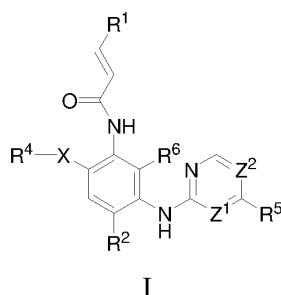


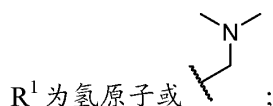
权 利 要 求

1. 式 I 所示的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物



5

其中，在式 I 中，

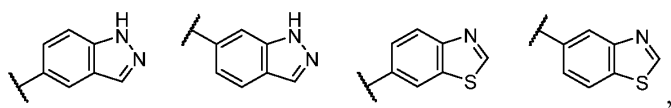


R^2 为 C_{1-6} 烷基或 OR^8 , R^8 为氢原子, C_{1-8} 烷基, 卤代 C_{1-8} 烷基, C_{3-8} 环烷基, 卤代 C_{3-8} 环烷基, C_{3-7} 环烷基- C_{1-6} 烷基, 取代或未取代含有 1-2 个选自 N、O 和 S 中的杂原子的 4-7 元杂环基, 取代或未取代含有 1-2 个选自 N、O 和 S 中的杂原子的 4-7 元杂环基- C_{1-8} 烷基;

X 为化学键、O、S、CO、 NR^3 或 CR^3 , 其中 R^3 为氢, C_{1-6} 烷基, 卤代 C_{1-6} 烷基, C_{3-8} 环烷基, 卤代 C_{3-8} 环烷基, C_{1-6} 烷氧基- C_{1-6} 烷基, C_{1-8} 烷基-CO 或 4-6 元杂环基;

R^4 为 C_{1-6} 烷基, C_{3-6} 环烷基, 4-7 元杂环基或 4-7 元双环桥杂环基, 它们可以任选地被 1-3 个独立地选自下组的取代基所取代: C_{1-6} 烷基, 卤代 C_{1-6} 烷基, C_{1-6} 烷氧基, 卤代 C_{1-6} 烷氧基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基, C_{3-6} 环烷氧基, 卤代 C_{3-6} 环烷氧基, C_{1-6} 烷氧基- C_{1-6} 烷基, 羟基- C_{1-6} 烷基, 氨基- C_{1-6} 烷基, C_{1-6} 烷基-氨基- C_{1-6} 烷基, 卤素, 羟基, 氰基, 氰基- C_{1-8} 烷基, 氨基, C_{1-6} 烷基-氨基, 二(C_{1-6} 烷基)-氨基, C_{3-6} 环烷基-氨基, C_{1-6} 烷基羰基, C_{1-6} 烷基-氨基-酰基, 二(C_{1-6} 烷基)-氨基-酰基, C_{3-6} 环烷基-氨基-酰基, C_{1-6} 酰基-氨基, 取代或未取代的杂环基, 取代或未取代的杂环基-烷基, 其中所述取代基可选择地和它们所连接的碳原子一起形成环;

R^5 为由两个环形成的并环, 选自



所述的并环非必需地由 1-3 个取代基所取代, 所述的取代基为 C_{1-6} 烷基, 卤代 C_{1-6} 烷基, C_{1-6} 烷氧基, 卤代 C_{1-6} 烷氧基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基, C_{3-6} 环烷氧基, 卤代 C_{3-6} 环烷氧基, C_{1-6} 烷氧基- C_{1-6} 烷基, 羟基- C_{1-6} 烷基, 氨基- C_{1-6} 烷基, C_{1-6} 烷基-氨基- C_{1-6} 烷基, 卤素, 羟基, 氰基, 氰基- C_{1-8} 烷基, 氨基, C_{1-6} 烷基-氨基, 二(C_{1-6} 烷基)-氨基, C_{3-6} 环烷基-氨基, C_{1-6} 烷基-氨基-酰基, 二(C_{1-6} 烷基)-氨基-酰基, C_{3-6} 环烷基-氨基-酰基, C_{1-6} 酰基-氨基, 取代或未取代的杂环基, 取代或未取代的杂环基-烷基, 其中所述取代基可选择地和它们所连接的碳原子一起形成环;

R^6 为氢, 卤素, 羟基, 腈基, C_{1-3} 烷基, 卤代 C_{1-3} 烷基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基, C_{1-3} 烷氧基, 卤代 C_{1-3} 烷氧基, C_{3-6} 环烷氧基, 卤代 C_{3-6} 环烷氧基;

Z^1 为 $C-R^7$, Z^2 为 N, 或者 Z^1 为 N, Z^2 为 $C-R^7$, 其中 R^7 为氢, 卤素, 腈基, C_{1-3} 烷基, 卤代 C_{1-3} 烷基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基。

2. 根据权利要求 1 所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物, 其中, 在式 I 中, R^2 为 OR^8 , R^8 为 C_{1-5} 烷基, 卤代 C_{1-5} 烷基, C_{3-7} 环烷基, 卤代 C_{3-7} 环烷基或 C_{3-7} 环烷基-甲基;

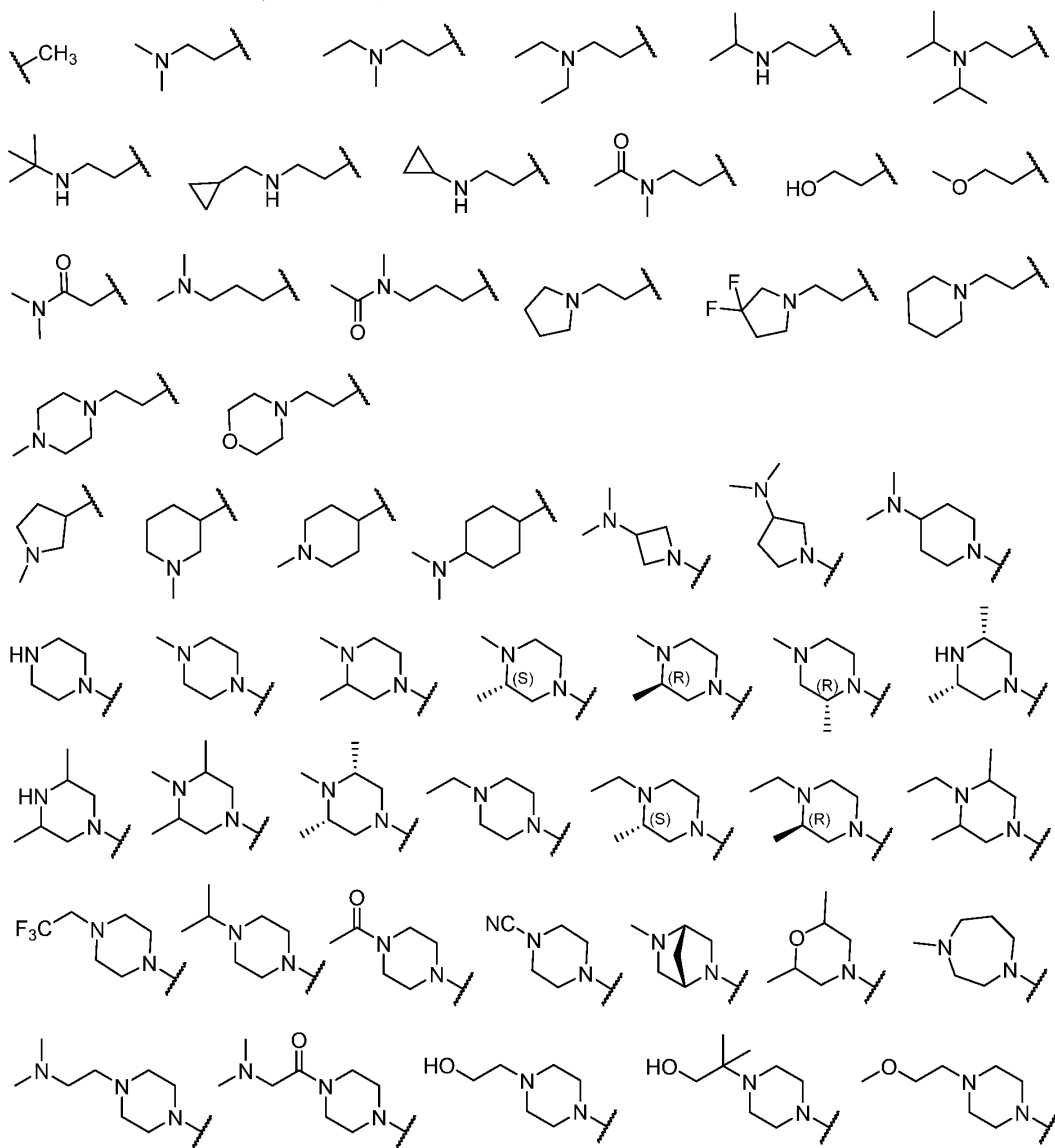
优选地, 在式 I 中, R^2 为 OR^8 , R^8 为甲基, 乙基, 正丙基, 异丙基, 环丙基, 二氟甲基, 三氟甲基, 环丁基, 环丙基甲基。

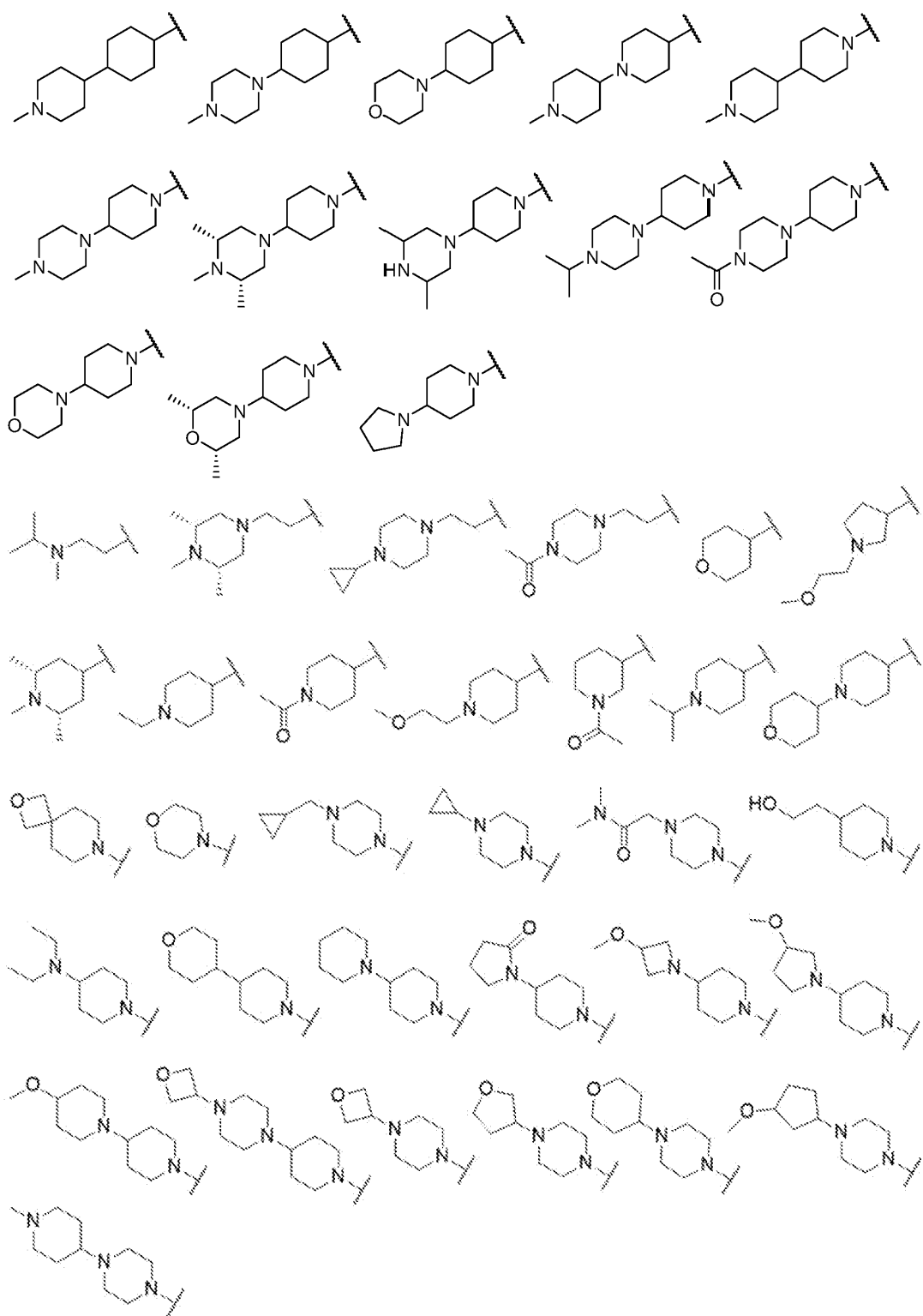
3. 根据权利要求 1 或 2 所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物, 其中, 在式 I 中, X 为化学键或 NR^3 , 其中 R^3 为氢, 甲基, 乙基、甲氧基乙基。

