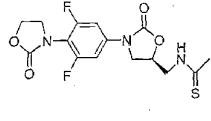
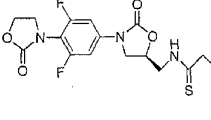
- where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4b} represents (C₁-C₆)alkyl,

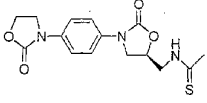
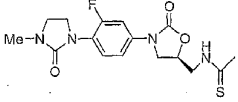
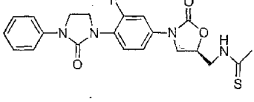
halo(C₁-C₆)alkyl, -C(=O)-(C₁-C₆)alkoxy, -C(=O)-aryloxy, -C(=S)-(C₁-C₆)alkyl or -C(=S)-aryl.

A solution of the amide (1 eq) and Lawesson's reagent (0.6 eq) in dry dioxane was heated to 55 to 90 °C over 3 to 10 h (TLC control). The reaction mixture was allowed to cool to room temperature and diluted with ethyl acetate. The resultant mixture was washed with water (4 times) followed by brine and dried. The residue obtained upon evaporation of solvent was passed through column of silica gel to afford the respective thioacetate.

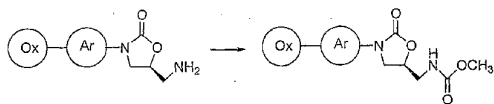
10 Examples 71-80 have been prepared according to the general procedure F

Example No.	Structure	Analytical Data
71		¹ HNMR (CDCl ₃ , 200MHz): δ 7.94 (bs, 1H), 7.66-7.52 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 5.20-4.85 (m, 1H), 4.54 (t, J = 7.8 Hz, 2H), 4.25-3.82 (m, 6H), 2.61 (s, 3H). Mp: 171 °C
72		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.51 (s, 1H), 7.64-7.47 (m, 2H), 7.16 (d, J = 8.8 Hz, 1H), 5.01 (bs, 1H), 4.53 (t, J = 7.2 Hz, 2H), 4.29-3.89 (m, 4H), 3.63 (q, J = 10.2 Hz, 2H). Mp: 165 °C
73		¹ HNMR (CDCl ₃ , 200MHz): δ 7.90 (bs, 1H), 7.61 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.50 (t, J = 8.2 Hz, 1H), 7.19 (dd, J = 2.4 Hz and 12.8

		1H), 7.19 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 5.0 (m, 1H), 4.25-3.74 (m, 8H), 3.24 (s, 3H), 2.6 (s, 3H). Mp: 111 °C
74		¹ HNMR (CDCl ₃ , 200MHz): δ 7.87-7.74 (m, 2H), 7.57 (t, J = 8.2 Hz, 1H), 7.39-7.18 (m, 4H), 6.87-6.85 (m, 1H), 5.08-5.05 (m, 1H), 4.37-4.27 (m, 1H), 4.23-4.06 (m, 2H), 3.94 (t, J = 6.8 Hz, 1H), 2.62 (s, 3H). Mp: 137 °C
75		¹ HNMR (CDCl ₃ , 200MHz): δ 8.1 (s, 1H), 7.9 (s, 1H), 7.8 (d, J = 8.7 Hz, 1H), 7.4 (d, J = 8.79, 1H), 5.0 (s, 1H), 4.6 (t, 2H), 4.0 (m, 6H), 2.6 (s, 3H). Mp: 154 °C
76		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 10.37 (bs, 1H), 7.50 (d, J = 10.8 Hz, 2H), 4.98(bs, 1H), 4.55 (t, J = 7.8 Hz, 2H), 4.23-3.78 (m, 6H), 2.50 (s, 3H). Mp: 108 °C
77		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (bt, 1H), 7.28 (d, J=9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J=7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J=7.4 Hz, 2H), 1.29 (t, J=7.8 Hz,

		3H). Mp: 168 °C
78		¹ HNMR (CDCl ₃ , 200MHz): δ 7.86 (hump, 1H), 7.25 (d, J = 9.6 Hz, 2H), 5.02-4.99 (m, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.24-3.80 (m, 6H), 2.71 (q, J = 7.4 Hz, 2H), 1.29 (t, J = 7.8 Hz, 3H). Mp: 195 °C
79		¹ HNMR (CDCl ₃ , 200MHz): δ 8.4 (1H), 7.5 (m, 2H), 7.0 (d, J = 8.8 Hz, 2H), 4.9 (m, 1H), 3.9 (m, 6H), 3.5 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H), 2.5 (s, 3H). Mp: 168 °C
80		¹ HNMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.4 (m, 2H), 7.2 (d, J = 8.8 Hz, 1H), 7.0 (t, 1H), 5.0 (m, 1H), 4.0 (m, 8H), 2.6 (s, 3H). Mp: 165 °C

G. General procedure for the conversion of



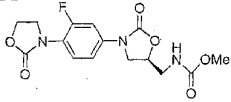
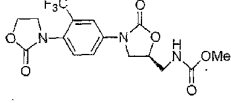
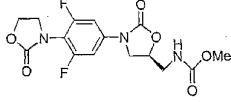
- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the

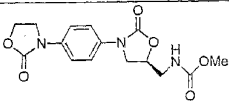
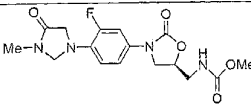
heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

To a solution of the amine (1 eq), Et₃N (2.2 eq) in dry dichloromethane methyl chloroformate under argon was added at 0 °C (1.2 eq). The reaction mixture was stirred at room temperature overnight and worked up by diluting with dichloromethane followed by washing with water and brine. The residue obtained after evaporation of the dried organic layer was passed through column to afford the carbamate.

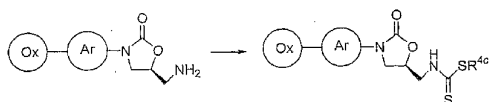
Examples 81-85 have been prepared according to the general procedure G

10

Example No.	Structure	Analytical Data
81		¹ HNMR (CDCl ₃ , 200MHz): δ 7.68-7.49 (m, 2H), 7.16 (d, J = 8.4 Hz, 1H), 5.16 (bs, 1H), 4.78 (bs, 1H), 4.52 (t, J = 7.2 Hz, 2H), 4.09-4.0 (m, 3H), 3.84-3.55 (m, 6H). Mp: 153 °C
82		¹ HNMR (CDCl ₃ , 200MHz): δ 7.9 (m, 2H), 7.4 (d, J = 8.3 Hz, 1H), 5.2 (s, 1H), 4.8 (s, 1H), 4.5 (t, 1H), 4.0 (m, 9H). Mp: 148 °C
83		¹ HNMR (CDCl ₃ , 200MHz): δ 7.27 (d, J = 6.8 Hz, 2H), 5.16 (bs, 1H), 4.84-4.80 (m, 1H), 4.58 (t, J = 7.2 Hz, 2H), 4.07-3.60 (m, 9H). Mp: 157 °C

84		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.57 (s, 4H), 6.98 (bs, 1H), 4.96-4.76 (m, 1H), 4.51 (t, J = 7.4 Hz, 2H), 4.47 (m, 3H), 3.91-3.84 (m, 1H), 3.65 (s, 1H), 3.51 (bs, 3H). Mp: 195 °C
85		¹ HNMR (CDCl ₃ , 200MHz): δ 3.0 (s, 3H), 3.8 (m, 6H), 4.8 (m, 1H), 4.9 (s, 2H), 5.1 (m, 1H), 6.6 (t, 1H). Mp: 226 °C

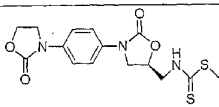
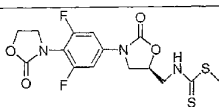
H. General procedure for the conversion of



5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4c} represents (C₁-C₆)alkyl group.

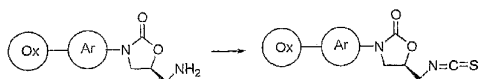
10 To an ice cold mixture of amine (1 eq), Et₃N (2 eq) and water (few drops) in EtOH CS₂ (1 eq) was added under argon. Stirred overnight at room temperature, Methyl iodide (MeI) (1.1 eq) in EtOH was added and the stirring was continued for 12 h. The volatiles were removed and the residue was taken up in ethyl acetate. The organic mixture was washed with saturated NaHCO₃, water, brine and dried. The residue
15 obtained was passed through column to afford the product.

Examples 86 & 87 have been prepared according to the general procedure H

Example No.	Structure	Analytical Data
86		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 9.98 (bt, 1H), 7.55 (s, 4H), 5.05-5.02 (m, 1H), 4.50 (t, J=7.8 Hz, 2H), 4.12-3.87 (m, 6H), 2.60 (s, 3H). Mp: 161 °C
87		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.26 (s, 1H), 6.15 (d, J = 10.2 Hz, 2H), 4.56-4.49 (m, 3H), 4.27-3.83 (m, 5H), 3.26-3.15 (m, 1H), 2.54 (s, 3H). Mp: 147 °C

I. General procedure for the conversion of

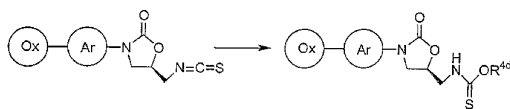
Step (i):



where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group and 'Ar' represents substituted or unsubstituted phenyl ring.

Thiophosgene (1.2 eq) was added drop wise to a solution of the amine (1 eq), Et₃N (2.4 eq) in dry dichloromethane at ice bath temperature under argon. The reaction mixture was warmed to room temperature over 3 h and then the volatiles were removed. The residue obtained was directly charged on to a column of silica gel to afford the product.

Step (ii):



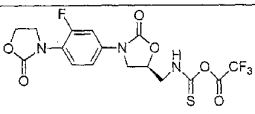
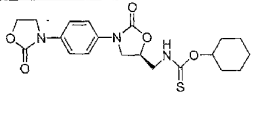
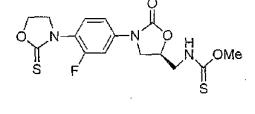
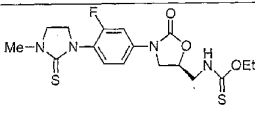
- where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring and R^{4d} represents (C₁-C₆)alkyl, cyclo(C₃-C₆)alkyl, -(C=O)-(C₁-C₆)alkyl group substituted with fluorine; aryl, halo(C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl or (C₂-C₆)alkenyl.

- A solution of the isothiocyanate in the respective alcohol was heated to 80 to 100 °C while monitoring by TLC. At the complete consumption of starting material, the reaction mixture was allowed to cool to room temperature. The crystals formed were separated, washed with ether and dried at vacuum to yield the pure product.

