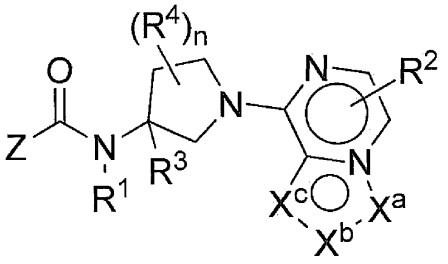
BRIEF SUMMARY

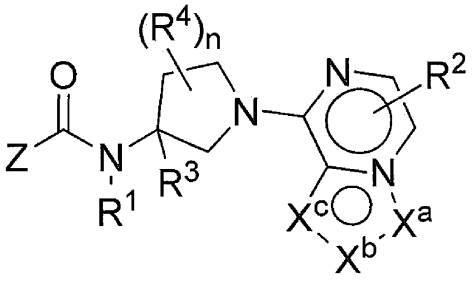
[0016] The present disclosure provides compounds having formula I,



(I)

or pharmaceutically acceptable salts, hydrates or N-oxides thereof. The various groups (e.g., R^1, R^2, R^3, R^4, Z, X^a, X^b, X^c and the subscript n) are described in the Detailed Description of the Invention.

[0016a] In one aspect of the present disclosure, there is provided a compound having formula I



(I)

or a pharmaceutically acceptable salt, hydrate, isotopically enriched or enantiomerically enriched version thereof, wherein

each of ring vertices X^a, X^b and X^c is independently selected from the group consisting of N, NH, N(R^2), CH and C(R^2);

the subscript n is 0, 1 or 2;

Z is

monocyclic or fused-bicyclic heteroaryl, having 1-3 heteroatoms as ring members selected from N, O and S; and wherein said heteroaryl group is optionally substituted with from 1 to 5 R^5 substituents;

R^1 is a member selected from the group consisting of H and C_{1-8} alkyl, wherein the alkyl portion is optionally substituted with halogen, $-NR^aR^b$, $-OR^a$, $-CO_2R^a$, and $-CONR^aR^b$;

each R^2 is independently selected from the group consisting of H, halogen, CN, C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

R^3 is a member selected from the group consisting of H, C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-CO_2R^a$, $-X-CO_2R^a$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

each R^4 , when present, is a member independently selected from the group consisting of C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

each R^5 is a member independently selected from the group consisting of halogen, CN, -X-CN, C_{1-8} alkyl, C_{3-8} cycloalkyl, C_{3-8} cycloalkenyl, C_{3-5} spirocycloalkyl, C_{2-8} alkenyl, C_{2-8} alkynyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$, $-X-CONR^aR^b$, aryl, 5- or 6-membered heteroaryl, and 3-, 4-, 5- or 6-membered heterocyclic wherein the heteroatoms present as ring vertices of the heteroaryl and heterocyclic rings are selected from N, O and S, and wherein the aryl, heteroaryl and hetereocyclic portions of R^5 are optionally further substituted with 1-3 R^a;

each R^a and R^b is independently selected from the group consisting of hydrogen, hydroxyl, halogen, cyano, C_{1-8} alkyl, C_{1-8} alkoxy,C_{1-8} haloalkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkylalkyl, amino, C_{1-8} alkylamino, di C_{1-8} alkylamino, carboxamide, carboxy C_{1-4} alkyl ester, carboxylic acid, and $-SO_2-$ C_{1-8} alkyl;

each X is a C_{1-4} alkylene linking group or a linking group having the formula $-(CH_2)_mO(CH_2)_p-$, wherein the subscripts m and p are integer of from 0 to 5, and m + p is from 0 to 6, wherein any of the methylene portions of X are optionally substituted with one or two methyl groups.

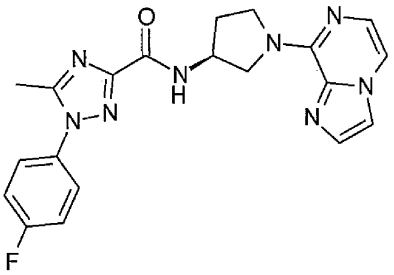
[0017] The compounds provided herein are useful for binding to CXCR7, and treating diseases that are dependent, at least in part, on CXCR7 activity. Accordingly, the present disclosure provides in another aspect, a pharmaceutical composition containing one or more of the above-noted compounds in admixture with a pharmaceutically acceptable excipient.