4. 根据权利要求 1 至 3 中任一项所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物, 其中, 在式 I 中, R^4 为 C_{1-3} 烷基, C_{3-6} 环烷基, 包含 1-2 个选自 N、O 和 S 的杂原子的 4-7 元杂环基或 4-7 元双环桥杂环基, 它们可以任选地被 1-3 个独立地选自下组的取代基所取代: C_{1-6} 烷基, 卤代 C_{1-6} 烷基, C_{1-6} 烷氧基, 卤代 C_{1-6} 烷氧基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基, C_{3-6} 环烷氧基, 卤代 C_{3-6} 环烷氧基, C_{1-6} 烷氧基- C_{1-6} 烷基, 羟基- C_{1-6} 烷基, 氨基- C_{1-6} 烷基, C_{1-6} 烷基-氨基- C_{1-6} 烷基, 卤素, 羟基, 氰基, 氰基- C_{1-8} 烷基, 氨基, C_{1-6} 烷基-氨基, 二(C_{1-6} 烷基)-氨基, C_{3-6} 环烷基-氨基, C_{1-6} 烷基-氨基-酰基, C_{1-6} 酰基-氨基, 取代或未取代的杂环基, 取代或未取代的杂环基-烷基, 其中所述取代基可选择地和它们所连接的碳原子一起形成环;

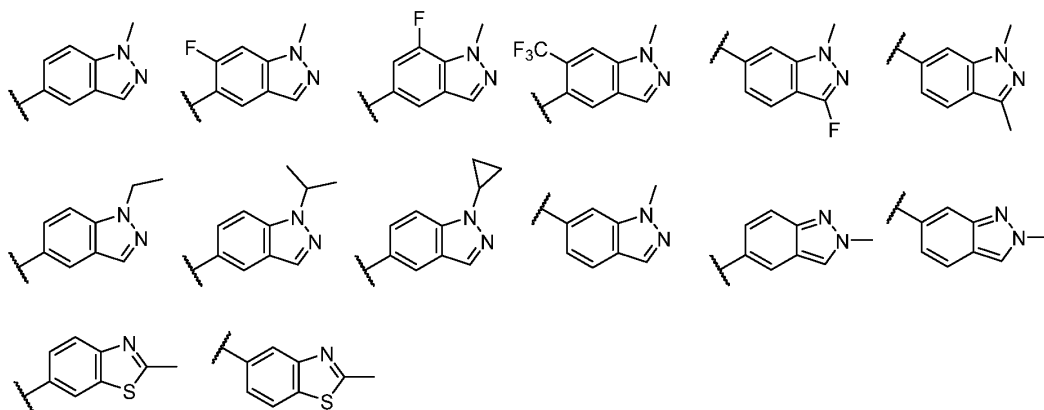
C₁₋₆ 酰基-氨基, 取代或未取代的 4-7 元杂环基;

优选地, R⁴ 选自下列基团:





5. 根据权利要求 1 至 4 中任一项所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物，其中，在式 I 中，R⁵ 选自下列基团：



6. 根据权利要求 1 至 5 中任一项所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物, 其中, 在式 I 中, R^6 为氢, 卤素, 羟基, 腈基, C_{1-3} 烷基, 卤代 C_{1-3} 烷基, C_{1-3} 烷氧基, 卤代 C_{1-3} 烷氧基;

5 优选地, 在式 I 中, Z^1 为 $C-R^7$, Z^2 为 N, 或者 Z^1 为 N, Z^2 为 $C-R^7$, 其中 R^7 为氢。

7. 根据权利要求 1 至 6 中任一项所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物, 在式 I 中,

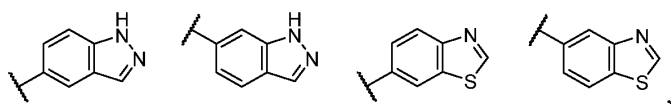
R^1 为氢原子;

R^2 为 OR^8 , R^8 为 C_{1-5} 烷基, 卤代 C_{1-5} 烷基, C_{3-7} 环烷基, 卤代 C_{3-7} 环烷基或 C_{3-7} 环烷基-甲基;

X 为化学键或 NR^3 , 其中 R^3 为氢, 甲基, 乙基、甲氧基乙基;

R^4 为 C_{1-3} 烷基, C_{3-6} 环烷基, 包含 1-2 个选自 N、O 和 S 的杂原子的 4-7 元杂环基或 4-7 元双环桥杂环基, 它们可以任选地被 1-3 个独立地选自下组的取代基所取代: C_{1-6} 烷基, 卤代 C_{1-6} 烷基, C_{1-6} 烷氧基, 卤代 C_{1-6} 烷氧基, C_{3-6} 环烷基, 卤代 C_{3-6} 环烷基, C_{3-6} 环烷氧基, 卤代 C_{3-6} 环烷氧基, C_{1-6} 烷氧基- C_{1-6} 烷基, 羟基- C_{1-6} 烷基, 氨基- C_{1-6} 烷基, C_{1-6} 烷基-氨基- C_{1-6} 烷基, 卤素, 羟基, 氰基, 氰基- C_{1-8} 烷基, 氨基, C_{1-6} 烷基-氨基, 二 (C_{1-6} 烷基)-氨基, C_{3-6} 环烷基-氨基, C_{1-6} 烷基羰基, C_{1-6} 烷基-氨基-酰基, 二 (C_{1-6} 烷基)-氨基-酰基, C_{3-6} 环烷基-氨基-酰基, C_{1-6} 酰基-氨基, 取代或未取代的 4-7 元杂环基;

20 R^5 为由两个环形成的并环, 选自



所述的并环非必需地由 1-3 个取代基所取代, 所述的取代基为 C_{1-6} 烷基, 卤代 C_{1-6} 烷

基, C₁₋₆ 烷氧基, 卤代 C₁₋₆ 烷氧基, C₃₋₆ 环烷基, 卤代 C₃₋₆ 环烷基, C₃₋₆ 环烷氧基, 卤代 C₃₋₆ 环烷氧基, C₁₋₆ 烷氧基-C₁₋₆ 烷基, 羟基-C₁₋₆ 烷基, 氨基-C₁₋₆ 烷基, C₁₋₆ 烷基-氨基-C₁₋₆ 烷基, 卤素, 羟基, 氰基, 氰基-C₁₋₈ 烷基, 氨基, C₁₋₆ 烷基-氨基, 二(C₁₋₆ 烷基)-氨基, C₃₋₆ 环烷基-氨基, C₁₋₆ 烷基-氨基-酰基, 二(C₁₋₆ 烷基)-氨基-酰基, C₃₋₆ 环烷基-氨基-酰基, C₁₋₆ 酰基-氨基, 取代或未取代的杂环基, 取代或未取代的杂环基-烷基, 其中所述取代基可选择地和它们所连接的碳原子一起形成环;

R⁶ 为氢, 卤素, 羟基, 腈基, C₁₋₃ 烷基, 卤代 C₁₋₃ 烷基, C₁₋₃ 烷氧基, 卤代 C₁₋₃ 烷氧基;

Z^1 为 $C-R^7$, Z^2 为 N , 或者 Z^1 为 N , Z^2 为 $C-R^7$, 其中 R^7 为氢;

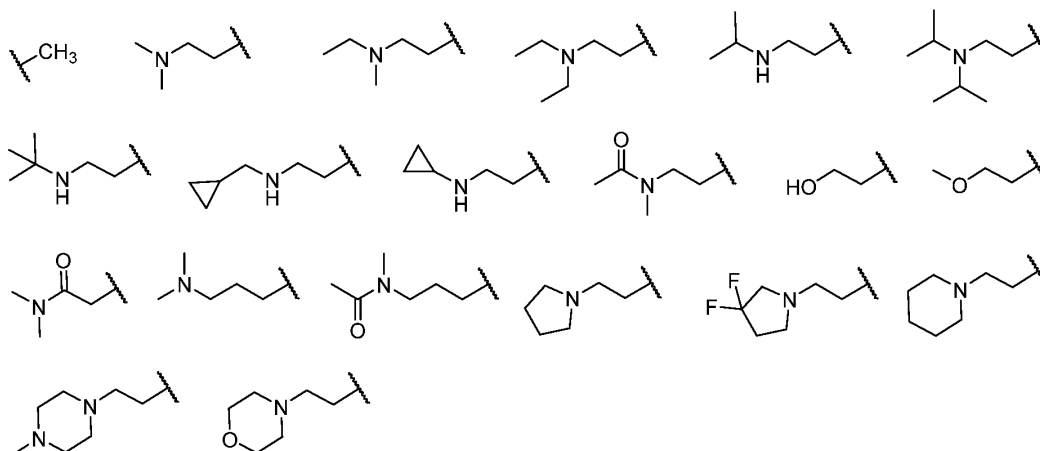
10 优选地, 在式 I 中,

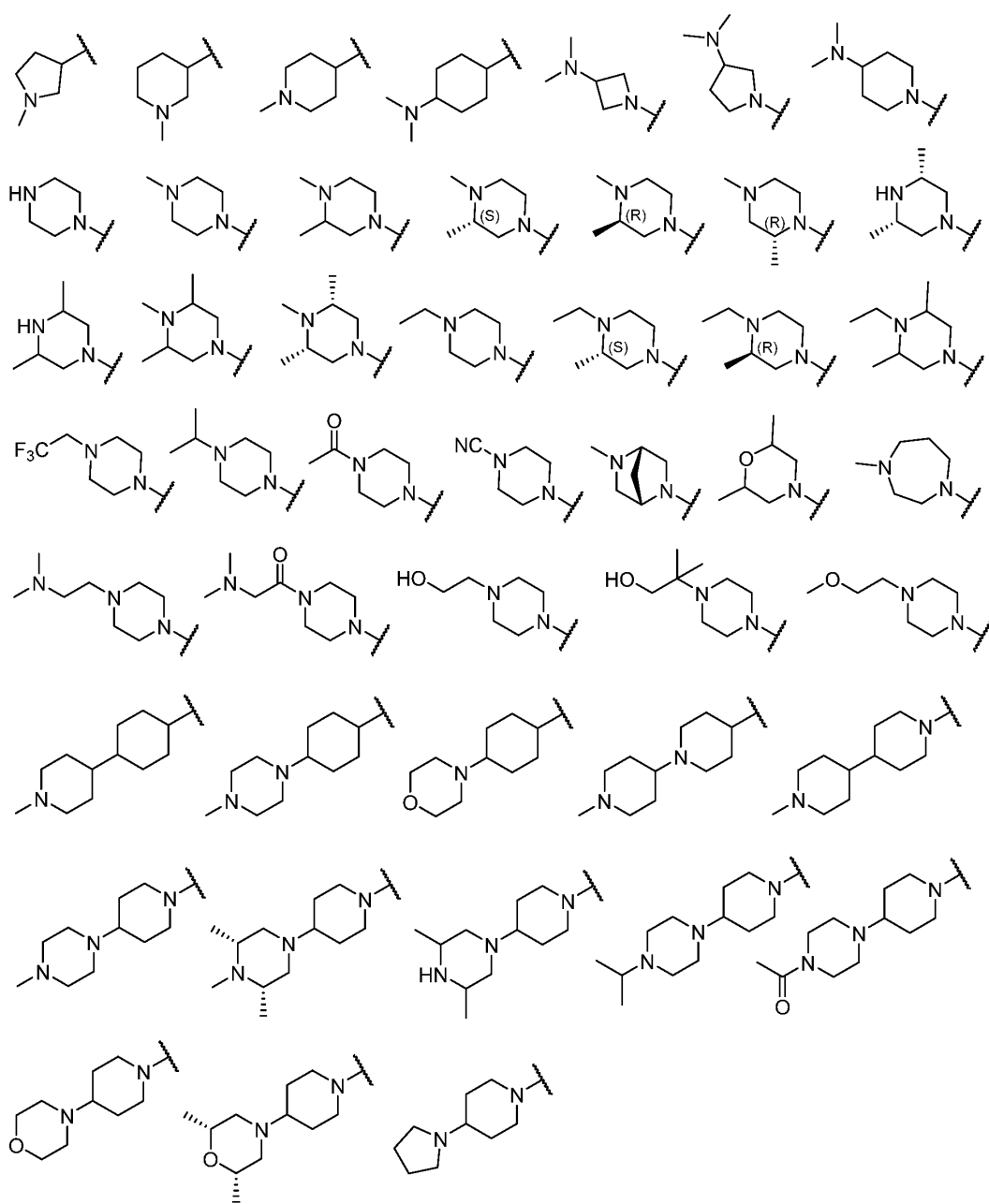
R¹ 为氢原子;