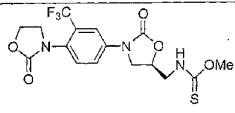
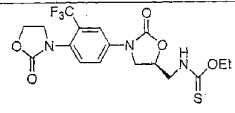
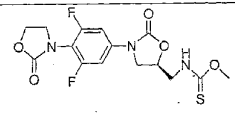
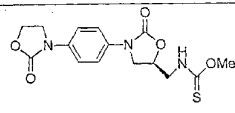
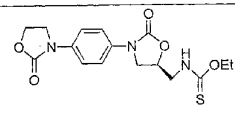
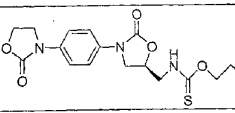
Examples 88-129 have been prepared according to the general procedure I

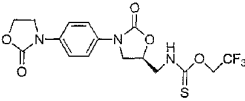
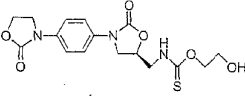
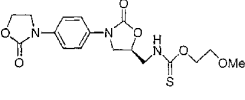
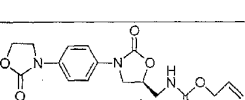
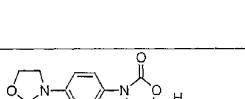
15

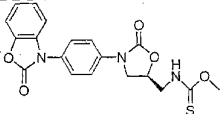
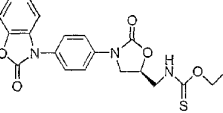
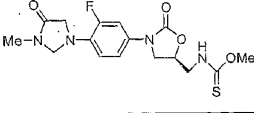
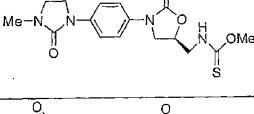
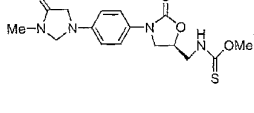
Example No.	Structure	Analytical Data
88		¹ HNMR (CDCl ₃ , 200MHz): δ 7.67-7.56 (m, 2H), 7.16 (d, J = 2.0 Hz, 1H), 6.72 (bs, 1H), 4.94 (bs, 1H), 4.52 (t, J = 7.8 Hz, 2H), 4.12-3.83 (m, 9H). Mp: 137 °C
89		¹ HNMR (CDCl ₃ , 200MHz): δ 7.66-7.50 (m, 2H), 7.15 (d, J = 7.4 Hz, 1H), 6.66 (hump, 1H), 4.94 (bs, 1H), 4.56-4.43 (m, 4H), 4.12-3.84 (m, 9H).

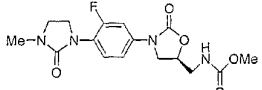
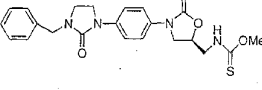
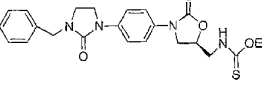
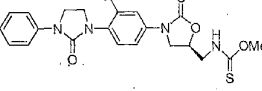
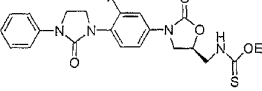
		4.56-4.43 (m, 4H), 4.12-3.84 (m, 6H), 1.32 (t, J = 6.8 Hz, 3H). Mp: 208 °C
90		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.45 (bs, 1H), 7.65-7.46 (m, 2H), 7.17 (d, J = 8.8 Hz, 1H), 4.81 (bs, 1H), 4.53 (t, J = 7.4 Hz, 2H), 4.09-3.99 (m, 3H), 3.84-3.55 (m, 3H), 3.13(q, J = 10.4 Hz, 2H). Mp: 184 °C
91		¹ HNMR (DMSO-d ₆ , 200MHz): δ 9.54 (m, 1H), 7.57 (s, 4H), 4.90-4.80 (m, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.21-4.01 (m, 4H), 3.88-3.77 (m, 3H), 3.56-3.53 (m, 1H), 1.23-0.97 (m, 6H). Mp: 153 °C
92		¹ HNMR (CDCl ₃ , 200MHz): δ 8.2 (m, 1H), 7.7 (d, J= 10.74 Hz, 1H), 7.5 (t, 1H), 7.3 (d, J = 8.79 Hz, 1H), 5.0 (m, 1H), 4.70 (t, 2H), 4.1 (m, 9H). Mp: 197 °C
93		¹ HNMR (CDCl ₃ , 200MHz): δ 7.02 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 7.49 (t, J = 8.8 Hz and 12.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.8 Hz, 1H), 6.63 (bs, 1H), 4.93 (m, 1H),

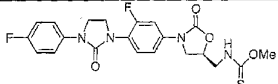
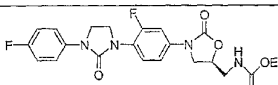
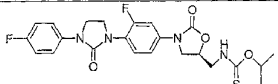
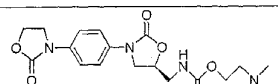
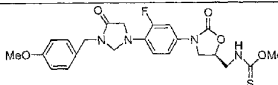
		4.54-4.64 (q, J = 7.4 Hz, 2H), 4.13-3.72 (m, 8H), 3.24 (s, 3H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 197 °C
94		¹HNMR (CDCl₃, 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.6 Hz, 1H), 6.65 (bs, 1H), 4.94 (m, 1H), 4.38 (t, J = 8.8 Hz, 2H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.78-1.63 (m, 2H), 0.99 (t, 3H). Mp: >200 °C
95		¹HNMR (CDCl₃, 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 6.70 (bs, 1H), 4.94 (m, 1H), 4.13-3.72 (m, 11H), 3.24 (s, 3H). Mp: 179 °C
96		¹HNMR (CDCl₃, 200MHz): δ 7.62 (dd, J = 2.4 Hz and 12.7 Hz, 1H), 7.49 (t, J = 8.8 Hz, 1H), 7.20 (dd, J = 2.4 Hz and 13.0 Hz, 1H), 6.55 (bs, 1H), 5.58-5.49 (heptet, 1H), 4.92 (m, 1H), 4.13-3.73 (m, 8H), 3.24 (s, 3H), 1.39-1.25 (m, 6H). Mp: 183 °C

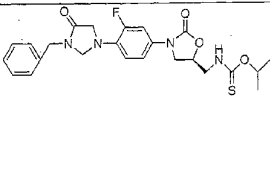
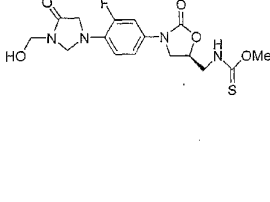
97		¹ HNMR (CDCl ₃ , 200MHz): δ 7.9 (m, 2H), 7.5 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (t, 2H), 4.0 (m, 9H). Mp: 146 °C
98		¹ HNMR (CDCl ₃ , 200MHz): δ 7.8 (m, 2H), 7.4 (d, J = 8.79 Hz, 1H), 6.7 (s, 1H), 5.0 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (m, 3H). Mp: 157 °C
99		¹ HNMR (CDCl ₃ , 200MHz): δ 7.29-7.24 (m, 2H), 6.73 (hump, 1H), 4.96 (huimp, 1H), 4.58 (t, J = 7.4 Hz, 2H), 4.08-3.83 (m, 9H). Mp: 182 °C
100		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 6.81 (bs, 1H), 4.91 (hump, 1H), 4.49 (t, J = 7.8 Hz, 2H), 4.13-3.82 (m, 9H). Mp: 153 °C
101		¹ HNMR (CDCl ₃ , 200MHz): δ 7.5 (s, 4H), 6.7 (s, 1H), 4.9 (s, 1H), 4.5 (m, 4H), 4.0 (m, 6H), 1.3 (t, J = 6.8 Hz, 3H). Mp: 168 °C
102		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.7 (s, 1H), 4.9 (m, 1H), 4.4 (m, 4H), 4.0 (m, 6H), 1.7 (m, 2H), 0.95 (t, J = 7.4 Hz, 3H).

		0.95 (t, J = 7.4 Hz, 3H). Mp: 176 °C
103		¹ HNMR (CDCl ₃ , 200MHz): δ 7.52 (s, 4H), 7.26 (bs, 1H), 4.96-4.77 (m, 3H), 4.50 (t, J=7.2 Hz, 2H), 4.15-3.80 (m, 6H). Melting Point (°C): 181 °C
104		¹ HNMR (CDCl ₃ , 200MHz): δ 9.2-8.9 (m, 1H), 7.5 (s, 4H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.5 (m, 8H). Mp: 141 °C
105		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.81 (bt, 1H), 4.91 (m, 1H), 4.67-4.58 (m, 2H), 4.50 (t, J=7.2 Hz, 2H), 4.13-3.82 (m, 6H), 3.68-3.63 (m, 2H), 3.38 (s, 3H). Mp: 149 °C
106		¹ HNMR (CDCl ₃ , 200MHz): δ 7.55 (s, 4H), 7.26 (s, 2H), 6.7 (s, 1H), 5.93 (m, 1H), 5.29 (m, 2H), 4.9 (m, 3H), 4.5 (t, J = 7.4 Hz, 2H), 4.0 (m, 6H). Mp: 150 °C
107		¹ HNMR (CDCl ₃ , 200MHz): δ 7.54 (s, 4H), 6.57 (s, 1H), 5.5 (m, 1H), 4.92 (m, 1H), 4.5 (t, J = 7.4 Hz, 2H), 2.9 (m, 6H), 1.31 (dd, J = 10.2 Hz

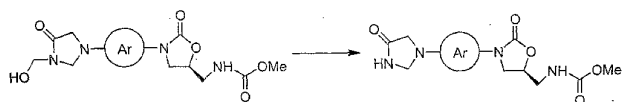
		and 13.8 Hz, 6H). Mp: 140 °C
108		¹ HNMR (CDCl ₃ , 200MHz): δ 7.72 (d, J = 9.2 Hz, 2H), 7.57 (d, J = 9.2 Hz, 2H), 7.31-7.01 (m, 4H), 6.77 (bs, 1H), 4.97-4.96 (m, 1H), 4.19-3.91 (m, 7H). Mp: 141 °C
109		¹ HNMR (CDCl ₃ , 200MHz): δ 7.73 (d, J = 8.8 Hz, 2H), 7.56 (d, J = 8.8 Hz, 2H), 7.31-7.01 (m, 4H), 6.70 (bs, 1H), 4.97 (m, 1H), 4.55-4.44 (q, J = 6.8 Hz, 2H), 4.19-3.92 (m, 4H), 1.32 (t, J = 7.0 Hz, 3H). Mp: 147 °C
110		¹ HNMR (CDCl ₃ , 200MHz): δ 2.8 (s, 3H), 4.8 (t, 1H), 3.6 (m, 8H), 6.8 (t, 1H), 7.2 (d, 1H), 7.5 (dd, 1H). Mp: 218 °C
111		¹ HNMR (CDCl ₃ , 200MHz): δ 1.5 (s, 3H), 2.9 (s, 3H), 3.6 (t, 2H), 4.9 (m, 1H), 6.8 (m, 1H), 7.8 (d, 2H). Mp: 209 °C
112		¹ HNMR (DMSO-d ₆ , 200MHz): 9.5 (br, 1H), 7.4 (d, J=8.8 Hz, 2H), 6.6 (d, J=8.8 Hz, 2H), 4.90-4.80 (m, 1H), 4.7 (s, 2H), 4.2-3.4 (m, 9H), 2.9 (s, 3H).