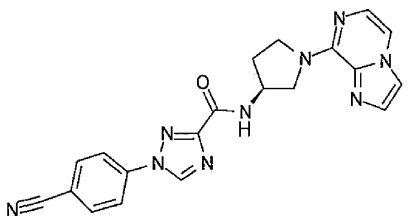
[0337] DMSO (0.5 mL) was added to a mixture of 1-phenyl-1*H*-[1,2,3]triazole-4-carboxylic acid (42 mg, 0.22 mmol) and 1-pyrrolo[1,2-*a*]pyrazin-1-yl-pyrrolidin-3-ylamine dihydrochloride salt (60 mg, 0.22 mmol). To this was added triethylamine (0.123 mL, 0.88 mmol) followed by HATU (91 mg, 0.24 mmol). The mixture was allowed to stir for 30 min after which time it was diluted with dichloromethane (1.0 mL), washed with water (3 × 1.0 mL), dried over sodium sulfate, filtered, and concentrated under reduced pressure. The crude material was purified by reverse phase HPLC (10:90 – 95:5 MeCN:H_2O + 0.1% TFA). The combined product fractions were lyophilized to give the TFA salt of the product as a pale yellow solid (68 mg, 0.14 mmol, 63% yield). ^{1}H NMR (400 MHz, CD3OD) δ 9.03 (d, J = 6.7 Hz, 1 H), 8.97 (s, 1 H), 7.89 (d, J = 8.2 Hz, 2 H), 7.79 (dd, J = 1.2, 2.7 Hz, 1 H), 7.74 (d, J = 5.9 Hz, 1 H), 7.65-7.50 (m, 4 H), 6.95 (dd, J = 2.8, 4.7 Hz, 1 H), 6.87 (d, J = 5.9 Hz, 1 H), 5.00-4.80 (m, 1H), 4.70-3.70 (br, 4 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ $[M + H]^+$ 374.2, found 374.

Example 150

[0338] The compounds in the Table below were prepared as described above. Characterization data (NMR) is provided for each.

Specific Examples (Table 1)

Structure	Avg Bind IC50 (nM)	Avg Ser IC50 (nM)	NMR and MS Data
		+++	**Compound 1.001:** ^{1}H NMR (400 MHz, CD_3OD) δ 8.95 (d, J = 6.3 Hz, 0.2 H), 8.05 (s, 1 H), 7.94 (d, J = 5.5 Hz, 1 H), 7.81 (s, 1 H), 7.64-7.59 (m, 2 H), 7.36-7.30 (m, 2 H), 7.17 (d, J = 5.4 Hz, 1 H), 5.00-4.85 (m, 1H), 4.80-3.65 (br, 4 H), 2.51 (s, 3 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}FN_8O$ $[M + H]^+$ 407.2, found 407.



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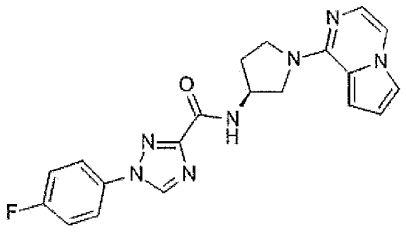
Compound 1.002: ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.64 (s, 1 H), 7.94 (d, *J* = 6.6 Hz, 2 H), 7.85 (d, *J* = 6.6 Hz, 2 H), 7.55 (s, 1 H), 7.50 (s, 1 H), 7.44 (d, *J* = 4.3 Hz, 1 H), 7.40-7.30 (m, 2 H), 5.00-4.85 (m, 1H), 4.50-4.35 (br, 1 H), 4.30-4.15 (br, 3 H), 2.50-2.38 (m, 1 H), 2.25-2.15 (m, 1 H); MS: (ES) *m/z* calculated for $C_{20}H_{17}N_9O$ $[M + H]^+$ 400.2, found 400.