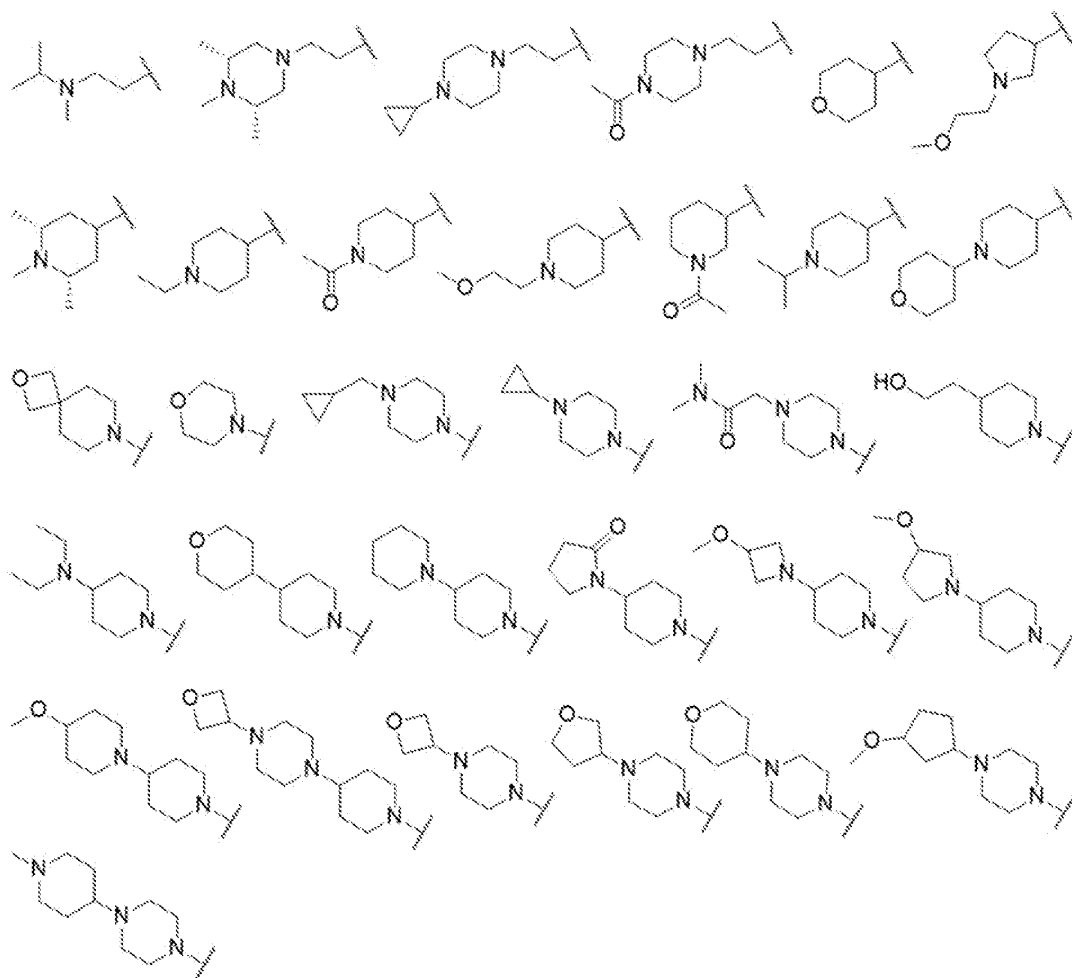
R² 为 OR⁸, R⁸ 为甲基, 乙基, 正丙基, 异丙基, 环丙基, 二氟甲基, 三氟甲基, 环丁基, 环丙基甲基;

X 为化学键或 NR^3 , 其中 R^3 为氢, 甲基, 乙基、甲氧基乙基;

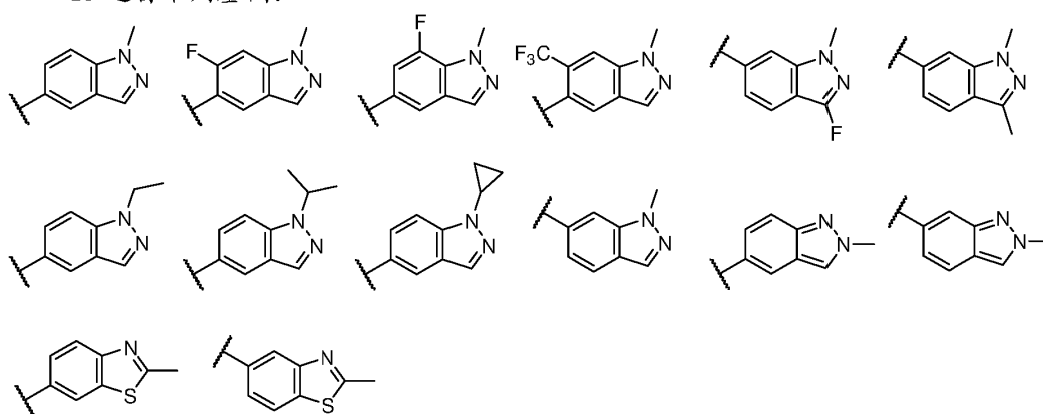
15 R^4 选自下列基团:







R⁵选自下列基团:



5

R⁶为氢, 卤素;

Z¹为 C-R⁷, Z²为 N, 或者 Z¹为 N, Z²为 C-R⁷, 其中 R⁷为氢;

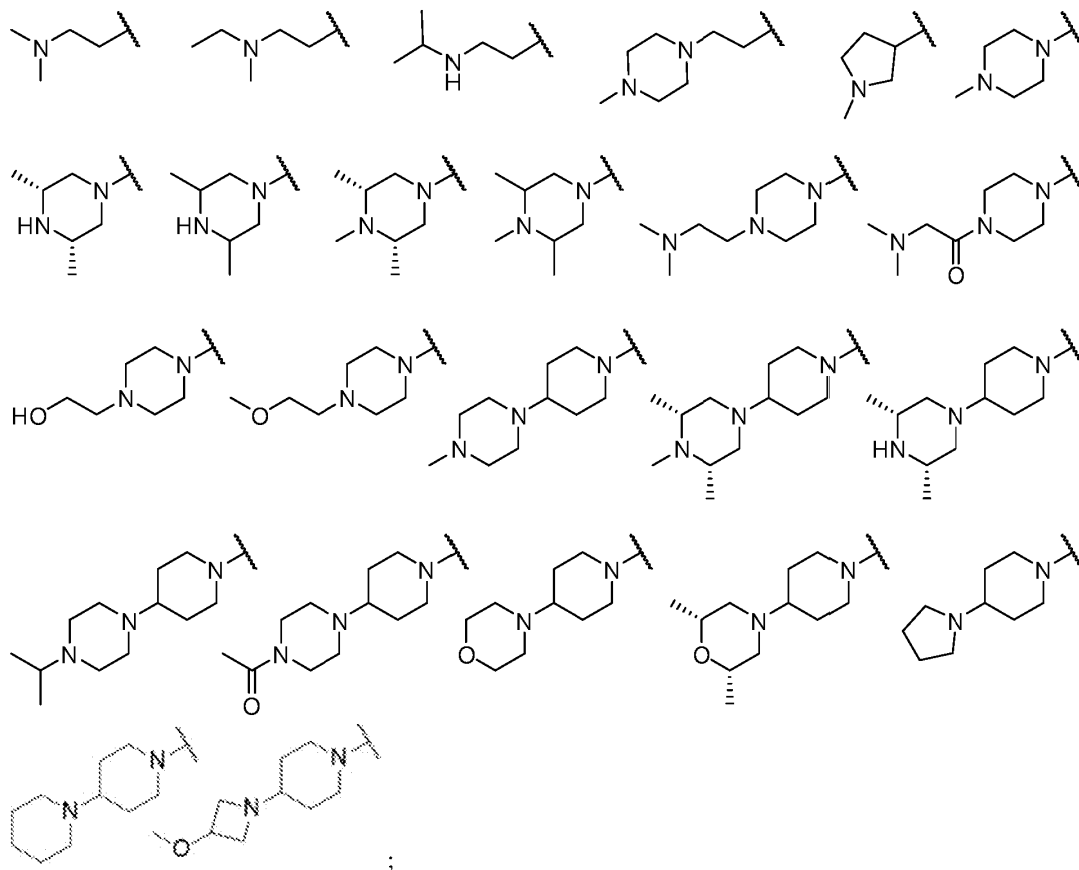
更优选地, 在式 I 中,

R^1 为氢原子;

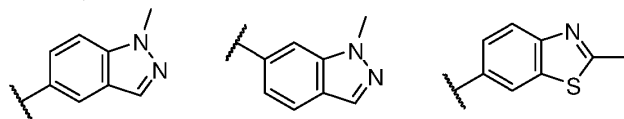
R^2 为 OR^8 , R^8 为甲基, 乙基, 二氟甲基;

X 为化学键或 NR^3 , 其中 R^3 为氢, C_{1-6} 烷基 (例如甲基, 乙基);

5 R^4 选自下列基团:



R^5 选自下列基团:

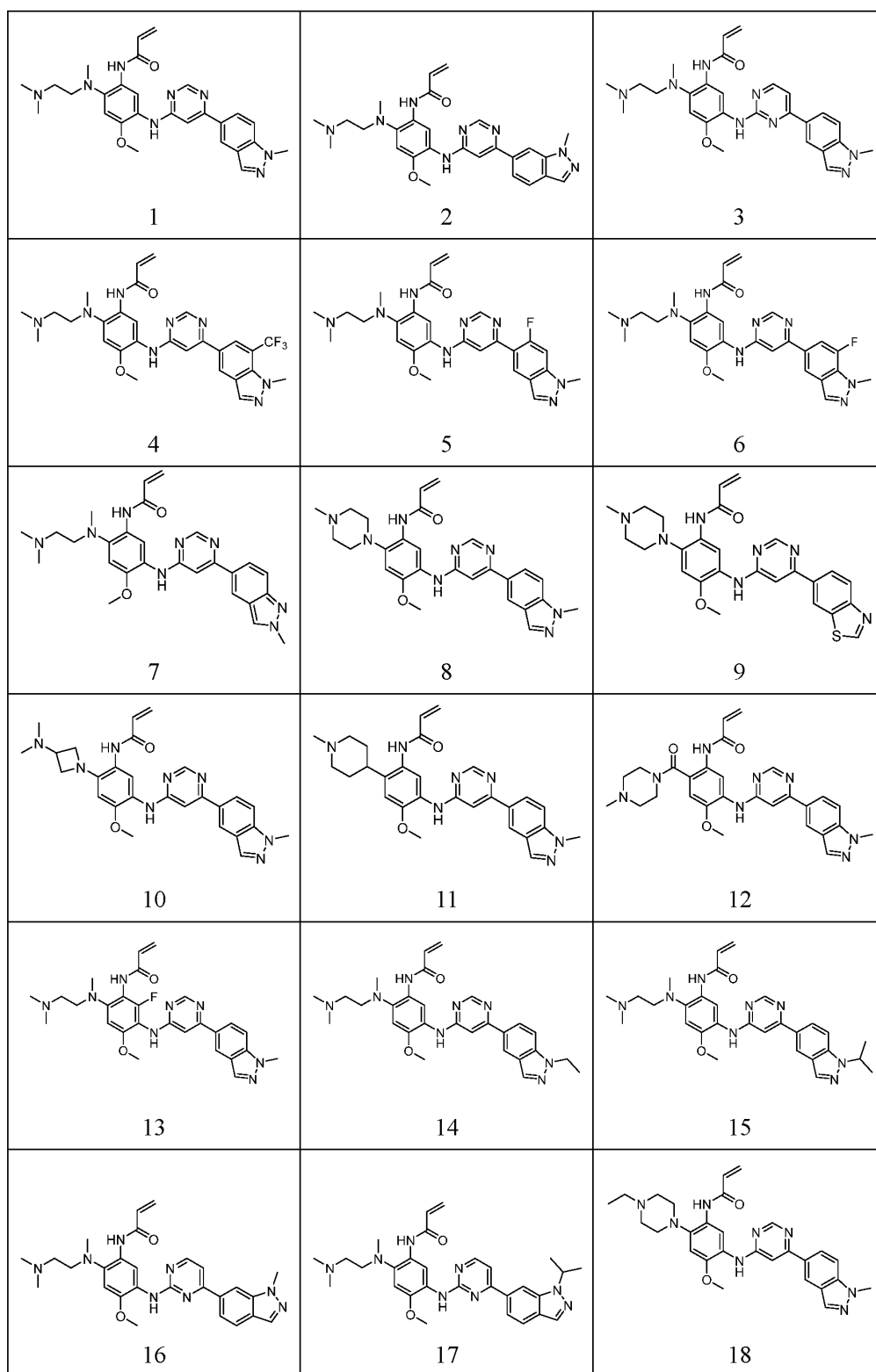


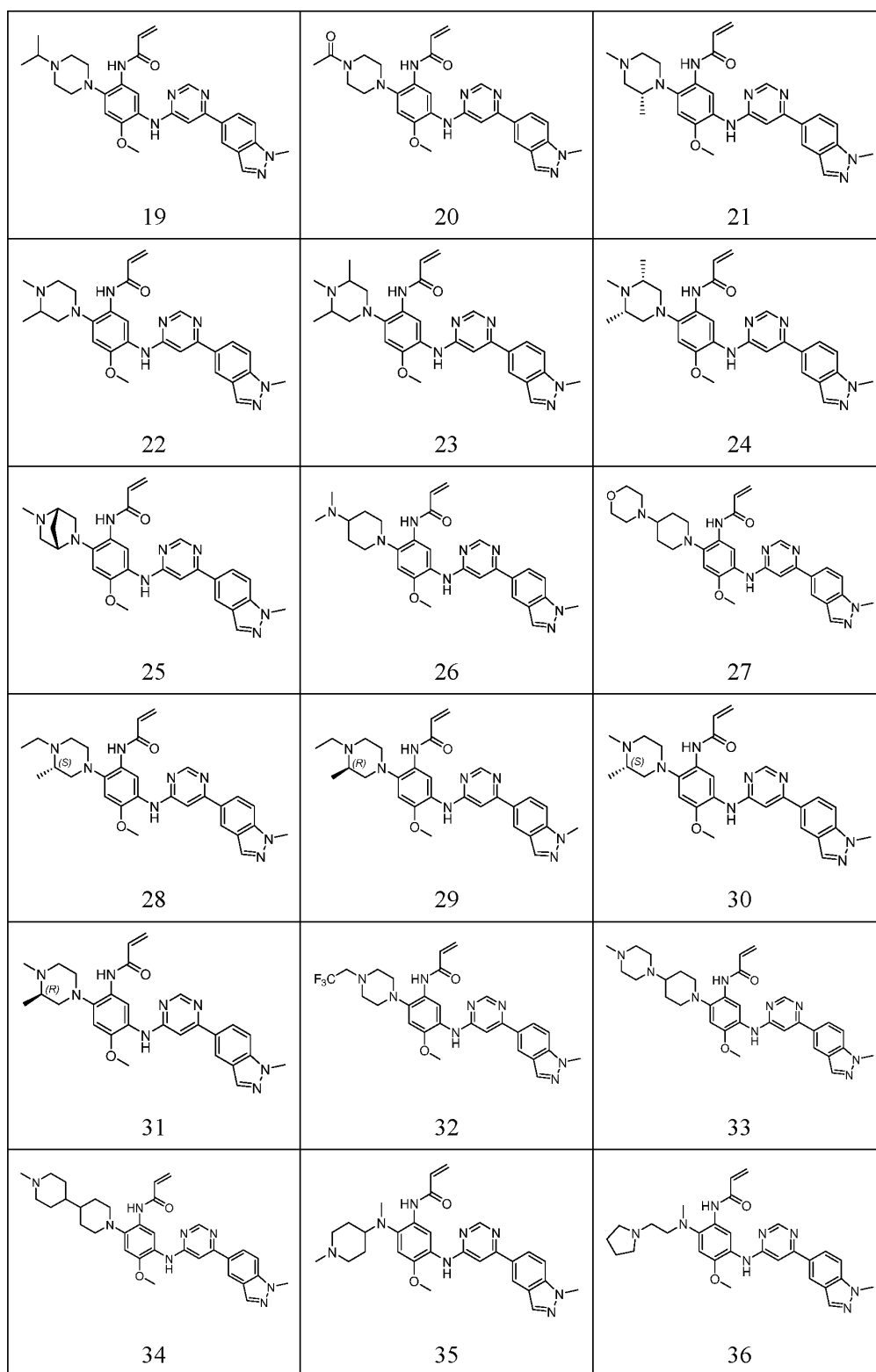
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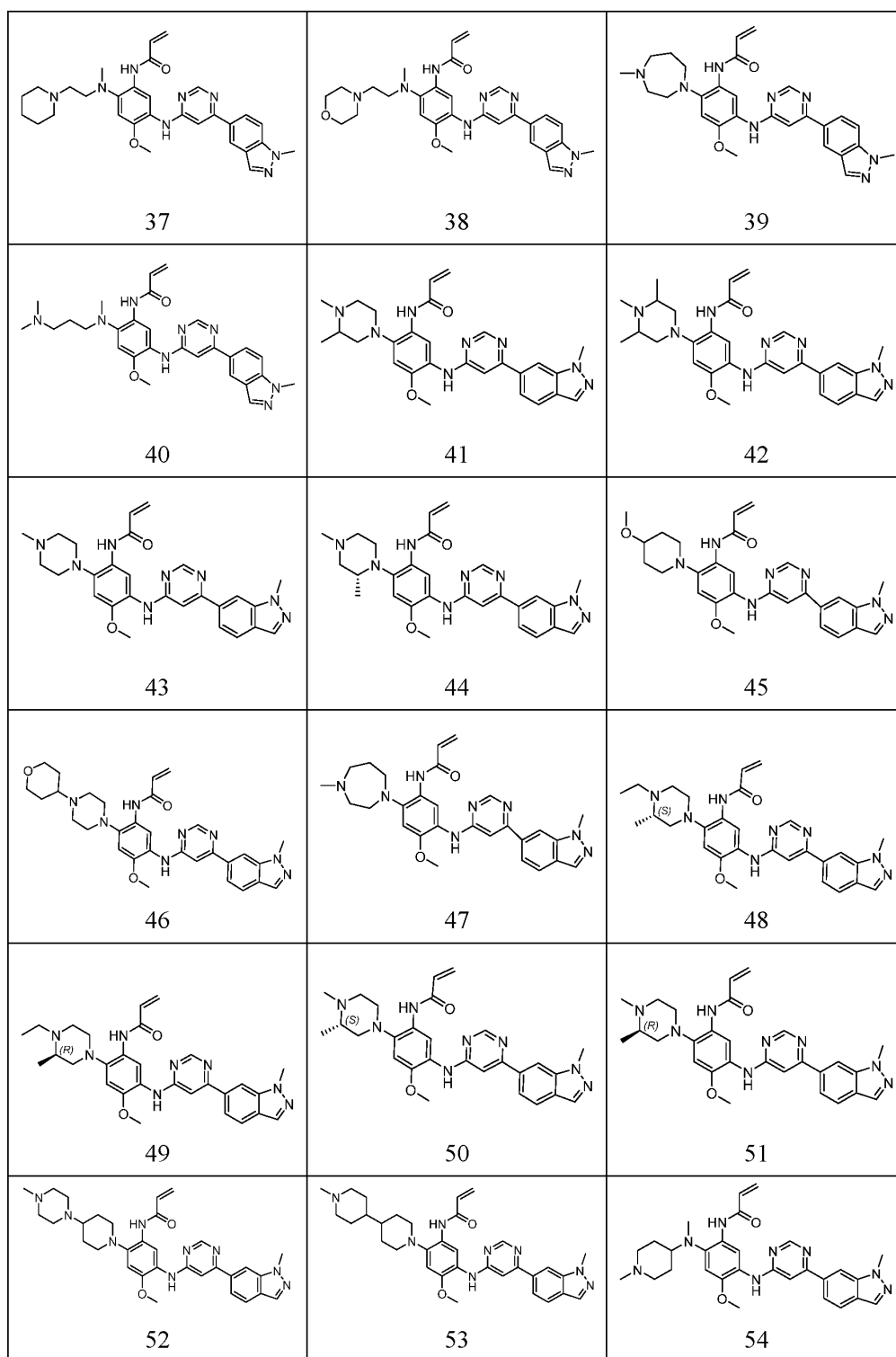
R^6 为氢或卤素;

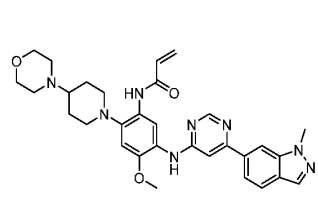
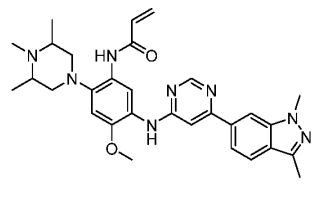
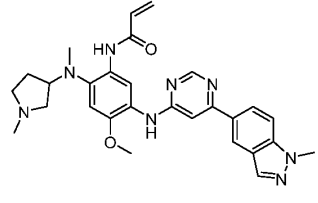
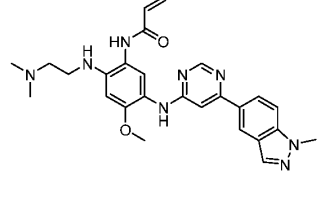
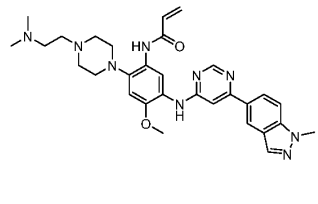
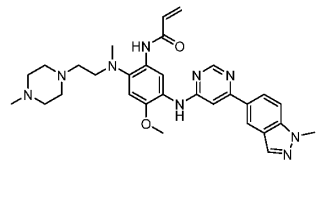
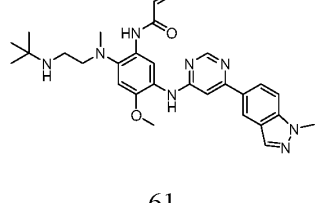
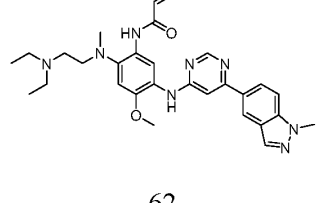
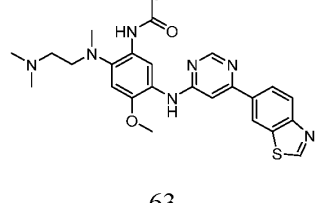
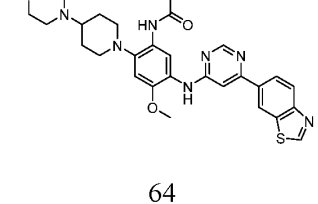
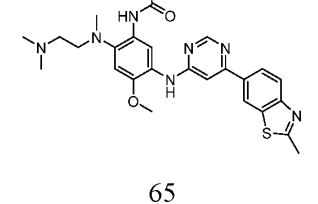
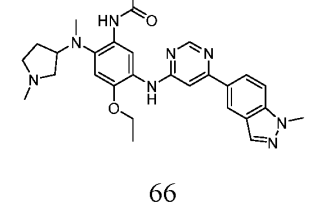
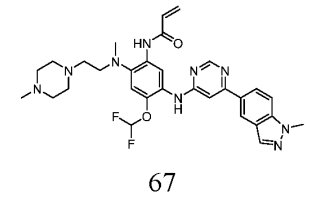
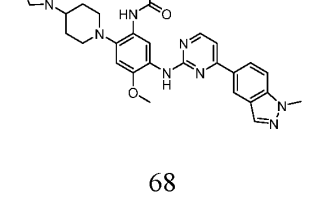
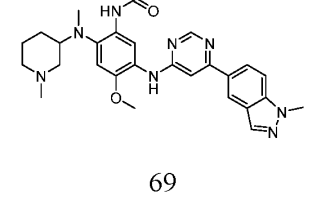
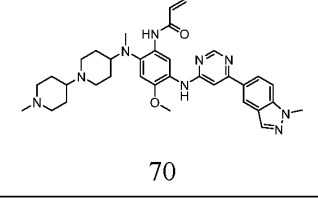
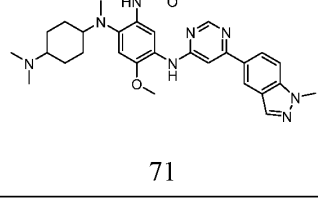
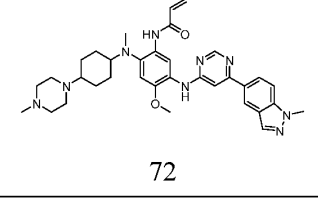
Z^1 为 $C-R^7$, Z^2 为 N, 或者 Z^1 为 N, Z^2 为 $C-R^7$, 其中 R^7 为氢;