113		Mp: 205 °C ¹HNMR (CDCl₃, 200MHz): δ 7.5 (m, 2H), 7.1 (m, 1H), 6.9 (s, 1H), 4.9 (m, 1H), 3.8 (m, 9H), 3.4 (t, J = 8.8 Hz, 2H), 2.9 (s, 3H). Mp: 146 °C
114		¹HNMR (CDCl₃, 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.5 (s, 2H), 4.2-3.6 (m, 9H), 3.4 (t, J=8.8 Hz, 2H). Mp: 170 °C
115		¹HNMR (CDCl₃, 200MHz): δ 7.6-7.2 (m, 9H), 6.7 (bt, 1H), 5.0-4.8 (m, 1H), 4.6-4.4 (m, 4H), 4.2-3.6 (m, 6H), 3.7 (t, J=8.3 Hz, 2H), 1.3 (t, J=6.8 Hz, 3H). Mp: 160 °C
116		¹HNMR (CDCl₃, 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.4 (m, 3H), 7.0 (m, 1H), 4.9 (m, 1H), 4.2 (m, 1H), 3.8-4.0 (m, 7H), 3.3 (s, 3H). Mp: 174 °C
117		¹HNMR (CDCl₃, 200MHz): δ 9.5 (m, 1H), 7.6 (m, 4H), 7.3 (m, 3H), 7.1 (t, 1H), 4.8 (m, 1H), 4.4 (m, 2H), 4.2 (m, 1H), 3.7-4.1 (m, 5H), 3.5 (m, 2H), 1.2 (t, 3H). Mp: 195 °C

118		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 4H), 4.9 (m, 1H), 4.0 (11H). Mp: 208 °C
119		¹ H NMR (CDCl ₃ , 200MHz): δ 7.6 (m, 4H), 7.0-7.2 (m, 3H), 4.9 (m, 2H), 4.5 (m, 2H), 4.0 (m, 8H), 1.3 (t, 3H). Mp: 215 °C
120		¹ H NMR (CDCl ₃ , 200MHz): δ 7.5 (m, 4H), 7.0 (m, 3H), 5.5 (m, 1H), 4.9 (m, 1H), 4.0 (m, 8H), 1.3 (t, 6H). Mp: 220 °C
121		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 7.57 (s, 4H), 5.00-4.75 (m, 1H), 4.44-3.40 (m, 12H), 2.16 (s, 6H). Mp: 161 °C.
122		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.40 (dd, J = 17.6, 2.4 Hz, 1H), 7.24 (d, J = 9.7 Hz, 2H), 7.04 (d, J = 8.8 Hz, 1H), 6.89 (d, J = 8.8 Hz, 2H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.80 (m, 1H), 4.75 (s, 2H), 4.54 (s, 2H), 4.20-3.60 (m, 9H), 3.81 (s, 3H). Mp: 158 °C

123		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.50-9.35 (m, 1H), 7.60-6.60 (m, 8H), 5.50-5.30 (m, 1H), 4.95-4.70 (m, 1H), 4.74 (s, 2H), 4.55 (s, 2H), 4.20-3.25 (m, 6H), 1.40-1.10 (bd, 6H). Mp: 192 °C
124		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.55-9.35 (m, 1H), 7.45 (d, <i>J</i> = 18.1 Hz, 1H), 7.15 (d, <i>J</i> = 8.8 Hz, 1H), 6.90-6.80 (m, 1H), 6.09 (t, <i>J</i> = 6.8 Hz, 1H), 4.87 (s, 2H), 4.90-4.75 (m, 1H), 4.71 (d, <i>J</i> = 6.8 Hz, 2H), 4.20-3.10 (m, 9H). Mp: 184 °C

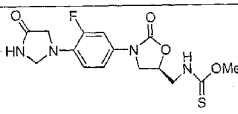
J. General procedure for the conversion of



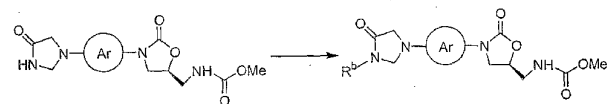
where 'Ar' represents substituted or unsubstituted phenyl ring

- 5 Sodium hydride (360 mg, 7.5 mmol) was added to a solution of starting material (300 mg, 0.75 mmol) in dry THF (30 mL) and the resultant suspension was stirred at room temperature overnight. The reaction mixture was diluted with ethyl acetate (150 mL) and washed with water, brine and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product as a colorless
- 10 solid (150 mg, 54% yield).

Example 125 has been prepared according to the general procedure J

Example No.	Structure	Analytical Data
125		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 8.62 (s, 1H), 7.45 (d, J = 16.2 Hz, 1H), 7.16 (d, J = 8.6 Hz, 1H), 6.90-6.80 (m, 1H), 4.90-4.75 (m, 1H), 4.73 (s, 2H), 4.20-3.40 (m, 9H). Mp: 223 °C

K. General procedure for the conversion of



where 'Ar' represents substituted phenyl ring and R^b represents (C₁-C₆)alkyl or aralkyl.

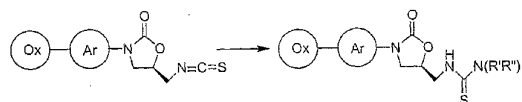
To a solution of starting material (1 eq) in dry DMF was added NaH (1.2 eq) at 0 °C under argon followed by appropriate alkyl halide or aralkyl halide (1.2 eq). The reaction mixture was stirred for 2-6 h while monitoring by TLC. After the consumption of starting material, the reaction mixture was diluted with ethyl acetate and washed with water, brine and dried. The residue obtained upon evaporation of solvent was passed through a column of silica gel to afford the product.

15

Example 126-129 have been prepared according to the general procedure K

Example No.	Structure	Analytical Data
126		¹ H NMR (DMSO-d ₆ , 200 MHz): δ 9.60-9.40 (m, 1H), 7.49 (dd, <i>J</i> = 15.6, 2.4 Hz, 1H), 7.18 (d, <i>J</i> = 9.1 Hz, 1H), 6.95-6.80 (m, 1H), 5.17 (s, 2H), 4.95-4.70 (m, 1H), 4.42 (s, 2H), 4.20-3.40 (m, 7H). Mp: 195 °C
127		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.46 (dd, <i>J</i> = 15.1, 2.4 Hz, 1H), 7.10 (d, <i>J</i> = 8.8 Hz, 1H), 6.77 (bt, 1H), 6.65-6.56 (m, 1H), 4.97 (s, 2H), 4.97-4.80 (m, 1H), 4.84 (s, 2H), 4.20-3.55 (m, 9H), 3.37 (s, 3H). Mp: 160 °C.
128		¹ H NMR (CDCl ₃ +DMSO-d ₆ , 200 MHz): δ 9.95-9.25 (m, 1H), 7.55-7.25 (m, 6H), 7.45 (d, <i>J</i> = 15.4 Hz, 1H), 6.63-6.54 (m, 1H), 5.00-4.80 (m, 1H), 4.77 (s, 2H), 4.60 (s, 2H), 4.20-3.75 (m, 9H). Mp: 176 °C
129		¹ H NMR (CDCl ₃ , 200 MHz): δ 7.50-7.20 (m, 6H), 7.04 (d, <i>J</i> = 8.6 Hz, 1H), 6.78 (bt, 1H), 6.58-6.49 (m, 1H), 5.00-4.35 (m, 7H), 4.20-3.60 (m, 6H), 1.31 (t, <i>J</i> = 7.0 Hz, 3H). Mp: 184 °C

L. General procedure for the conversion of

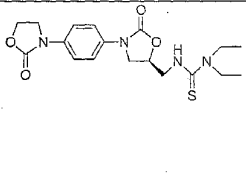
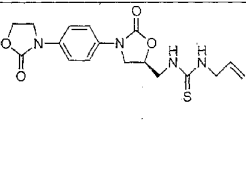
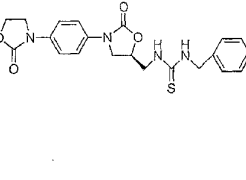
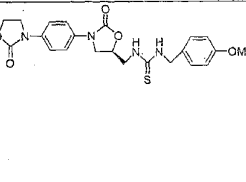


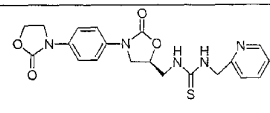
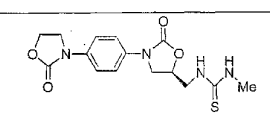
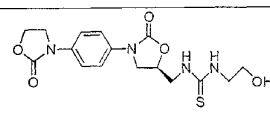
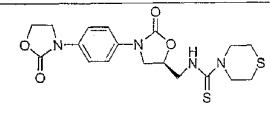
- 5 where 'Ox' represents a five membered heterocyclic group, containing two heteroatoms selected from oxygen, nitrogen or sulfur, and is substituted by an =O or =S group, the heterocycle may also be fused with substituted or unsubstituted phenyl group; 'Ar' represents substituted or unsubstituted phenyl ring; R' represents hydrogen, (C₁-C₆)alkyl, (C₂-C₆)alkenyl, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy(C₁-C₆)alkyl and R'' represents hydrogen or alkyl or the two R' and R'' groups together form a 5 or 6 membered cyclic structure containing one or two hetero atoms.

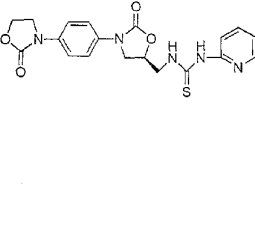
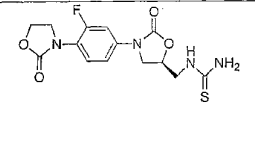
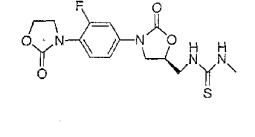
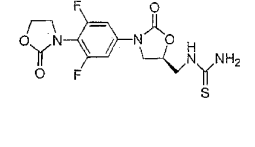
- Ammonia gas (or appropriate amine) was bubbled to a solution of isothiocyanate in THF at -10°C over 20 min. The resultant mixture was stirred at room temperature for 1 h and then diluted with ethyl acetate. The organic layer was washed with water (2 times), brine and dried. The residue obtained upon evaporation of the solvent was passed through a column of silica gel to afford the product.

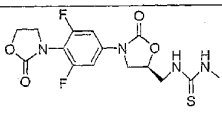
Examples 130-143 have been prepared according to the general procedure L

Example No.	Structure	Analytical Data
130		¹ HNMR (CDCl ₃ , 200MHz): δ 7.51 (s, 4H), 4.98-4.95 (m, 1H), 4.49 (t, J=7.8 HZ, 2H), 4.17-3.88 (m, 8H), 3.71-3.69 (m, 3H), 1.93-1.78 (m, 4H). Mp: 159 °C

131		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.63 (s, 1H), 7.57 (s, 4H), 4.94-4.91 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-3.75 (m, 6H), 3.66-3.56 (q, J=6.8 Hz, 4H), 1.07 (t, J=6.8 Hz, 6H). Mp: 103 °C
132		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 7.79 (bs, 1H), 7.57 (s, 4H), 5.80-5.75 (m, 1H), 5.15-5.01 (m, 2H), 4.86 (m, 1H), 4.44 (t, J=7.4 Hz, 2H), 4.17-4.01 (m, 5H), 3.85 (m, 2H). Mp: 171 °C
133		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.05 (bs, 1H), 7.86 (bs, 1H), 7.57 (s, 4H), 7.25 (s, 5H), 4.88-4.84 (m, 1H), 4.67 (s, 2H), 4.44 (t, J=7.8 Hz, 2H), 4.16-4.01 (m, 3H), 3.89-3.86 (m, 3H). Mp: 181 °C
134		¹ HNMR (DMSO-d ⁶ , 200MHz): δ 8.00 (bs, 1H), 7.80 (bs, 1H), 7.57 (s, 4H), 7.19-7.15 (d, J=8.4 Hz, 2H), 6.84-6.80 (d, J=8.2 Hz, 2H), 4.86 (bs, 1H), 4.57 (bs, 2H), 4.44 (t, J=7.4 Hz, 2H), 4.08-4.01 (m, 3H), 3.88-3.85 (m, 3H), 3.70 (s, 3H). Mp: 169 °C

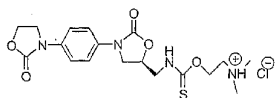
135		¹ HNMR (DMSO-d ₆ , 200MHz): δ 8.50-8.48 (d, J=3.8 Hz, 1H), 8.16 (m, 2H), 7.69 (t, J=7.8 Hz, 1H), 7.57 (s, 4H), 7.26-7.22 (d, J=7.8 Hz, 2H), 4.88 (m, 1H), 4.75 (bs, 2H), 4.44 (t, J=7.2 Hz, 2H), 4.18-4.01 (m, 3H), 3.89-3.82 (m, 3H). Mp: 165 °C
136		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.77 (bs, 1H), 7.57 (s, 5H), 4.86 (m, 1H), 4.44 (t, J=7.8 Hz, 2H), 4.17-4.01 (m, 3H), 3.81-3.33 (m, 3H), 2.83 (bs, 3H). Mp: 175 °C
137		¹ HNMR (DMSO-d ₆ , 200MHz): δ 7.86 (hump, 1H), 7.66 (hump, 1H), 7.57 (s, 4H), 4.78-4.68 (m, 2H), 4.43 (t, J=7.2 Hz, 2H), 4.12-4.01 (m, 3H), 3.83 (bs, 3H), 3.46-3.33 (m, 4H). Mp: 161 °C
138		¹ HNMR (DMSO-d ₆ , 200MHz): δ 8.05 (hump, 1H), 7.57 (s, 4H), 4.95 (m, 1H), 4.43 (t, J=7.2 Hz, 2H), 4.08-3.89 (m, 8H), 2.57 (s, 4H), 2.49 (s, 4H). Mp: 159 °C