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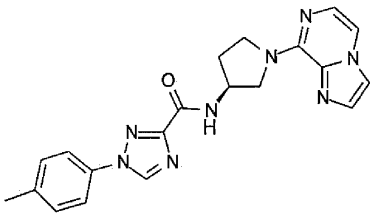
Compound 1.003: ^{1}H NMR (400 MHz, CD_3OD) δ 9.10 (s, 1 H), 7.91-7.88 (m, 2 H), 7.79 (dd, *J* = 1.2, 2.8 Hz, 1 H), 7.74 (d, *J* = 5.9 Hz, 1 H), 7.59 (d, *J* = 4.3 Hz, 1 H), 7.34 (t, *J* = 8.6 Hz, 2 H), 6.95 (dd, *J* = 2.8, 4.7 Hz, 1 H), 6.86 (d, *J* = 5.5 Hz, 1 H), 5.00-4.85 (m, 1H), 4.80-3.65 (br, 4 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}FN_7O$ $[M + H]^+$ 392.2, found 392.



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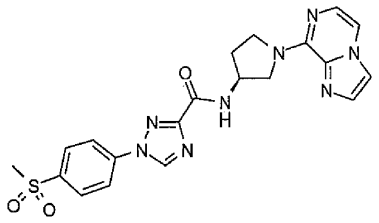
Compound 1.004: ^{1}H NMR (400 MHz, CD_3OD) δ 9.07 (s, 1 H), 8.05 (s, 1 H), 7.94 (d, *J* = 5.9 Hz, 1 H), 7.82 (s, 1 H), 7.74 (d, *J* = 8.6 Hz, 2 H), 7.38 (d, *J* = 8.6 Hz, 2 H), 7.17 (d, *J* = 5.4 Hz, 1 H), 5.00-3.65 (br, 5 H), 2.60-2.38 (m, 2 H), 2.41 (s, 1 H); MS: (ES) *m/z* calculated for $C_{20}H_{20}N_8O$ $[M + H]^+$ 389.2, found 389.



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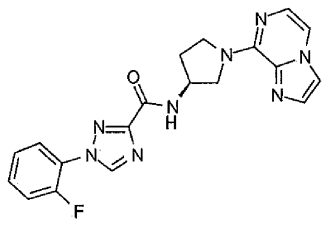
Compound 1.005: ^{1}H NMR (400 MHz, CD_3OD) δ 9.31 (s, 1 H), 9.15 (d, *J* = 7.0 Hz, 0.5 H), 8.20-8.10 (m, 4 H), 8.05 (s, 1 H), 7.95 (d, *J* = 5.4 Hz, 1 H), 7.82 (s, 1 H), 7.18 (d, *J* = 5.8 Hz, 1 H), 5.00-3.65 (br, 5 H), 3.18 (s, 3 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{20}N_8O_3S$ $[M + H]^+$ 453.2, found 453.



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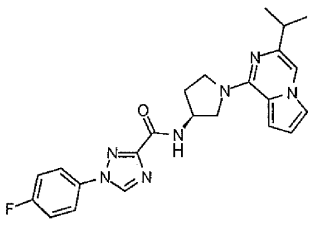
Compound 1.006: ^{1}H NMR (400 MHz, CD_3OD) δ 8.96 (d, *J* = 2.7 Hz, 1 H), 8.05 (s, 1 H), 7.95-7.82 (m, 3 H), 7.56-7.38 (m, 3 H), 7.17 (d, *J* = 5.5 Hz, 1 H), 5.00-3.65 (br, 5 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ $[M + H]^+$ 393.2, found 393.



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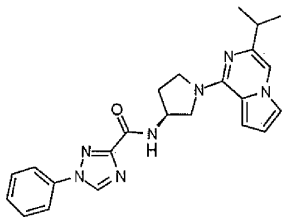
Compound 1.007: ^{1}H NMR (400 MHz, CD_3OD) δ 9.10 (s, 1 H), 7.92 (dd, J = 4.7, 7.0 Hz, 2 H), 7.73 (s, 1 H), 7.57 (s, 1 H), 7.54 (d, J = 4.3 Hz, 1 H), 7.35 (t, J = 8.6 Hz, 2 H), 6.91 (dd, J = 2.7, 4.3 Hz, 1 H), 5.00-4.85 (m, 1H), 4.60-3.65 (br, 4 H), 3.05-2.95 (m, 1 H), 2.60-2.38 (m, 2 H), 1.35 (d, J = 7.0 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{23}H_{24}FN_7O$ $[M + H]^+$ 434.2, found 434.