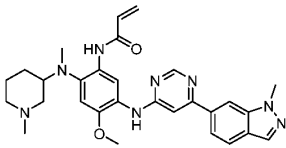
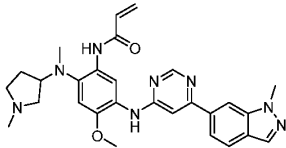
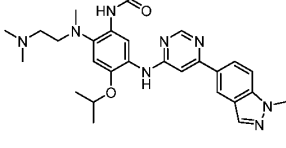
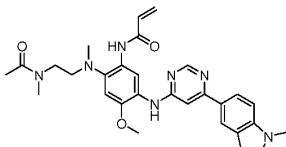
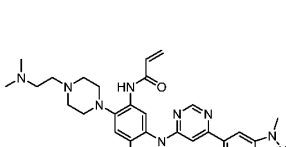
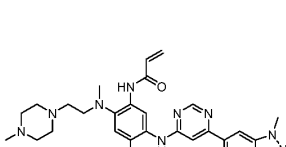
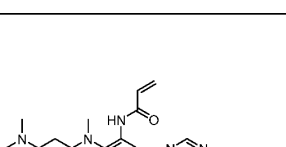
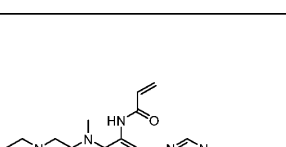
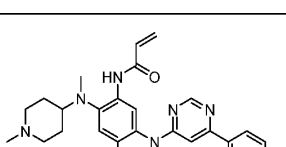
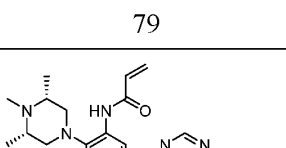
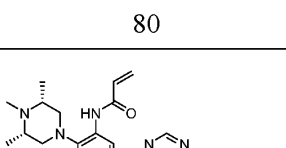
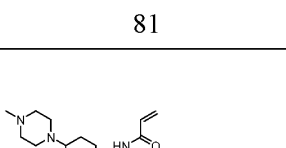
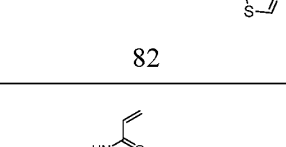
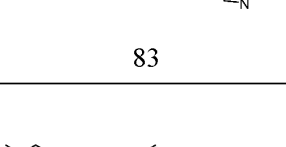
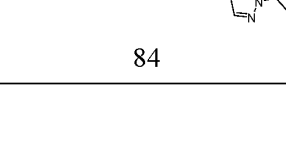
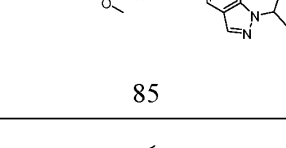
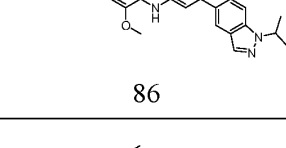
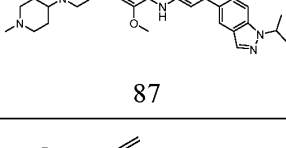
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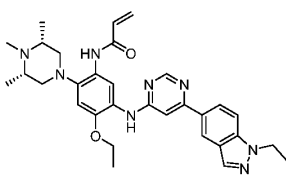
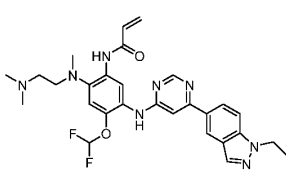
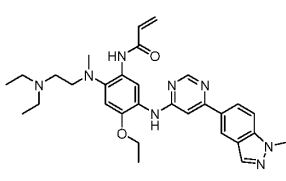
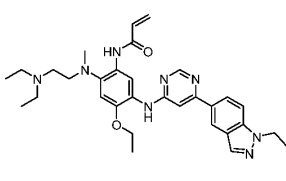
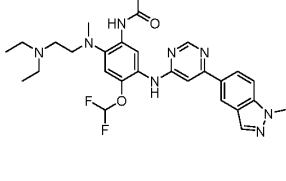
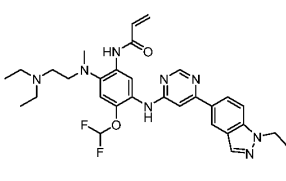
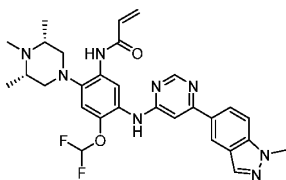
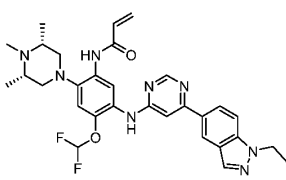
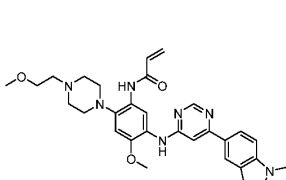
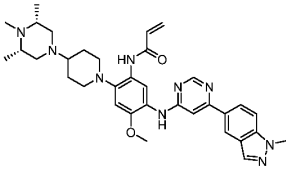
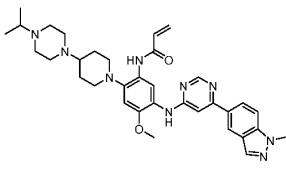
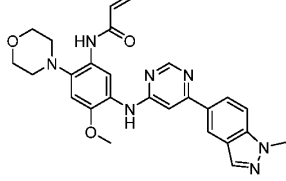
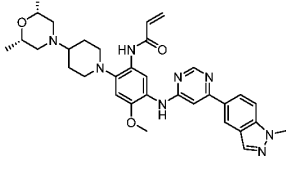
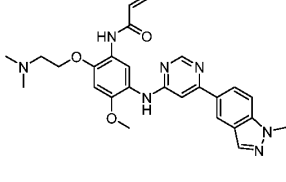
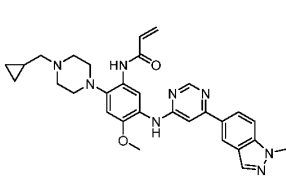
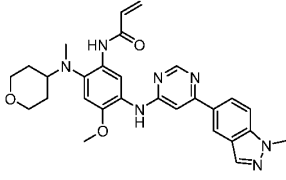
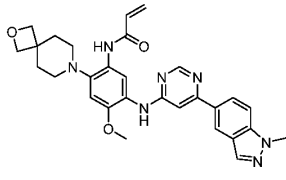
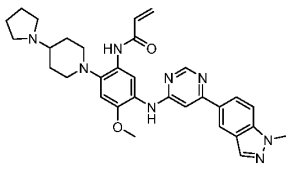


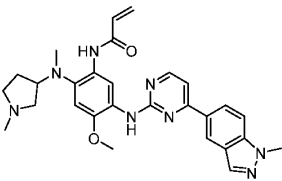
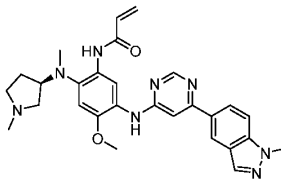
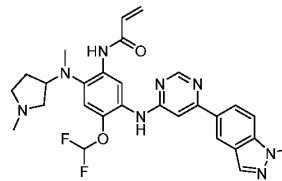
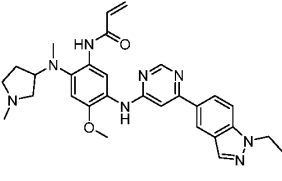
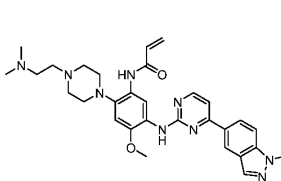
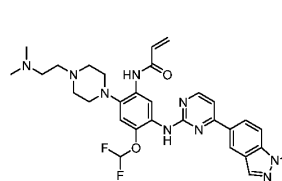
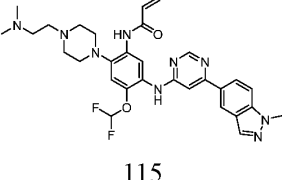
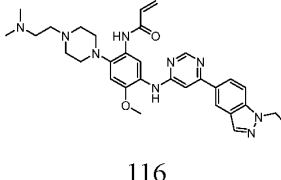
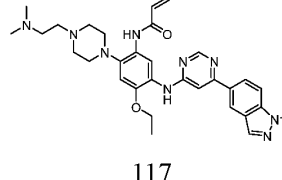
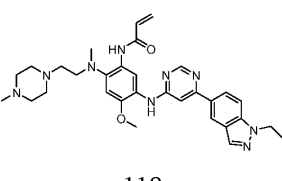
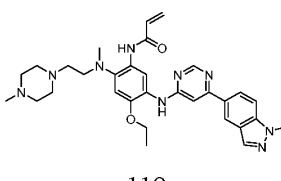
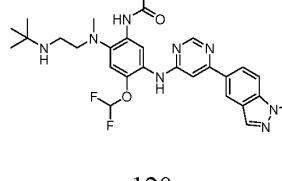
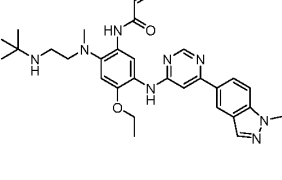
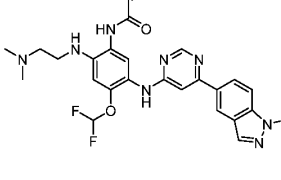
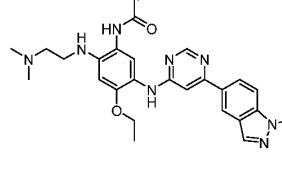
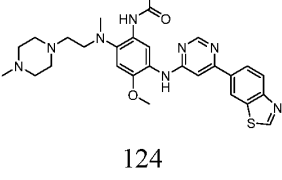
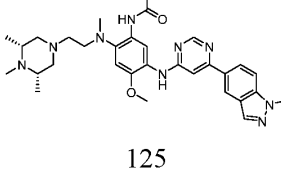
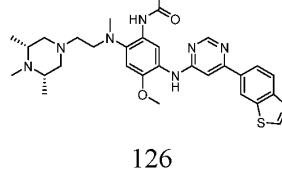
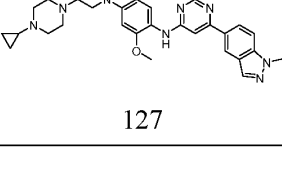
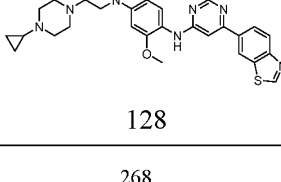
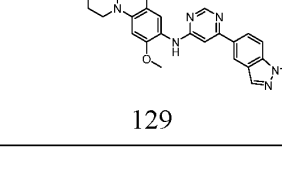