139		¹ HNMR (DMSO-d ₆ , 200MHz): δ 12.06 (bs, 1H), 10.76 (s, 1H), 8.14-8.11 (d, J=5.0 Hz, 1H), 7.77 (t, J=8.2 Hz, 1H), 7.52 (s, 4H), 7.17-7.13 (d, J=3.2 Hz, 1H), 7.04 (t, J=5.8 Hz, 1H), 5.05-5.03 (m, 1H), 4.43 (t, J=7.4 Hz, 2H), 4.22 (t, J=9.2 Hz, 1H), 4.07-3.84 (m, 5H). Mp: 189 °C
140		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.07 (bs, 1H), 7.62-7.40 (m, 2H), 7.16 (d, J = 7.8 Hz, 1H), 6.65 (bs, 1H), 4.85 (bs, 1H), 4.48 (t, J = 8.0 Hz, 2H), 4.04-3.96 (m, 6H). Mp: 178 °C
141		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 7.68-7.19 (m, 5H), 4.92 (hump, 1H), 4.53 (t, J = 7.8 Hz, 2H), 4.08-3.98 (m, 6H), 3.10 (s, 3H). Mp: 144 °C
142		¹ HNMR (CDCl ₃ +DMSO-d ₆ , 200MHz): δ 8.10 (bs, 1H), 7.35 (d, J = 8.4 Hz, 2H), 6.58 (bs, 1H), 4.91-4.89 (m, 1H), 4.58 (t, J = 7.8 Hz, 2H), 4.54-3.87 (m, 6H). Mp: 92 °C

143		¹ HNMR (CDCl ₃ , 200MHz): δ 7.26 (s, 2H), 6.39 (hump, 2H), 4.93 (hump, 1H), 4.60 (t, J = 7.4 Hz, 2H), 4.21-3.93 (m, 6H), 2.99 (d, J = 4.8 Hz, 3H). Mp: 113 °C

Example 144

N1-((5S)-3-((3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl)-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate hydrochloride



5 N1-((5S)-3-((3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl)-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate (obtained in example 121), was taken in methanol (100 mg) and was bubbled with HCl gas for 30 min. Then methanol was evaporated from the resultant mixture and washed with ether twice to obtain the title
 10 compound (Yield: 100%). Mp: 100 °C (hygroscopic).

¹H NMR (DMSO-d₆, 200 MHz): δ 10.60 (bs, 1H), 9.85-9.65 (m, 1H), 7.58 (s, 4H), 5.00-4.65 (m, 3H), 4.44 (t, J = 7.6 Hz, 2H), 4.25-3.40 (m, 8H), 2.81 (s, 3H), 2.79 (s, 3H).

***In vitro* Data:**

15 Minimum Inhibitor Concentrations (MICs) were determined by broth microdilution technique as per the guidelines prescribed in the fifth edition of Approved Standards, NCCLS document *M7-A5 Vol 20 - No 2, 2000* Villanova, PA.

20 Initial stock solution of the test compound was prepared in DMSO. Subsequent two fold dilutions were carried out in sterile Mueller Hinton Broth (Difco) (MHB).

Frozen cultures stocks were inoculated into 50 ml sterile MHB in 250 ml Erlenmeyer flasks.

Composition of MHB is as follows:

Beef Extract Powder - 2.0 g/litre

5 Acid Digest of Casein - 17.5 g/ litre

Soluble Starch - 1.5 g/litre

Final pH 7.3 $\pm$ 0.1

Flasks were incubated for 4 to 5 h at 35 °C on a rotary shaker at 150 rpm.

Inoculum was prepared by diluting the culture in sterile MHB to obtain a turbidity of 0.5

10 McFarland standard. This corresponds to $1-2 \times 10^8$ CFU/ml. The stock was further diluted in sterile broth to obtain $1-2 \times 10^6$ CFU/ml. 50 μ l of the above diluted inoculum was added from 1-10 wells. The plates were incubated overnight at 37 °C.

MIC is read as the lowest concentration of the compound that completely inhibits growth of the organism in the microdilution wells as detected by the unaided eye.

15

Organism	Culture No.	DRCC No.
<i>Staphylococcus aureus</i>	ATCC 33591	019
<i>Staphylococcus aureus</i>	ATCC 49951	213
<i>Staphylococcus aureus</i>	ATCC 29213	035
<i>Enterococcus faecalis</i>	ATCC 29212	034
<i>Enterococcus faecalis</i>	NCTC 12201	153
<i>Enterococcus faecium</i>	NCTC 12202	154
<i>Escherichia coli</i>	ATCC 25922	018

ATCC: American Type Culture Collection, USA

NCTC: National Collections of Type Cultures, Colindale, UK

DRCC: Dr. Reddy's Culture Collection, Hyderabad, India.

20

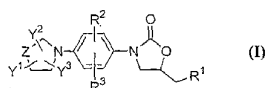
The *in vitro* antibacterial activity data is shown in TABLE 1.

TABLE 1:*In vitro* Activity of Compounds against Gram positive and Gram negative bacteria

Example No.	Antimicrobial Screening (MIC) µg/ml						
	<i>Staphylococcus aureus</i>			<i>Enterococcus sp</i>			<i>E coli</i>
	019 MRSA	213 Smith S	035 S	034 S	153 R	154 R	18 S
40	8.0	4.0	8.0	16.0	8.0	8.0	32.0
62	2.0	1.0	4.0	-	8.0	8.0	32.0
76	2.0	2.0	4.0	4.0	4.0	4.0	>32.0
79	2.0	2.0	4.0	4.0	8.0	8.0	32.0
88	1.0	1.0	2.0	2.0	2.0	2.0	>32.0
89	4.0	4.0	4.0	8.0	8.0	8.0	>32.0
99	2.0	2.0	2.0	2.0	2.0	2.0	>32.0
100	0.5	0.5	0.5	1.0	1.0	1.0	32.0
107	2.0	4.0	4.0	8.0	4.0	4.0	32.0
110	0.5	0.5	0.5	1.0	1.0	1.0	32.0
113	2.0	4.0	4.0	4.0	4.0	8.0	32.0
124	0.25	0.25	0.5	0.5	0.25	0.5	-
125	0.25	0.25	0.5	0.5	0.25	0.5	-
127	0.5	1.0	1.0	1.0	1.0	1.0	-

Claims

1. A compound of the formula (I)



wherein R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $N(R^4)_2$, where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, (C_3-C_6) cycloalkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxythiocarbonyl, (C_1-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-C(=O)-C(=O)-alkyl$, $-C(=O)-C(=O)-aryl$, $-C(=O)-C(=O)-alkoxy$, $-C(=O)-C(=O)-aryloxy$, $-(C=S)-S-alkyl$, $-(C=S)-NH_2$, $-(C=S)-NH-alkyl$, $-C(=S)-N-(alkyl)_2$, $-C(=S)-NH-alkenyl$, $(C=S)-(C=O)-alkoxy$, $-(C=S)-(C=O)-aryloxy$, $-C(=S)-O-(C=O)-alkyl$, $C(=S)-C(=S)-alkyl$, $-C(=S)-C(=S)-aryl$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxythiocarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered

aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates.

- 5 2. The compound according to claim 1, wherein the substituents on R^d are selected from halogen, hydroxy, amino, monoalkylamino, dialkylamino, cyano, nitro, alkoxy, aryl, hydroxyaryl, pyridyl, hydroxyalkyl, alkoxyaryl or carboxyl and its derivatives.
3. The compound according to claim 1, wherein the substituents on R^b are selected from hydroxy, halogen, pyrrolidinylthiocarbonyl, nitro, amino, alkoxy, carboxy or
- 10 cyano,
4. The compound according to claim 1, wherein the substituents on Y² and Y³ are selected from hydroxy, nitro, cyano, amino, *tert*-butyldimethylsilyloxy(TBSO), halogen, (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₃-C₆)cycloalkyl, aryl, benzyloxy, acyl, carboxyl or acyloxy groups.
- 15 5. The compound according to claim 1, wherein the cyclic structure formed by Y² and Y³ is selected from substituted or unsubstituted benzene, pyridine, pyrrolidine, furan, thiophene, morpholine, piperazine or pyrrole.
6. A compound of the formula (I) as defined according to claim 1 which is selected from:
- 20 (5R)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
 (5R)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
 (5R)-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-
- 25 2-one or its salts;
 (5R)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo [d][1,3]oxazol-2-one or its salts;

- 3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-6-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
3-{2-fluoro-4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-5-methyl-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 5 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
(5R)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-[3,5-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 10 (5R)-5-hydroxymethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
3-{4-[(5R)-5-hydroxymethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- 15 (5R)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
- 20 (5R)-5-hydroxymethyl-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
(5R)-5-hydroxymethyl-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- 25 (5R)-3-[3-fluoro-4-(2-oxo-3-phenyl-1-imidazolidinyl)phenyl]-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;
(5R)-3-{3-fluoro-4-[3-(fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-5-hydroxymethyl-1,3-oxazolan-2-one or its salts;

- (5R)-azidomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one
or its salts;
- (5R)-azidomethyl-3-[3-fluoro-4-(3-methyl-2-thio-1-imidazolidinyl)phenyl]-1,3-
oxazolan-2-one or its salts;
- 5 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-6-methyl-2,3-
dihydro benzo[d][1,3]oxazol-2-one or its salts;
- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]-2-fluorophenyl}-5-methyl-2,3-
dihydro benzo[d][1,3]oxazol-2-one or its salts;
- (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-
10 oxazolan-2-one or its salts;
- (5R)-5-azidomethyl-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one
or its salts;
- (5R)-azidomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-
one or its salts;
- 15 (5R)-5-azidomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its
salts;
- 3-{4-[(5R)-5-azidomethyl-2-oxo-1,3-oxazolan-3-yl]phenyl}-2,3-dihydrobenzo[d][1,3]
oxazol-2-one or its salts;
- (5R)-5-azidomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-
20 oxazolan-2-one or its salts;
- (5R)-5-azidomethyl-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-1,3-
oxazolan-2-one or its salts;
- (5R)-5-azidomethyl-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-
1,3-oxazolan-2-one or its salts;
- 25 (5R)-aminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one
or its salts;
- (5R)-aminomethyl-3-[3-fluoro-4-(3-methyl-2-thio-1-imidazolidinyl)phenyl]-1,3-
oxazolan-2-one or its salts;

- (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-aminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 5 (5R)-5-aminomethyl-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5R)-5-aminomethyl-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-1,3-oxazolan-2-one or its salts;
- N-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] methanamide or its salts;
- 10 N-[(5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] methanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] acetamide or its salts;
- 15 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] propanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] butanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] pentanamide or its salts;
- 20 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] heptanamide or its salts;
- N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] acrylamide or its salts;
- 25 N1-[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl]-2,2,2-trifluoroacetamide or its salts;
- Ethyl[(5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl] carbamoylmethanoate or its salts;

- N1-{{(5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-2-oxo-3-[4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
5 N1-{{(5S)-2-oxo-3-[3-fluoro-4-(2-thioxo-1,3-thiazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-3-[3-fluoro-4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
10 N1-{{(5S)-3-[3-fluoro-4-(6-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-3-[3-fluoro-4-(5-methyl-2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
15 N1-{{(5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} propanamide or its salts;
N1-{{(5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} heptanamide or its salts;
20 N1-{{(5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl} acrylamide or its salts;
N1-{{(5S)-3-[2-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
25 N1-{{(5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} acetamide or its salts;
N1-{{(5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl} propanamide or its salts;