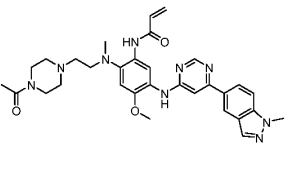
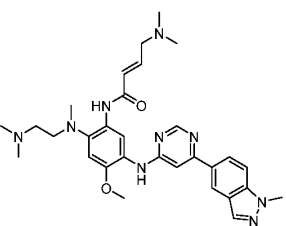
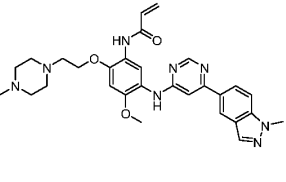
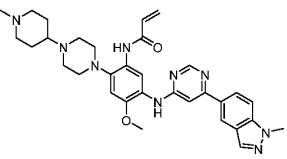
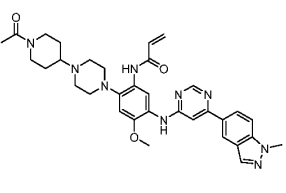
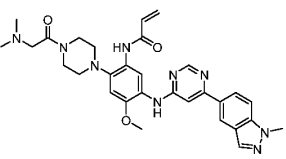
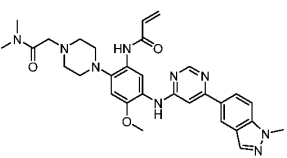
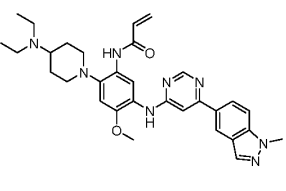
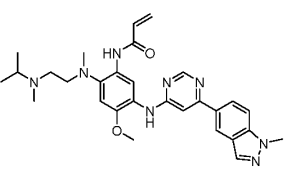
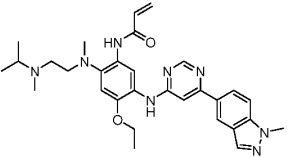
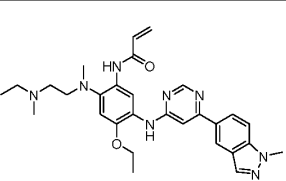
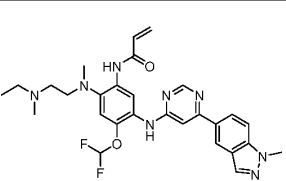
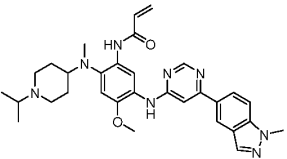
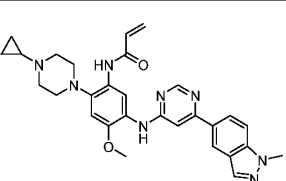
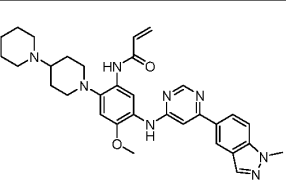
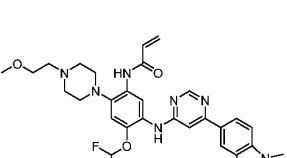
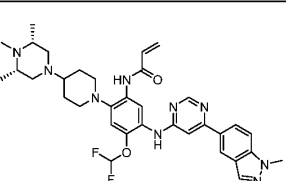
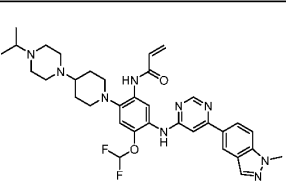


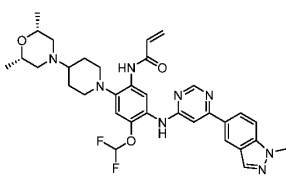
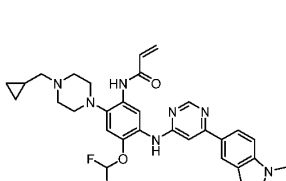
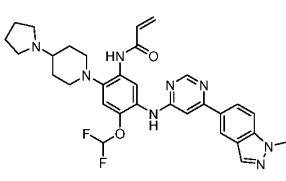
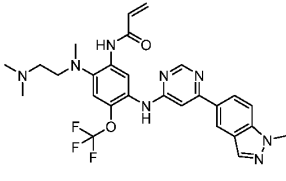
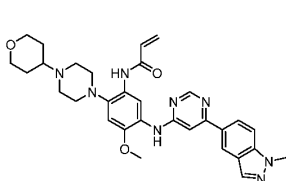
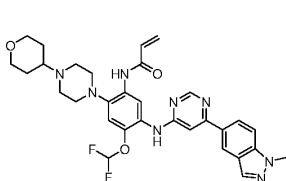
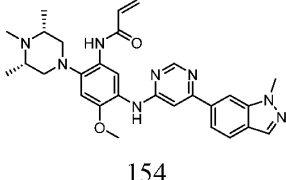
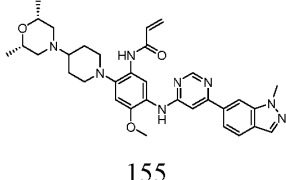
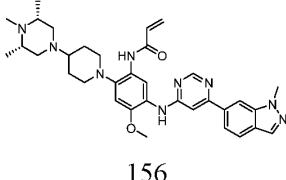
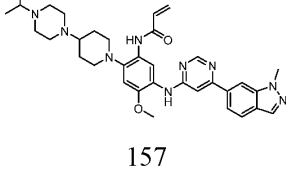
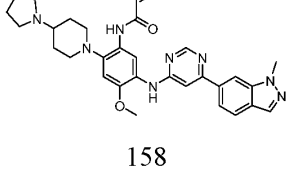
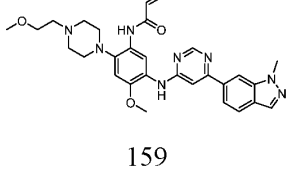
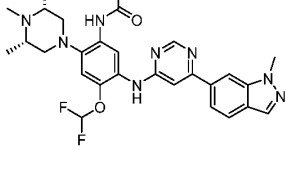
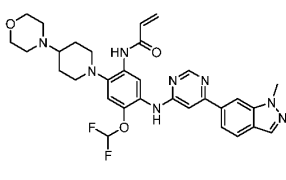
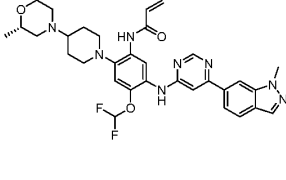
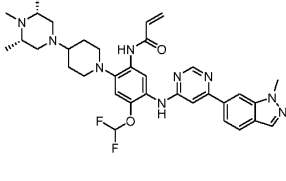
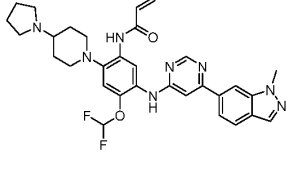
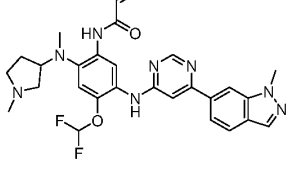
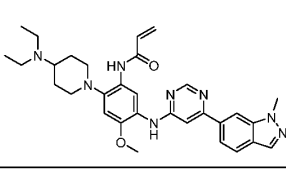
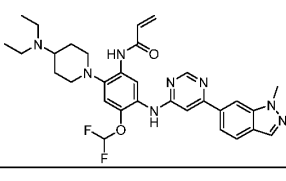
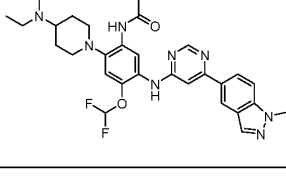
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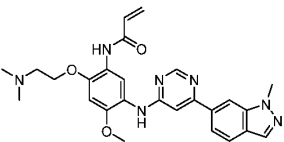
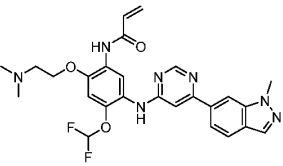
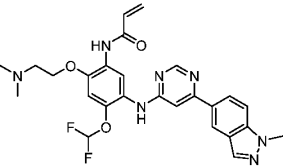
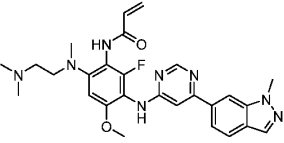
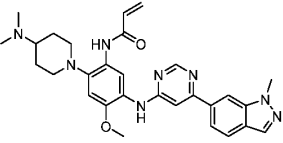
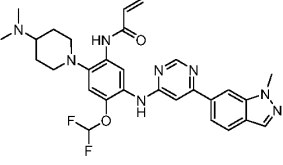
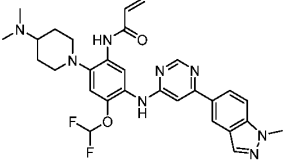
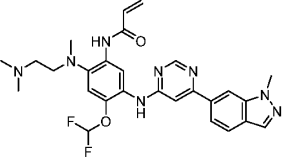
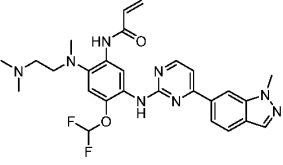
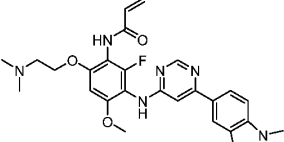
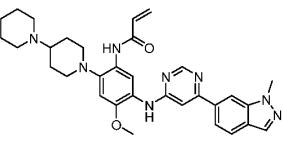
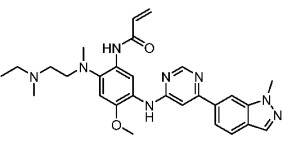
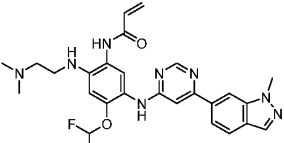
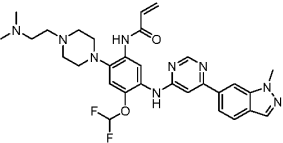
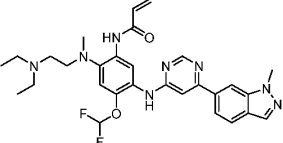
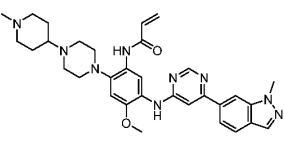
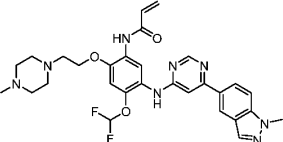
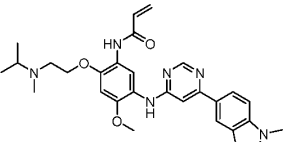
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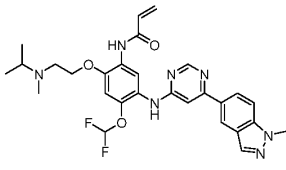
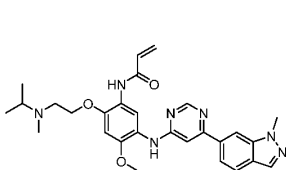
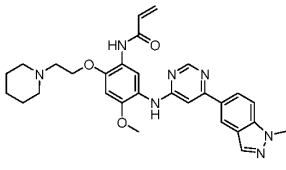
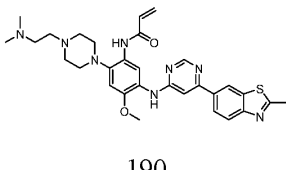
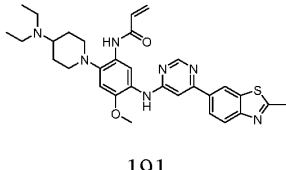
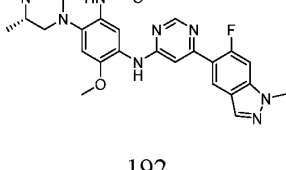
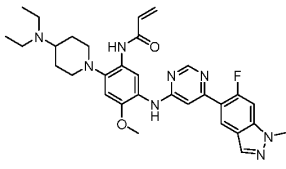
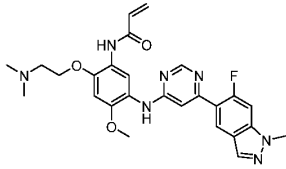
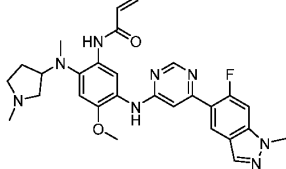
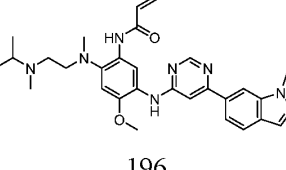
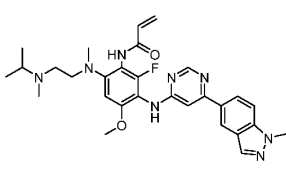
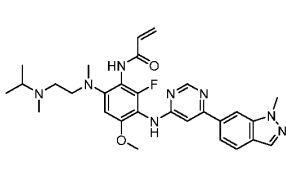
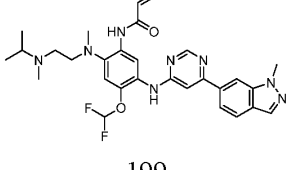
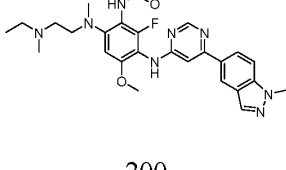
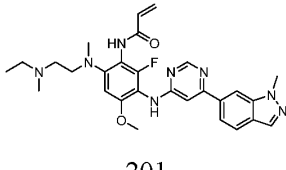
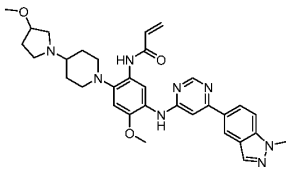
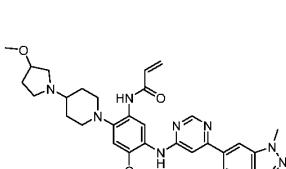
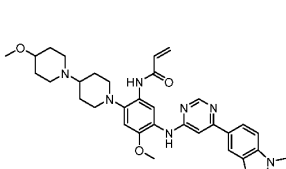
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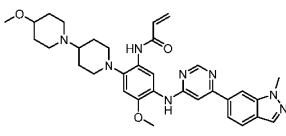
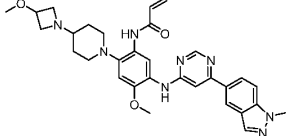
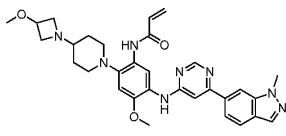
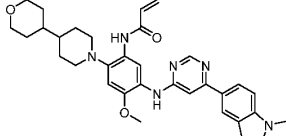
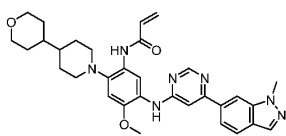
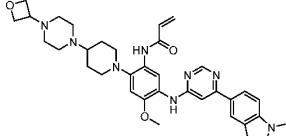
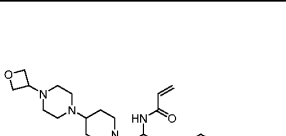
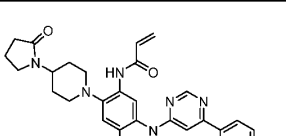
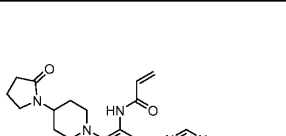
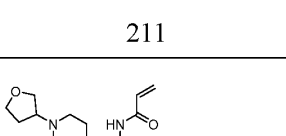
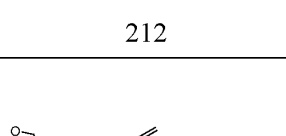
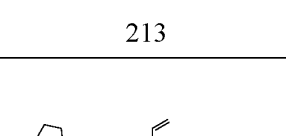
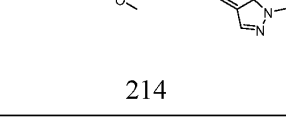
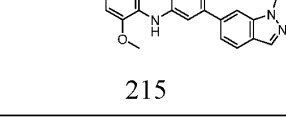
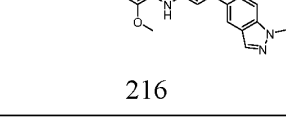
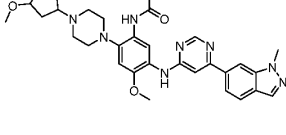
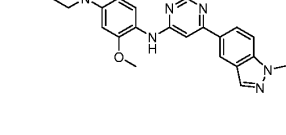
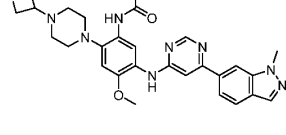
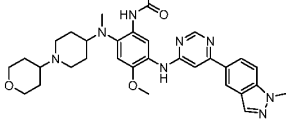
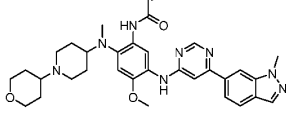
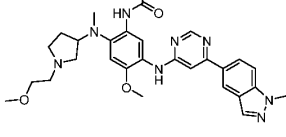
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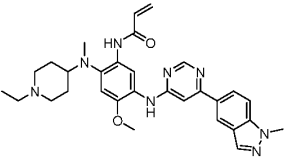
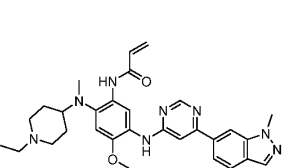
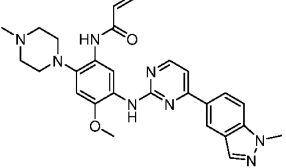
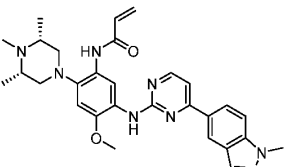
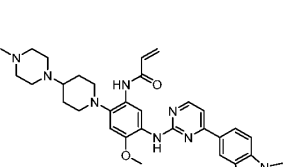
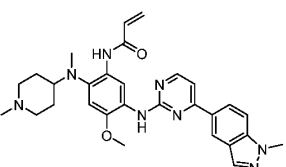
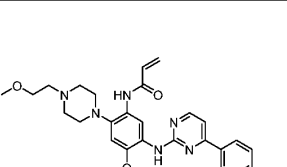
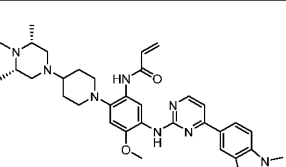
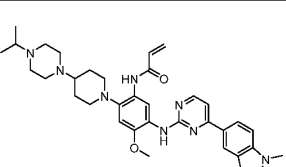
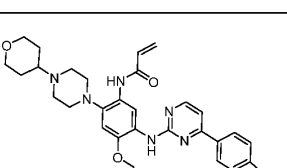
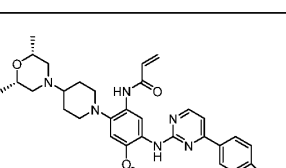
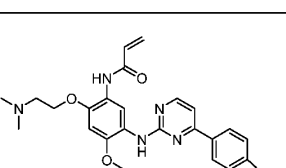
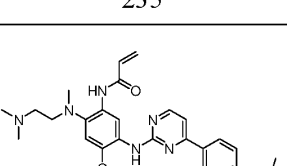
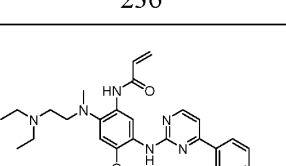
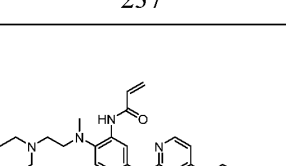
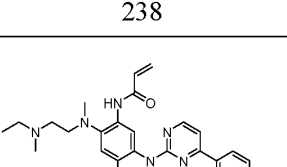
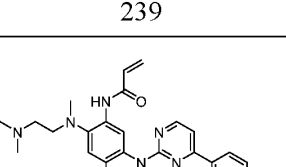
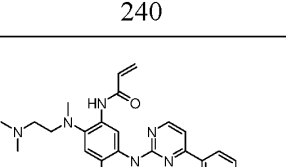
		