- N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl}
acetamide or its salts;
- N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-
oxazolan-5-ylmethyl} acetamide or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-
5-ylmethyl} acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-benzyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-
5-ylmethyl} acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-
5-ylmethyl} acetamide or its salts;
- 10 N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-
ylmethyl} acetamide or its salts;
- N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-
ylmethyl} acetamide or its salts;
- 15 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-
5-ylmethyl} acetamide or its salts;
- N1-((5S)-3-[3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl]-2-oxo-1,3-
oxazolan-5-ylmethyl} acetamide or its salts;
- (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-
20 oxazolan-2-one or its salts;
- (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(3,3,3-trifluoro-1-thioxopropyl
aminomethyl)-1,3-oxazolan-2-one or its salts;
- (5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino
methyl)-1,3-oxazolan-2-one or its salts;
- 25 3-[2-fluoro-4-((5S)-2-oxo-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-3-yl)phenyl]-
2,3-dihydrobenzo[d][1,3]oxazol-2-one or its salts;
- (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-5-(1-thioxoethylamino
methyl)-1,3-oxazolan-2-one or its salts;

- (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxopropylamino methyl)-1,3-oxazolan-2-one or its salts;
- 5 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-(1-thioxoethylaminomethyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-5-(1-thioxoethylamino methyl)-1,3-oxazolan-2-one or its salts;
- 10 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
- 15 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methyl carbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylcarbamate or its salts;
- 20 (5S)-5-methylthioxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 25 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;

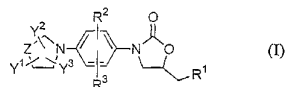
- N1-((5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) trifluoroacetoxymethylthiocarbamate or its salts;
 (5S)-5-cyclohexyloxy (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[3-fluoro-4-(2-thioxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propylthiocarbamate or its salts;
- 10 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-thioxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;
- 15 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-1,3-oxazolan-3-yl)-3-trifluoromethylphenyl]-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
 N1-((5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 20 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- 25 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-1-propylthiocarbamate or its salts;
 (5S)-5-[2,2-trifluoroethyloxy(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

- (5S)-5-[2-hydroxyethyloxy (thio) methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-[2-methoxyethyloxy (thio) methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl) phenyl]-1,3-oxazolan-2-one or its salts;
- 5 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) allylthio carbamate or its salts;
 N1-((5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthio carbamate or its salts;
 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 10 N1-((5S)-2-oxo-3-[4-(2-oxo-2,3-dihydrobenzo[d][1,3]oxazol-3-yl)phenyl]-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
- 15 N1-((5S)-3-[4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[4-(3-methyl-4-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-methyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-
- 20 5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[4-(3-benzyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;
- 25 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) methylthiocarbamate or its salts;
 N1-((5S)-3-[3-fluoro-4-(3-phenyl-2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl) ethylthiocarbamate or its salts;

- N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- 5 N1-((5S)-3-{3-fluoro-4-[3-(4-fluorophenyl)-2-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-2-propylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-methoxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 10 N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)ethylthiocarbamate or its salts;
- N1-((5S)-3-{4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate or its salts;
- 15 N1-((5S)-3-{3-fluoro-4-[3-(4-methoxybenzyl)-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-benzyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)isopropylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-[3-hydroxymethyl-4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 20 N1-((5S)-3-{3-fluoro-4-[4-oxo-1-imidazolidinyl]phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- N1-((5S)-3-{3-fluoro-4-(3-methyl-4-thioxo-1-imidazolidinyl)phenyl}-2-oxo-1,3-oxazolan-5-ylmethyl)methylthiocarbamate or its salts;
- 25 (5S)-5-[(2S)-2-hydroxymethylazolan-1-yl(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
- (5S)-5-diethylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;

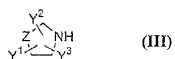
- (5S)-5-allylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-benzylamino(thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 5 (5S)-5-[4-methoxybenzylamino(thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylmethylamino (thioxo)methylaminomethyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-methylamino (thioxo)methylaminomethyl-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 10 (5S)-5-[2-hydroxyethylamino (thioxo)methylaminomethyl]-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[1,4-thiazinan-4-yl (thioxo)methylamino methyl]-1,3-oxazolan-2-one or its salts;
 15 (5S)-3-[4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-[2-pyridylamino (thioxo)methylamino methyl]-1,3-oxazolan-2-one or its salts;
 (5S)-5-amino(thioxo)methylaminomethyl-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3-fluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylamino methyl-1,3-oxazolan-2-one or its salts;
 20 (5S)-5-amino(thioxo)methylaminomethyl-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-1,3-oxazolan-2-one or its salts;
 (5S)-3-[3,5-difluoro-4-(2-oxo-1,3-oxazolan-3-yl)phenyl]-5-methylamino(thioxo)methylaminomethyl-1,3-oxazolan-2-one or its salts and
 25 N1-((5S)-3-[4-(2-oxo-1-imidazolidinyl)phenyl]-2-oxo-1,3-oxazolan-5-ylmethyl)-(N,N-dimethylamino)ethylthiocarbamate.hydrochloride.
 7. A compound according to claims 1 or 6, wherein the pharmaceutically acceptable

salt is selected from Li, Na, K, Ca, Mg, Fe, Cu, Zn, Mn; salts of organic bases, chiral bases, natural amino acids, unnatural amino acids, substituted amino acids, guanidine, substituted guanidine salts; ammonium, substituted ammonium salts, aluminum salts and acid addition salts. 8. A process for the preparation of the compound of formula (I)

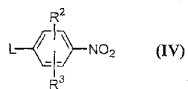


- 5 where R¹ represents NHR⁴, wherein R⁴ represents hydrogen atom; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b
- 10 where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted
- 15 groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl,
- 20 heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable
- 25 solvates; which comprises:
- (i) reacting a compound of formula (III)

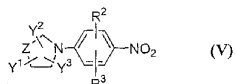
127



where Y¹, Y², Y³ and Z are as defined above, with a compound of formula (IV)

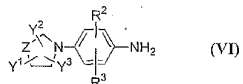


- where L represents a leaving group ; R² and R³ are as defined above, to produce a
5 compound of formula (V)



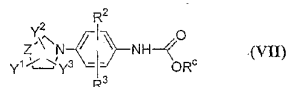
where Y¹, Y², Y³, R², R³ and Z are as defined above,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



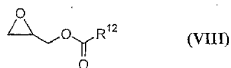
- 10 where Y¹, Y², Y³, R², R³ and Z are as defined above,

- (iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a
compound of formula (VII)

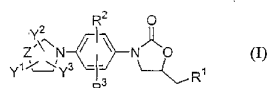


where R^c represents (C₁-C₈)alkyl group group; Y¹, Y², Y³, R², R³ and Z are as defined
15 above,

- (iv) reacting the compound of formula (VII) with a compound of formula (VIII)

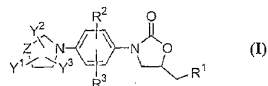


where R^{12} represents (C_1-C_3) alkyl group in the presence of a base to produce a compound of formula (I)



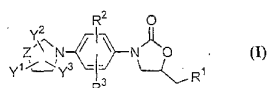
where R^1 represents hydroxy; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above,

- 5 (v) reacting the compound of formula (I) with alkylsulfonyl chloride or aryl sulfonyl chloride to produce a compound of formula (I), where R^1 represents alkyl sulfonyl or aryl sulfonyl, and reacted with NaN_3 to produce compound of formula (I)



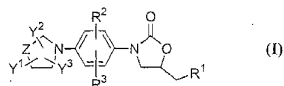
where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above and

- 10 (vi) reducing the compound of formula (I) where R^1 represents azido group, to produce a compound of formula (I)



where R^1 represents NHR^4 wherein R^4 represents hydrogen atom; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

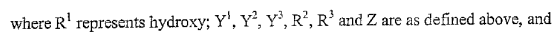
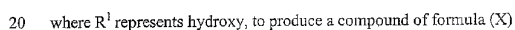
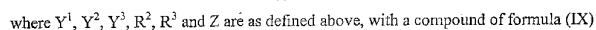
- 15 9. A process for the preparation of compound of formula (I)



where R^1 represents hydroxy; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or

- 20 halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or

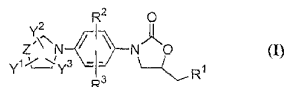
(i) reacting the compound of formula (VI)



(ii) carbonylating the compound of formula (X) with a carbonylating agent to produce the compound of formula (I) where R^1 represents hydroxy; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z

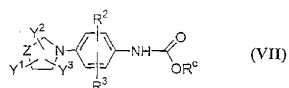
are as defined above.

- 5 10. A process for the preparation of compound of the formula (I)



- where R^1 represents azido; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxycarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:
- 25 (i) reacting a compound of formula (VII)

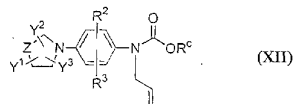
131



where R^c represents (C₁-C₈)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (XI)

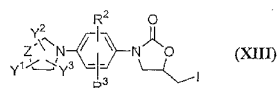


- 5 where L represents a leaving group; to produce a compound of formula (XII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined above,

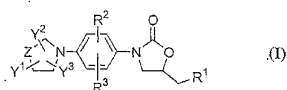
- (ii) converting the compound of formula (XII) defined above to a compound of formula (XIII)



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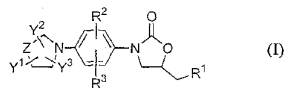
where Y¹, Y², Y³, R², R³ and Z are as defined above, and

- (iii) converting the compound of formula (XIII) defined above to a compound of formula (I) by reacting with organic or inorganic azide



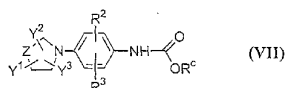
- 15 where R¹ represents azido group; Y¹, Y², Y³, R², R³ and Z are as defined above.

11. A process for the preparation of compound of formula (I)



- where R¹ represents azido group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

- (i) reacting a compound of formula (VII)

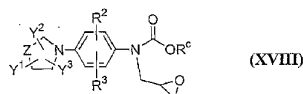


133

where R^5 represents (C₁-C₈)alkyl group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, with a compound of formula (XVII)



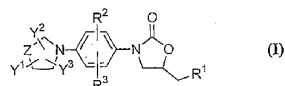
where L represents leaving group; to produce a compound of formula (XVIII)



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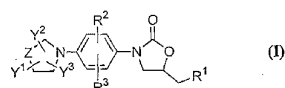
where R^5 , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, and

(ii) converting the compound of formula (XVIII) defined above to a compound of formula (I), by reacting with an organic or an inorganic azide,



10 where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

12. A process for the preparation of compound of formula (I)



where R^1 represents hydroxy group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro,

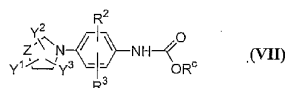
15 SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y^1 represents =O or =S group and Y^2 and Y^3

20 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl,

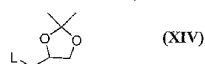
134

hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

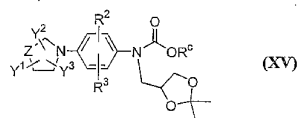
(i) reacting a compound of formula (VII)



where R^c represents (C₁-C₆)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (XIV)



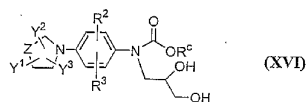
where L represents a leaving group; to produce a compound of formula (XV)



where R^c represents (C₁-C₆)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above,

(ii) hydrolysing the acetonide moiety in the compound of formula (XV) to produce a compound of formula (XVI)

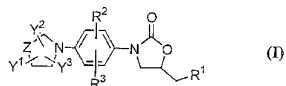
135



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, and

- (iii) cyclising the compound of formula (XVI) with or without a base to a compound of formula (I), where R^1 represents hydroxy group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above.

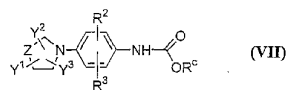
13. A process for the preparation of compound of the formula (I)



- where R^1 represents NHR^4 , wherein R^4 represents acetyl group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxycarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero

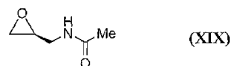
atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

(i) reacting a compound of formula (VII)

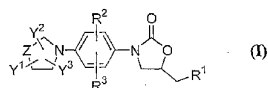


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where R^c represents (C₁-C₈)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined above, with a compound of formula (XIX)



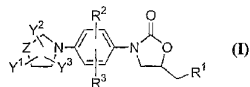
to produce a compound of formula (I)



10

where R¹ represents NHR^d, wherein R^d represents acetyl group; Y¹, Y², Y³, R², R³ and Z are as defined above.

14. A process for the preparation of compound of formula (I)



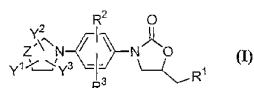
15

where R¹ represents NHR^d, wherein R^d represents formyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-

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C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; which comprises: formulating the compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen and Y¹, Y², Y³, R², R³ and Z are as defined above, by using alkylformate.

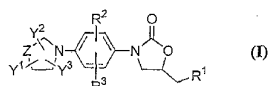
15 15. A process for the preparation of compound of formula (I)



where R¹ represents NHR⁴, wherein R⁴ represents -C(=O)-R^{4a}, wherein R^{4a} represents (C₁-C₆)alkyl, (C₁-C₆)alkoxy, (C₂-C₆)alkenyl, halo(C₁-C₆)alkyl, aryloxy, (C₂-C₆)alkenyloxy, aryloxy carbonyl or (C₁-C₆)alkoxycarbonyl; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted

groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; which comprise: acetylating the compound of formula (I) where R¹ represents NHR⁴ wherein R⁴ represents hydrogen; Y¹, Y², Y³, R², R³ and Z are as defined above, by using a halide.

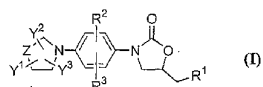
16. A process for the preparation of compound of formula (I)



where R¹ represents NHR⁴, wherein R⁴ represents acetyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl,

heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting compound of formula (I) where R^1 represents azido group; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, with thioacetic acid.

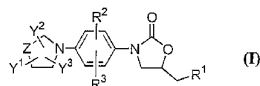
17. A process for the preparation of compound of formula (I)



- 10 where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl$, $halo(C_1-C_6)alkyl$, $-C(=O)-(C_1-C_6)alkoxy$, $-C(=O)-aryloxy$, $-C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, $(C_1-C_6)alkyl$ group, $halo(C_1-C_6)alkyl$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-C_6)alkyl$ group, or $halo(C_1-C_6)alkyl$; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted $(C_1-C_6)alkyl$, $(C_2-C_6)alkenyl$, $(C_1-C_6)cycloalkyl$, $(C_1-C_6)alkoxy$, aryl, aralkyl, aryloxy, $(C_1-C_6)alkylcarbonyl$, arylcarbonyl, $(C_1-C_6)alkoxycarbonyl$ or aryloxycarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from $(C_1-C_6)alkyl$, hydroxy $(C_1-C_6)alkyl$, $(C_1-C_6)alkoxy(C_1-C_6)alkyl$, $(C_1-C_6)alkoxycarbonyl$, carboxy $(C_1-C_6)alkyl$, $(C_1-C_6)alkylsulfonyl$, $(C_1-C_6)alkylcarbonylamino(C_1-C_6)alkyl$, arylcarbonylamino $(C_1-C_6)alkyl$, $(C_1-C_6)alkylcarbonyloxy(C_1-C_6)alkyl$, amino $(C_1-C_6)alkyl$, mono $(C_1-C_6)alkylamino$, di $(C_1-C_6)alkylamino$, arylamino, $(C_1-C_6)alkoxy$, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two

hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=O)-R^{4b}$, wherein R^{4b} represents $(C_1-C_6)alkyl, halo(C_1-C_6)alkyl, -C(=O)-(C_1-C_6)alkoxy, -C(=O)-aryloxy, -C(=S)-(C_1-C_6)alkyl$ or $-C(=S)-aryl$; Y^1, Y^2, Y^3, R^2, R^3 and Z are as defined above, with 2,4-bis(methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulfide (Lawesson's reagent).

18. A process for the preparation of compound of formula (I)

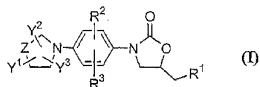


- 10 where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-SR^{4c}$ wherein $(C_1-C_6)alkyl$ group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, $(C_1-C_6)alkyl$ group, $halo(C_1-C_6)alkyl$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-C_6)alkyl$ group, or $halo(C_1-C_6)alkyl$; Z represents $S, O, =CH$ or NR^b where R^b represents hydrogen, or substituted or
- 15 unsubstituted $(C_1-C_6)alkyl, (C_2-C_6)alkenyl, (C_1-C_6)cycloalkyl, (C_1-C_6)alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6)alkylcarbonyl, arylcarbonyl, (C_1-C_6)alkoxycarbonyl$ or $aryloxycarbonyl$; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O, =S$ group, or substituted or unsubstituted groups selected from $(C_1-C_6)alkyl, hydroxy(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)alkyl, (C_1-C_6)alkoxycarbonyl, carboxy(C_1-C_6)alkyl, (C_1-C_6)alkylsulfonyl, (C_1-C_6)alkylcarbonylamino(C_1-C_6)alkyl, arylcarbonylamino(C_1-C_6)alkyl, (C_1-C_6)alkylcarbonyloxy(C_1-C_6)alkyl, amino(C_1-C_6)alkyl, mono(C_1-C_6)alkylamino, di(C_1-C_6)alkylamino, arylamino, (C_1-C_6)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on$
- 20 adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its

polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where R¹ represents NHR⁴, wherein R⁴ represents hydrogen; Y¹, Y², Y³, R², R³ and Z are as defined above, by reacting with carbondisulfide, with an appropriate alkylhalide and a base selected

from Et₃N, diisopropylethylamine, K₂CO₃, NaH or KOt-Bu.

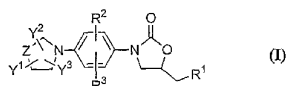
19. A process for the preparation of compound of formula (I)



where R¹ represents NHR⁴, wherein R⁴ represents -C(=S)-OR^{4d}, wherein R^{4d} represents (C₁-C₆)alkyl, cyclo(C₃-C₆)alkyl, -(C=O)-(C₁-C₆)alkyl group substituted with fluorine, aryl, halo(C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl or (C₂-C₆)alkenyl; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms; its derivatives, its analogs, its tautomeric forms, its stereoisomers, its

polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:

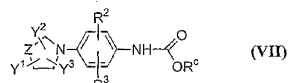
- (i) converting compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents hydrogen atom; Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined above, to a compound of formula (I) where R^1 represents isothiocyanate group and all other symbols are as defined above, by reacting with thiophosgene and
- (ii) converting compound of formula (I) where R^1 represents isothiocyanate group, to a compound of formula (I) where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-OR^{4d}$, wherein R^{4d} represents (C_1-C_6) alkyl, cyclo (C_3-C_6) alkyl, $-(C=O)-(C_1-C_6)$ alkyl group substituted with fluorine, aryl, halo (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl or (C_2-C_6) alkenyl and all symbols are as defined above, by reacting with alcohol.
20. A process for the preparation of compound of formula (I)



- 15 where R^1 represents NHR^4 , wherein R^4 represents $-C(=S)-N(R'R'')$, R' represents hydrogen, (C_1-C_6) alkyl, (C_2-C_6) alkenyl, substituted or unsubstituted aralkyl, heteroaralkyl, hydroxy (C_1-C_6) alkyl, R'' represents hydrogen or (C_1-C_6) alkyl or R' and R'' together form a 5 or 6 membered cyclic structures containing one or two hetero atoms; R^2 and R^3 are same or different and independently represent hydrogen, halogen
- 20 atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or
- 25 aryloxycarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, $(C_1-$

C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: converting compound of formula (I) where R¹ represents isothiocyanate group and all other symbols are as defined above by passing ammonia gas or by reacting with amine.

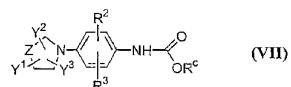
21. A novel intermediate of formula (VII)



15 where R⁵ represents (C₁-C₈)alkyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl,

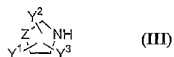
aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

- 5 22. A process for the preparation of compound of formula (VII), claimed in claim 21

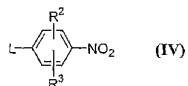


Y^1 , Y^2 , Y^3 , R^c , R^2 , R^3 and Z are as defined in claim 21, which comprises:

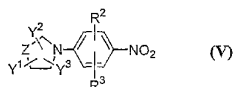
- (i) reacting a compound of formula (III)



- 10 where Y^1 , Y^2 , Y^3 and Z are as defined in claim 21, with a compound of formula (IV)

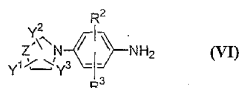


where L represents a leaving group; R^2 and R^3 are as defined in claim 21, to produce a compound of formula (V)



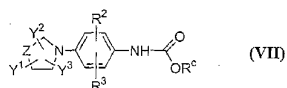
- 15 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 21,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 21,

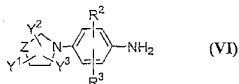
(iii) reacting the compound of formula (VI) with alkylchloroformate, to produce a compound of formula (VII)



where R^c represents (C₁-C₈)alkyl group; Y¹, Y², Y³, R², R³ and Z are as defined in claim

21.

23. A novel intermediate of formula (VI)



where R² and R³ may be same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where

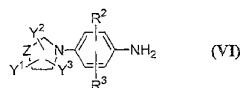
10 R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z

represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group; Y² and Y³ independently represent

15 hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-

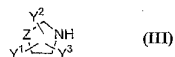
20 C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, containing one or two hetero atoms.

24. A process for the preparation of compound of formula (VI), claimed in claim 23

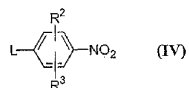


Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23, which comprises:

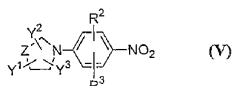
(i) reacting a compound of formula (III)



5 where Y^1 , Y^2 , Y^3 and Z are as defined in claim 23, with a compound of formula (IV)

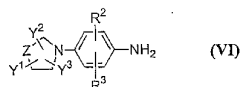


where L represents a leaving group; R^2 and R^3 are as defined in claim 23, to produce a compound of formula (V)



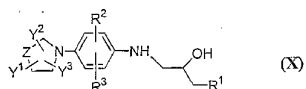
10 where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23, and

(ii) reducing the compound of formula (V) to produce a compound of formula (VI)



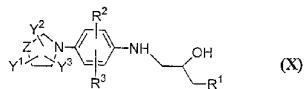
where Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 23.