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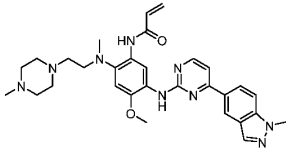
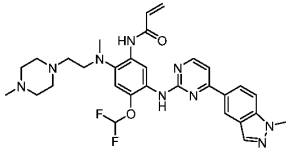
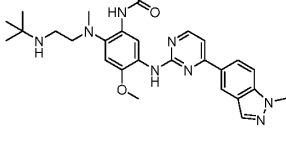
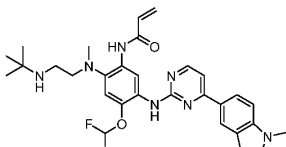
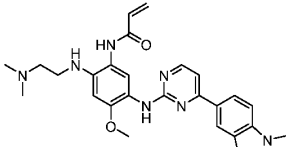
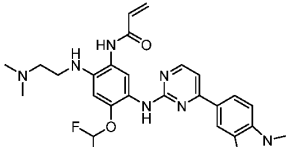
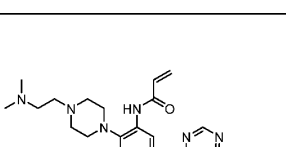
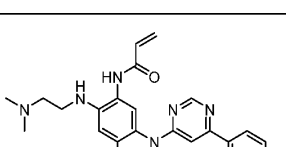
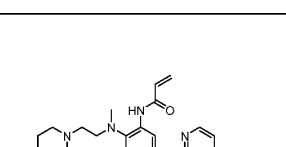
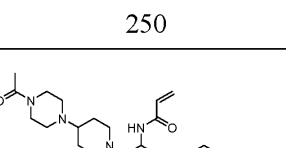
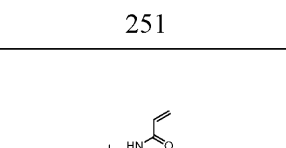
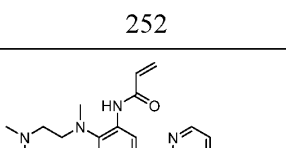
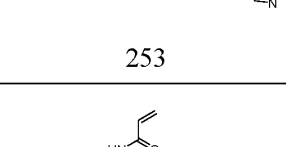
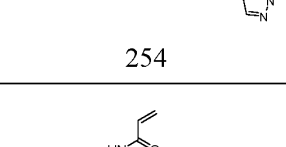
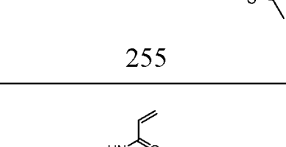
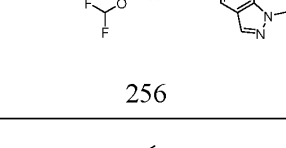
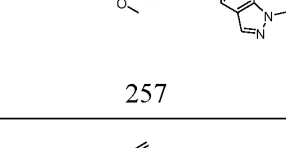
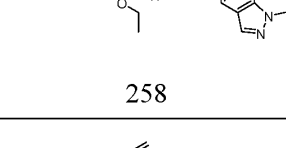
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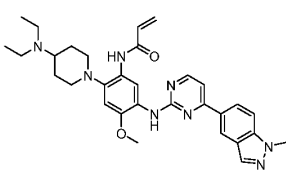
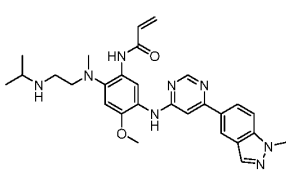
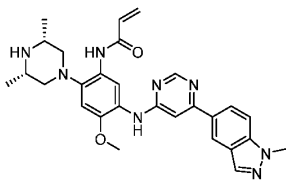
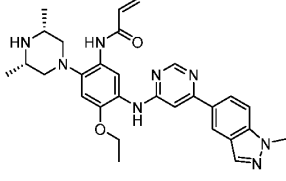
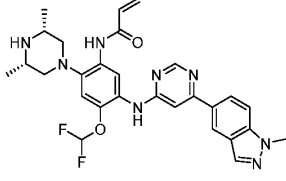
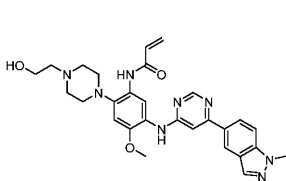
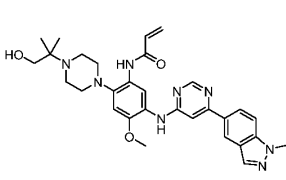
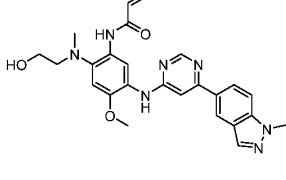
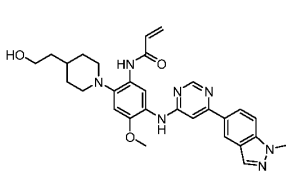
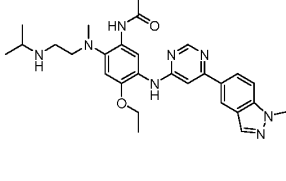
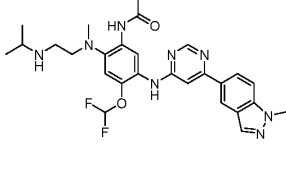
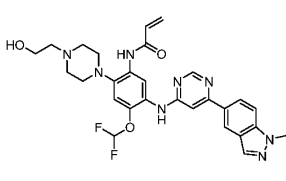
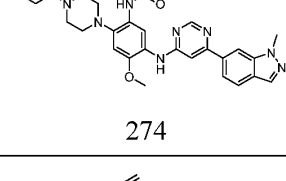
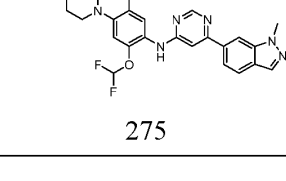
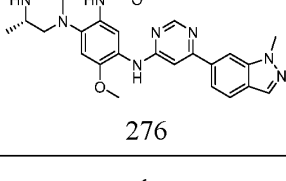
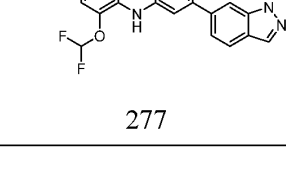
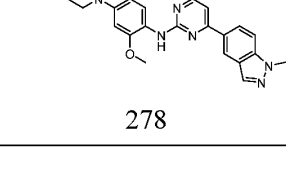
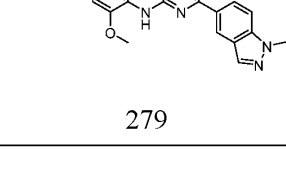
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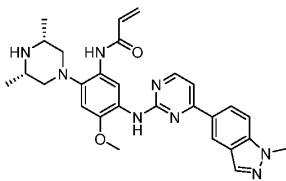
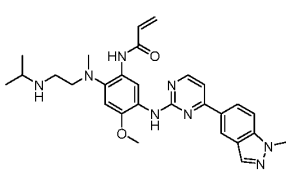
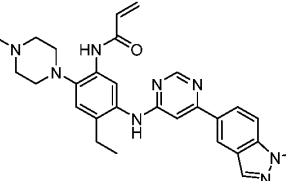
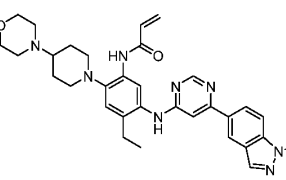
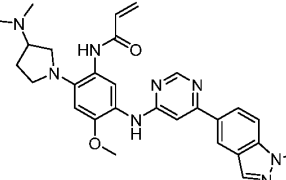
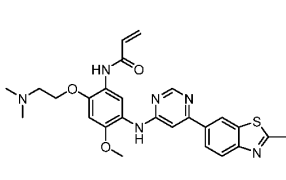
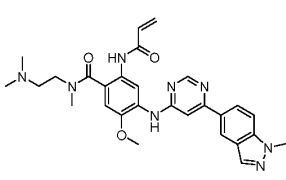
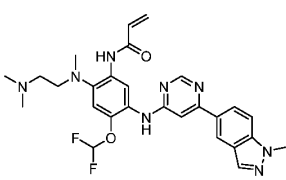
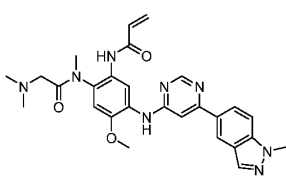
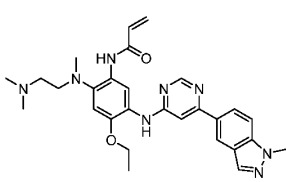
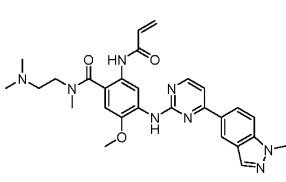
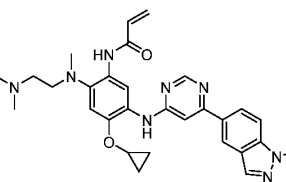
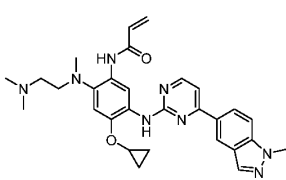
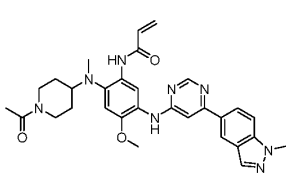
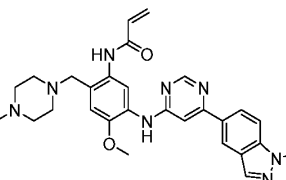
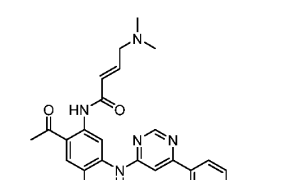
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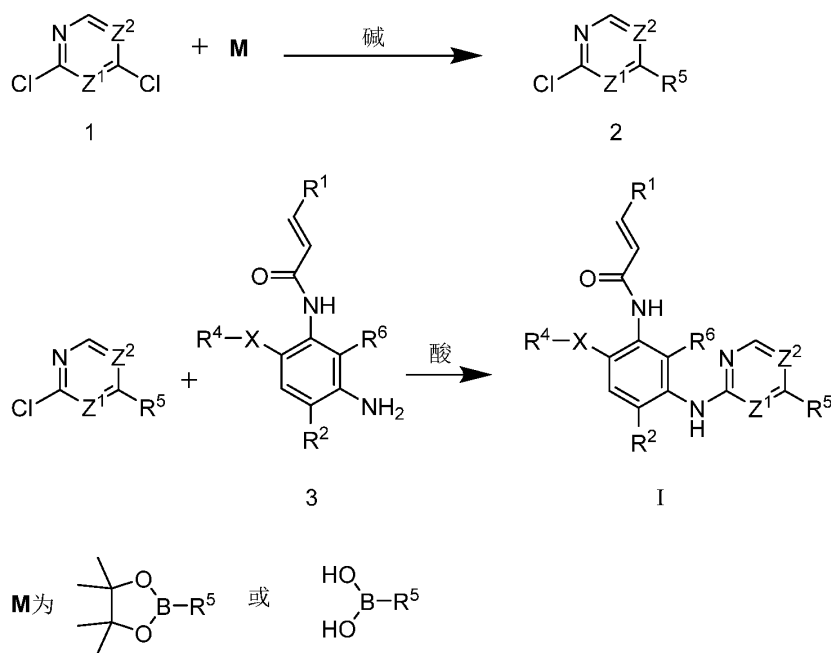
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8. 一种制备权利要求 1 至 7 中任一项所述的化合物的制备方法, 该方法包括使化合物 1 与化合物 M 在碱性条件下反应, 形成化合物 2, 然后再使化合物 2 与化合物 3 在酸性条件下反应形成式 I 化合物的步骤;