15 25. A novel intermediate of formula (X)



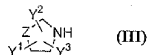
where R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $N(R^4)_2$, where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, (C_1-C_6) alkoxycarbonyl, (C_3-C_6) cycloalkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, (C_2-C_6) alkenylcarbonyl, aryloxythiocarbonyl, (C_1-C_6) alkoxythiocarbonyl, (C_2-C_6) alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-C(=O)-C(=O)-alkyl$, $-C(=O)-C(=O)-aryl$, $-C(=O)-C(=O)-alkoxy$, $-C(=O)-C(=O)-aryloxy$, $-(C=S)-S-alkyl$, $-(C=S)-NH_2$, $-(C=S)-NH-alkyl$, $-C(=S)-N-(alkyl)_2$, $-C(=S)-NH-alkenyl$, $(C=S)-(C=O)-alkoxy$, $-(C=S)-(C=O)-aryloxy$, $-C(=S)-O-(C=O)-alkyl$, $C(=S)-C(=S)-alkyl$, $-C(=S)-C(=S)-aryl$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^4 , NR^4 , OR^4 where R^4 represents substituted or unsubstituted (C_1-C_6) alkyl group, or halo (C_1-C_6) alkyl; Z represents S, O, $=CH$ or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C_1-C_6) alkyl, (C_2-C_6) alkenyl, (C_1-C_6) cycloalkyl, (C_1-C_6) alkoxy, aryl, aralkyl, aryloxy, (C_1-C_6) alkylcarbonyl, arylcarbonyl, (C_1-C_6) alkoxycarbonyl or aryloxythiocarbonyl; Y^1 represents $=O$ or $=S$ group and Y^2 and Y^3 independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, $=O$, $=S$ group, or substituted or unsubstituted groups selected from (C_1-C_6) alkyl, hydroxy (C_1-C_6) alkyl, (C_1-C_6) alkoxy (C_1-C_6) alkyl, (C_1-C_6) alkoxycarbonyl, carboxy (C_1-C_6) alkyl, (C_1-C_6) alkylsulfonyl, (C_1-C_6) alkylcarbonylamino (C_1-C_6) alkyl, arylcarbonylamino (C_1-C_6) alkyl, (C_1-C_6) alkylcarbonyloxy (C_1-C_6) alkyl, amino (C_1-C_6) alkyl, mono (C_1-C_6) alkylamino, di (C_1-C_6) alkylamino, arylamino, (C_1-C_6) alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroaralkyl, heterocyclyl or heterocycloalkyl; Y^2 and Y^3 when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

26. A process for the preparation of compound of formula (X), claimed in claim 25

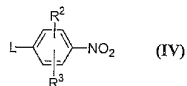


where R¹, Y¹, Y², Y³, R², R³ and Z are as defined in claim 25, which comprises:

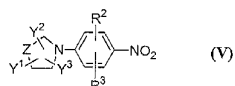
- (i) reacting a compound of formula (III)



- 5 where Y¹, Y², Y³ and Z are as defined in claim 25, with a compound of formula (IV)

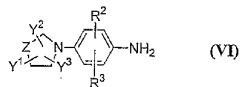


where L represents a leaving group; R² and R³ are as defined in claim 25, to produce a compound of formula (V)



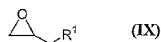
- 10 where Y¹, Y², Y³, R², R³ and Z are as defined in claim 25,

- (ii) reducing the compound of formula (V) to produce a compound of formula (VI)



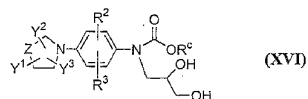
where Y¹, Y², Y³, R², R³ and Z are as defined in claim 25, and

- 15 (iii) reacting the compound of formula (VI) with a compound of formula (IX)



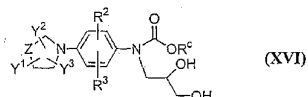
where R¹ is as defined in claim 25.

27. A novel intermediate of formula (XVI)



where R^c represents (C₁-C₆)alkyl group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxycarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

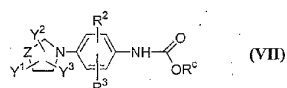
28. A process for the preparation of compound of formula (XVI), claimed in claim 27



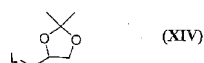
where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 27, which comprises:

(i) reacting a compound of formula (VII)

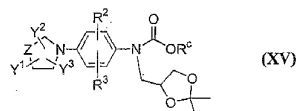
150



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27, with a compound of formula (XIV)

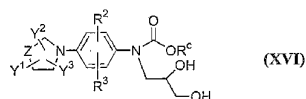


- 5 where L represents a leaving group; to produce a compound of formula (XV)



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27, and

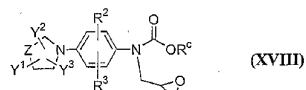
- (ii) hydrolysing the acetonide moiety in the compound of formula (XV) using conventional methods to produce a compound of formula (XVI)



10

where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 27.

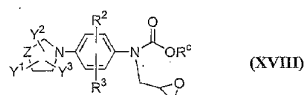
29. A novel intermediate of formula (XVIII)



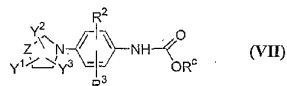
- 15 where R^c represents (C_1-C_8) alkyl group; R^2 and R^3 are same or different and independently represent hydrogen, halogen atom, (C_1-C_6) alkyl group, halo (C_1-C_6) alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(C_1-$

C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxcarbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms.

30. A process for the preparation of compound of formula (XVIII), claimed in claim 29



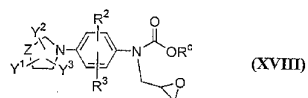
where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 29, which comprises: reacting a compound of formula (VII)



where R^c, Y¹, Y², Y³, R², R³ and Z are as defined in claim 29, with a compound of formula (XVII)

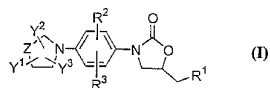


where L represents a leaving group; to produce a compound of formula (XVIII), where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 29.



where R^c , Y^1 , Y^2 , Y^3 , R^2 , R^3 and Z are as defined in claim 29.

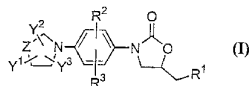
31. A pharmaceutical composition comprising a compound of formula (I)



as claimed in claim 1 and a pharmaceutically acceptable carrier, diluent, excipient or solvate.

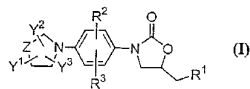
32. A pharmaceutical composition as claimed in claim 31, in the form of a tablet, capsule, powder, syrup, solution or suspension.
33. A method of treating a bacterial infection comprising administering a compound of formula (I) as claimed in claim 1 to a patient in need thereof.
34. A method of treating a bacterial infection comprising administering a pharmaceutical composition as claimed in claims 31 and 32 to a patient in need thereof.
35. A pharmaceutical composition comprising a compound as claimed in claim 6 and a pharmaceutically acceptable carrier, diluent, excipient or solvate.
36. A pharmaceutical composition as claimed in claim 35, in the form of a tablet, capsule, powder, syrup, solution or suspension.
37. A method of treating a bacterial infection comprising administering a compound as claimed in claim 6 to a patient in need thereof.
38. A method of treating a bacterial infection comprising administering a pharmaceutical composition as claimed in claims 35 and 36 to a patient in need thereof.

39. A process for the preparation of compound of formula (I),



- where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents 'O' group, Y^2 and Y^3 independently represent hydrogen atom, R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $\text{N(R}^4)_2$ where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, $(\text{C}_1\text{-C}_6)\text{alkoxycarbonyl}$, $(\text{C}_1\text{-C}_6)\text{cycloalkoxythiocarbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenyloxythiocarbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenylcarbonyl}$, aryloxythiocarbonyl, $(\text{C}_1\text{-C}_6)\text{alkoxythiocarbonyl}$, $(\text{C}_2\text{-C}_6)\text{alkenyloxythiocarbonyl}$, aryloxythiocarbonyl, $-\text{C}(=\text{O})-\text{C}(=\text{O})\text{-alkyl}$, $-\text{C}(=\text{O})-\text{C}(=\text{O})\text{-aryl}$, $-\text{C}(=\text{O})-\text{C}(=\text{O})\text{-alkoxy}$, $-\text{C}(=\text{O})-\text{C}(=\text{O})\text{-aryloxy}$, $-(\text{C}=\text{S})\text{-S-alkyl}$, $-(\text{C}=\text{S})\text{-NH}_2$, $-(\text{C}=\text{S})\text{-NH-alkyl}$, $-(\text{C}=\text{S})\text{-N-(alkyl)}_2$, $-(\text{C}=\text{S})\text{-NH-alkenyl}$, $(\text{C}=\text{S})\text{-(C=O)-alkoxy}$, $-(\text{C}=\text{S})\text{-(C=O)-aryloxy}$, $-(\text{C}=\text{S})\text{-O-(C=O)-alkyl}$, $\text{C}(\text{S})\text{-C}(\text{S})\text{-alkyl}$, $-\text{C}(\text{S})\text{-C}(\text{S})\text{-aryl}$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom, $(\text{C}_1\text{-C}_6)\text{alkyl}$ group, halo $(\text{C}_1\text{-C}_6)\text{alkyl}$, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$ group, or halo $(\text{C}_1\text{-C}_6)\text{alkyl}$; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted $(\text{C}_1\text{-C}_6)\text{alkyl}$, $(\text{C}_2\text{-C}_6)\text{alkenyl}$, $(\text{C}_1\text{-C}_6)\text{cycloalkyl}$, $(\text{C}_1\text{-C}_6)\text{alkoxy}$, aryl, aralkyl, aryloxy, $(\text{C}_1\text{-C}_6)\text{alkylcarbonyl}$, arylcarbonyl, $(\text{C}_1\text{-C}_6)\text{alkoxycarbonyl}$ or aryloxythiocarbonyl its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where Z represents NR^b wherein R^b represents $(\text{C}_1\text{-C}_6)\text{alkyl}$ group substituted with hydroxy group at α -position, Y^1 represents 'O' group, Y^2 and Y^3 independently represent hydrogen atom and all other symbols are as defined above, with a base.

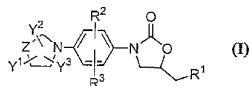
40. A process for the preparation of compound of formula (I),



- where Z represents NR^b wherein R^b represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)$ alkyl or aralkyl, Y^1 represents '=O group', Y^2 and Y^3 independently represent hydrogen atom;
- 5 R^1 represents halo, azido, isothiocyanate, thioalcohol, OR^4 , NHR^4 or $\text{N(R}^4)_2$ where R^4 represents hydrogen atom, or substituted or unsubstituted groups selected from acyl, thioacyl, $(\text{C}_1\text{-C}_6)$ alkoxycarbonyl, $(\text{C}_2\text{-C}_6)$ cycloalkoxythiocarbonyl, $(\text{C}_2\text{-C}_6)$ alkenyloxythiocarbonyl, $(\text{C}_2\text{-C}_6)$ alkenylcarbonyl, aryloxythiocarbonyl, $(\text{C}_1\text{-C}_6)$ alkoxythiocarbonyl, $(\text{C}_2\text{-C}_6)$ alkenyloxythiocarbonyl, aryloxythiocarbonyl, $-\text{C}(=\text{O})\text{-C}(=\text{O})\text{-alkyl}$, $-\text{C}(=\text{O})\text{-C}(=\text{O})\text{-aryl}$, $-\text{C}(=\text{O})\text{-C}(=\text{O})\text{-alkoxy}$, $-\text{C}(=\text{O})\text{-C}(=\text{O})\text{-aryloxy}$, $-\text{C}(=\text{S})\text{-S-alkyl}$, $-\text{C}(=\text{S})\text{-NH}_2$, $-\text{C}(=\text{S})\text{-NH-alkyl}$, $-\text{C}(=\text{S})\text{-N-(alkyl)}_2$, $-\text{C}(=\text{S})\text{-NH-alkenyl}$, $(\text{C}=\text{S})\text{-C}(=\text{O})\text{-alkoxy}$, $-\text{C}(=\text{S})\text{-C}(=\text{O})\text{-aryloxy}$, $-\text{C}(=\text{S})\text{-O-(C=O)-alkyl}$, $\text{C}(=\text{S})\text{-C}(=\text{S})\text{-alkyl}$, $-\text{C}(=\text{S})\text{-C}(=\text{S})\text{-aryl}$, thiomorpholinylthiocarbonyl or pyrrolidinylthiocarbonyl; R^2 and R^3 may be same or different and independently represent hydrogen, halogen atom,
- 15 $(\text{C}_1\text{-C}_6)$ alkyl group, halo $(\text{C}_1\text{-C}_6)$ alkyl, cyano, nitro, SR^a , NR^a , OR^a where R^a represents substituted or unsubstituted $(\text{C}_1\text{-C}_6)$ alkyl group, or halo $(\text{C}_1\text{-C}_6)$ alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen or substituted or unsubstituted $(\text{C}_1\text{-C}_6)$ alkyl, $(\text{C}_2\text{-C}_6)$ alkenyl, $(\text{C}_1\text{-C}_6)$ cycloalkyl, $(\text{C}_1\text{-C}_6)$ alkoxy, aryl, aralkyl, aryloxy, $(\text{C}_1\text{-C}_6)$ alkylcarbonyl, arylcarbonyl, $(\text{C}_1\text{-C}_6)$ alkoxycarbonyl or aryloxythiocarbonyl its
- 20 derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting the compound of formula (I) where Z represents NR^b wherein R^b represents hydrogen, Y^1 represents '=O' group, Y^2 and Y^3 independently represent hydrogen atom and all other symbols are as defined above, with a base and alkyl halide.
- 25 41. The compound according to claim 1, wherein the substituents on R^a are selected from hydroxy, halogen, nitro, amino, alkoxy, carboxy or cyano,

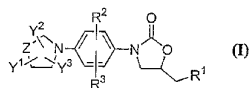
42. Pharmaceutically acceptable salt according to claim 7 wherein the salts of organic bases are selected from N,N'-diacetylenediamine, betaine, caffeine, 2-diethylaminoethanol, 2-dimethylaminoethanol, N-ethylmorpholine, N-ethylpiperidine, glucamine, glucosamine, hydrabamine, isopropylamine, methylglucamine, morpholine, 5 piperazine, piperidine, procaine, purines, theobromine, triethylamine, trimethylamine, tripropylamine, tromethamine, diethanolamine, meglumine, ethylenediamine, N,N'-diphenylethylenediamine, N,N'-dibenzylethylenediamine, N-benzyl phenylethylamine, choline, choline hydroxide, dicyclohexylamine, metformin, benzylamine, phenylethylamine, dialkylamine, trialkylamine, thiamine, aminopyrimidine, 10 aminopyridine, purine, spermidine.
43. Pharmaceutically acceptable salt according to claim 7 wherein the salts of chiral bases are selected from alkylphenylamine, glycinol, phenyl glycinol.
44. Pharmaceutically acceptable salt according to claim 7 wherein the salts of natural amino acids are selected from glycine, alanine, valine, leucine, isoleucine, norleucine, 15 tyrosine, cystine, cysteine, methionine, proline, hydroxy proline, histidine, ornithine, lysine, arginine, serine, threonine, phenylalanine.
45. Pharmaceutically acceptable salt according to claim 7 wherein the salts of unnatural amino acid, substituted amino acids are selected from D-isomers, guanidine, substituted guanidine wherein the substituents are selected from nitro, amino, alkyl such 20 as methyl, ethyl, propyl and the like; alkenyl such as ethenyl, propenyl, butenyl and the like; alkynyl such as ethynyl, propynyl.
46. Pharmaceutically acceptable salt according to claim 7 wherein the addition salts are selected from sulphates, nitrates, phosphates, perchlorates, borates, halides, acetates, tartrates, maleates, citrates, succinates, palmoates, methanesulphonates, benzoates, 25 salicylates, hydroxynaphthoates, benzenesulfonates, ascorbates, glycerophosphates, ketoglutarates.

47. A process for the preparation of compound of formula (I),

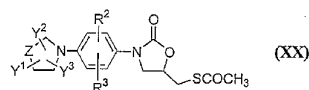


- where R¹ represents halogen atom; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, alkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, alkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms, its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises: reacting a compound of formula (I) where R¹ represents hydroxy group and all other symbols are as defined above, with tetrahalomethane group in the presence of PPh₃ or P(alkyl)₃.

48. A process for the preparation of compound of formula (I),



- where R¹ represents 'SH' group; R² and R³ are same or different and independently represent hydrogen, halogen atom, (C₁-C₆)alkyl group, halo(C₁-C₆)alkyl, cyano, nitro, SR^a, NR^a, OR^a where R^a represents substituted or unsubstituted (C₁-C₆)alkyl group, or halo(C₁-C₆)alkyl; Z represents S, O, =CH or NR^b where R^b represents hydrogen, or substituted or unsubstituted (C₁-C₆)alkyl, (C₂-C₆)alkenyl, (C₁-C₆)cycloalkyl, (C₁-C₆)alkoxy, aryl, aralkyl, aryloxy, (C₁-C₆)alkylcarbonyl, arylcarbonyl, (C₁-C₆)alkoxycarbonyl or aryloxy carbonyl; Y¹ represents =O or =S group and Y² and Y³ independently represent hydrogen, halogen, cyano, nitro, formyl, hydroxy, amino, =O, =S group, or substituted or unsubstituted groups selected from (C₁-C₆)alkyl, hydroxy(C₁-C₆)alkyl, (C₁-C₆)alkoxy(C₁-C₆)alkyl, (C₁-C₆)alkoxycarbonyl, carboxy(C₁-C₆)alkyl, (C₁-C₆)alkylsulfonyl, (C₁-C₆)alkylcarbonylamino(C₁-C₆)alkyl, arylcarbonylamino(C₁-C₆)alkyl, (C₁-C₆)alkylcarbonyloxy(C₁-C₆)alkyl, amino(C₁-C₆)alkyl, mono(C₁-C₆)alkylamino, di(C₁-C₆)alkylamino, arylamino, (C₁-C₆)alkoxy, aryl, aryloxy, aralkyl, heteroaryl, heteroalkyl, heterocyclyl or heterocycloalkyl; Y² and Y³ when present on adjacent carbon atoms together also form a substituted or unsubstituted 5 or 6 membered aromatic or non-aromatic cyclic structure, optionally containing one or two hetero atoms, its derivatives, its analogs, its tautomeric forms, its stereoisomers, its polymorphs, its pharmaceutically acceptable salts or its pharmaceutically acceptable solvates; which comprises:
- (i) reacting the compound of formula (I) where R¹ represents halogen atom, to produce a compound of formula (XX),



where all symbols are as defined above, with a base and thioacetic acid,

(ii) reacting the compound of formula (XX), to produce a compound of formula (I) where R¹ represents 'SH' group and all other symbols are as defined earlier, with base.

49. Use of a compound of formula (I) for treating a bacterial infection comprising
5 administering a therapeutically effective amount of a compound of formula (I) as
claimed in claim 1 to a patient in need thereof.
50. Use of a compound for treating a bacterial infection comprising administering a
pharmaceutical composition as claimed in claims 31 and 32 to a patient in need thereof.
51. Use of a compound of formula (I) for treating a bacterial infection comprising
10 administering a therapeutically effective amount of a compound of formula (I) as
claimed in claim 6 to a patient in need thereof.
52. Use of a compound for treating a bacterial infection comprising administering a
pharmaceutical composition as claimed in claims 35 and 36 to a patient in need thereof.

【国際調査報告】

INTERNATIONAL SEARCH REPORT		International Application No. PCT/IN 01/00227
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C07D263/24 C07D417/10 C07D413/10 C07D263/58 C07D263/10 C07D413/12 C07D417/12 A61K31/42		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 C07D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, PAJ, CHEM ABS Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 96 13502 A (UPJOHN CO ; HUTCHINSON DOUGLAS K (US); BARBACHYN MICHAEL R (US); TA) 9 May 1996 (1996-05-09) cited in the application claim 1	1-52
Y	WO 97 27188 A (ZENEC LTD ; BETTS MICHAEL JOHN (GB)) 31 July 1997 (1997-07-31) cited in the application claim 1	1-52
Y	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 02, 29 February 2000 (2000-02-29) - & JP 11 322729 A (HOKURIKU SEIYAKU CO LTD), 24 November 1999 (1999-11-24) abstract; examples 81,82,86-89,228,229 -/-	1-52
☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in annex.		
* Special categories of cited documents : *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (see specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is compared with one or more other such documents, such combination being obvious to a person skilled in the art *Z* document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
30 August 2002		12.09.02
Name and mailing address of the ISA European Patent Office, P.O. Box 6818 Patentlaan 2 NL - 2200 HV Rijswijk Tel. (+31-70) 940-2040, Tx. 31 651 epo nl, Fax (+31-70) 940-3018		Authorized officer Grassi, D

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT		International Application No. PCT/IN 01/00227
C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MELISSARIS A P ET AL: "THERMALLY STABLE POLYMERS BASED ON BISMALIMIDES CONTAINING AMIDE, IMIDE, AND ESTER LINKAGES" JOURNAL OF POLYMER SCIENCE, POLYMER CHEMISTRY EDITION, JOHN WILEY AND SONS. NEW YORK, US, vol. 27, no. 1, 15 January 1989 (1989-01-15), pages 245-262, XP000027582 ISSN: 0887-624X page 254	21
P,X	WO 01 09107 A (GORDEEV MIKHAIL F ;UPJOHN CO (US); LUEHR GARY W (US); PATEL DINESH) 8 February 2001 (2001-02-08) page 63-64	21
X	ARTICO, MARINO ET AL: "Compounds with antiproliferative activity. XXXIV. Derivatives of 3-(p-aminophenyl)-2-oxazolidinone: synthesis and antineoplastic activities" FARMACO, ED. SCI. (1969), 24(2), 179-90, XP001070657 examples III,IXC	21,23
X	DE 23 57 591 A (GEISTLICH SOEHNE AG) 22 May 1974 (1974-05-22) page 23; example D	23
X	US 6 124 334 A (HUTCHINSON DOUGLAS K) 26 September 2000 (2000-09-26) column 43; example 35	23
X	US 4 174 958 A (PILGRAM KURT H G) 20 November 1979 (1979-11-20) preparation of compound 23, table I column 13	23
X	US 3 651 079 A (SKORCZ JOSEPH A ET AL) 21 March 1972 (1972-03-21) column 3; claim 1	23
X	DE 35 36 066 A (OREAL) 17 April 1986 (1986-04-17) example 9	25
X	WO 95 07271 A (UPJOHN CO ;BARBACHYN MICHAEL R (US); BRICKNER STEVEN J (US); HUTCH) 16 March 1995 (1995-03-16) cited in the application page 29; example 11 claims 1,11	1-52

Form PCT/ISA/210 (continuation of second sheet) (July 1993)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN 01/00227**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(e) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 23(part), 24(part)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

International Application No. PCT/IN 01 00227

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 23(part),24(part)

The initial phase of the search revealed a very large number of documents relevant to the issue of novelty of the claims 23 and 24. So many documents were retrieved that it is impossible to determine which parts of the claim(s) may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search over the whole breadth of the said claims is impossible.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an international Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

International Application No. PCT/IN 01/00227

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-5 (part), 6, 7-52 (part)

Compounds in which Z is S, O, or NR^b, and Y¹ is bound to a carbon atom, the preparation, use, or intermediates thereof.

2. Claims: 1-5 (part), 7-52 (part)

Compounds in which Z is S and Y¹ is bound to the sulfur atom, the preparation, use, or intermediates thereof.

3. Claims: 1-5 (part), 7-52 (part)

Compounds in which Z is =CH, the preparation, use, or intermediates thereof.

INTERNATIONAL SEARCH REPORT

International Publication No.
PCT/IN 01/00227

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9613502	A	09-05-1996	AT 204277 T	15-09-2001
			AU 694271 B2	16-07-1998
			AU 3625495 A	23-05-1996
			BR 9509136 A	21-07-1998
			CA 2200433 A1	09-05-1996
			CN 1162312 A ,B	15-10-1997
			CZ 9701217 A3	16-07-1997
			DE 69522234 D1	20-09-2001
			DE 69522234 T2	16-05-2002
			DK 788498 T3	05-11-2001
			EP 0788498 A1	13-08-1997
			ES 2162941 T3	16-01-2002
			FI 971774 A	25-04-1997
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