其中 R^1 、 R^2 、 R^4 、 R^5 、 R^6 、 X 、 Z^1 和 Z^2 如权利要求 1 至 7 中任一项所定义,

优选地, 所述碱选自碳酸钠, 碳酸氢钠;

优选地, 所述酸选自甲磺酸, 对甲苯磺酸;

10 或者, 所述制备式 I 化合物的方法包括如下反应步骤:

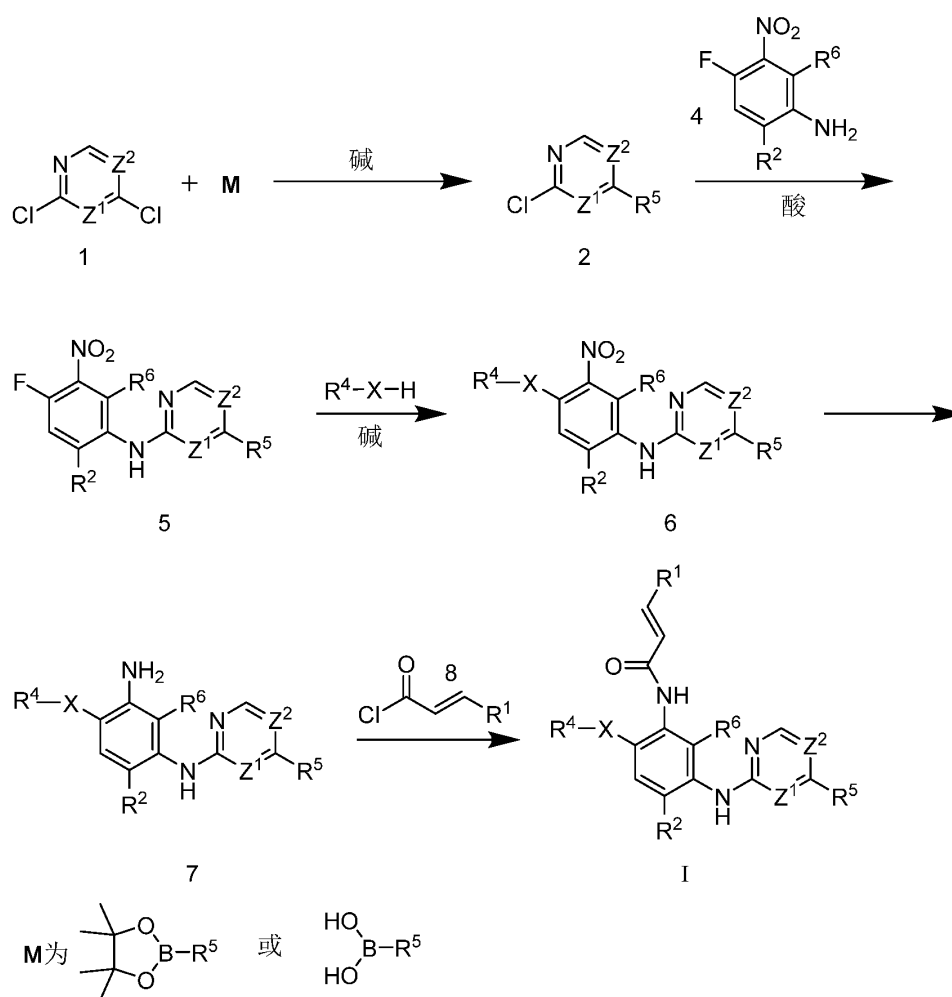
(1) 使化合物 1 与化合物 M 在碱性条件下反应, 形成化合物 2;

(2) 使化合物 2 与化合物 4 在酸性条件下反应形成化合物 5;

(3) 使化合物 5 与 $\text{R}^4\text{-X-H}$ 在碱性条件下反应形成化合物 6;

(4) 将化合物 6 还原为化合物 7;

15 (5) 使化合物 7 与化合物 8 反应, 形成式 I 所示的化合物;



其中 R^1 、 R^2 、 R^4 、 R^5 、 R^6 、 X 、 Z^1 和 Z^2 如权利要求 1 至 7 中任一项所定义。

优选地，在步骤 (1) 中，所述碱选自碳酸钠，碳酸氢钠；

5 优选地，在步骤 (2) 中，所述酸选自甲磺酸，对甲苯磺酸；

优选地，在步骤 (3) 中，所述碱选自二异丙基乙胺，碳酸钠，三乙胺。

9. 包含如权利要求 1-7 中任一项所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物以及药学上可接受的载体或赋形剂的药物组合物；优选地，所述药物组合物为片剂、胶囊剂、丸剂、颗粒剂、散剂、栓剂、注射剂、溶液剂、混悬剂、
10 膏剂、贴剂、洗剂、滴剂、擦剂、喷雾剂。

10. 根据权利要求 1-7 中任一项所述的化合物化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物和/或权利要求 9 所述的药物组合物在制备抗肿瘤药物中的应用；优选地，所述抗肿瘤药物应用于以下病症：头颈部癌，黑色素瘤，膀胱癌，食

道癌，间变性大细胞淋巴瘤，肾细胞癌，乳腺癌，结肠直肠癌，卵巢癌，宫颈癌，胰腺癌，胶质瘤，胶质母细胞瘤，前列腺癌，白血病，淋巴瘤，非霍奇金淋巴瘤，胃癌，肺癌，肝细胞癌，胃肠道基质瘤，甲状腺癌，胆管癌，子宫内膜癌，多发性骨髓瘤或间皮瘤。

- 5 11. 一种治疗主体中肿瘤的方法，该方法包括向所述主体给予治疗有效量的权利要求 1 至 7 所述的化合物或者其药学上可接受的盐、立体异构体、前药分子或溶剂合物或权利要求 9 所述的药物组合物；

 优选地，所述主体为哺乳动物，优选为人；

- 优选地，所述治疗方法给药方式包括口腔、粘膜、舌下、眼部、局部、肠道外、直
10 肠、脑池、阴道、腹膜、膀胱、鼻部给药；

 优选地，所述癌症选自头颈部癌，黑色素瘤，膀胱癌，食道癌，间变性大细胞淋巴瘤，肾细胞癌，乳腺癌，结肠直肠癌，卵巢癌，宫颈癌，胰腺癌，胶质瘤，胶质母细胞瘤，前列腺癌，白血病，淋巴瘤，非霍奇金淋巴瘤，胃癌，肺癌，肝细胞癌，胃肠道基质瘤，甲状腺癌，胆管癌，子宫内膜癌，多发性骨髓瘤和间皮瘤。

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