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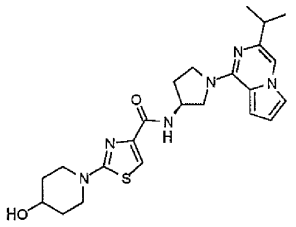
Compound 1.008: ^{1}H NMR (400 MHz, CD_3OD) δ 9.14 (s, 1 H), 7.89 (d, J = 7.4 Hz, 2 H), 7.73 (s, 1 H), 7.60-7.46 (m, 5 H), 6.90 (dd, J = 2.7, 4.3 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.85 (br, 4 H), 3.05-2.95 (m, 1 H), 2.60-2.38 (m, 2 H), 1.35 (d, J = 6.6 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{23}H_{25}N_7O$ $[M + H]^+$ 416.2, found 416.



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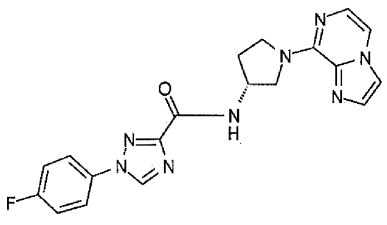
Compound 1.009: ^{1}H NMR (400 MHz, CD_3OD) δ 7.72 (d, J = 2.4 Hz, 1 H), 7.56 (s, 1 H), 7.52 (d, J = 4.3 Hz, 1 H), 7.41 (s, 1 H), 6.90-6.87 (m, 1 H), 4.95-4.70 (m, 2 H), 4.60-3.80 (br, 4 H), 3.95-3.80 (m, 2 H), 3.36-3.20 (m, 2 H), 3.05-2.95 (m, 1 H), 2.60-2.30 (m, 2 H), 1.98-1.90 (m, 2 H), 1.62-1.55 (m, 2 H), 1.35 (d, J = 6.6 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{23}H_{30}N_6O_2S$ $[M + H]^+$ 455.2, found 455.



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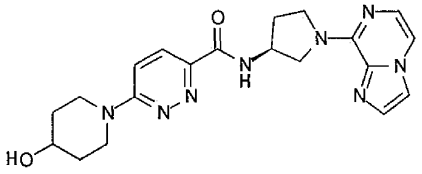
Compound 1.010: ^{1}H NMR (400 MHz, DMSO) δ 9.31 (s, 1 H), 8.92 (d, J = 5.9 Hz, 1 H), 7.92-7.85 (m, 3 H), 7.76 (s, 1 H), 7.53 (s, 1 H), 7.41 (t, J = 9.0 Hz, 2 H), 7.21 (d, J = 4.7 Hz, 1 H), 4.65-4.50 (m, 1 H), 4.48-3.65 (br, 4 H), 2.30-2.05 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ $[M + H]^+$ 393.2, found 393.



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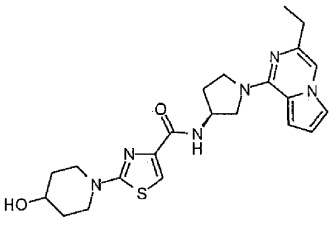
Compound 1.011: ^{1}H NMR (400 MHz, CD_3OD) δ 8.05 (s, 1 H), 8.02 (d, J = 9.8 Hz, 1 H), 7.94 (d, J = 5.5 Hz, 1 H), 7.81 (s, 1 H), 7.5 (d, J = 9.8 Hz, 1 H), 7.18 (d, J = 5.8 Hz, 1 H), 4.98-4.80 (m, 1 H), 4.80-3.80 (br, 4 H), 4.20-4.10 (m, 2 H), 4.00-3.90 (m, 1 H), 3.55-3.45 (m, 2 H), 2.60-2.35 (m, 2 H), 2.05-1.95 (m, 2 H), 1.68-1.55 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{24}N_8O_2$ [M + H]$^+$ 409.2, found 409.



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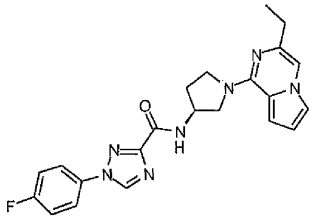
Compound 1.012: ^{1}H NMR (400 MHz, CD_3OD) δ 7.70 (d, J = 2.4 Hz, 1 H), 7.52-7.50 (m, 2 H), 7.41 (s, 1 H), 6.89 (dd, J = 2.4, 4.3 Hz, 1 H), 4.95-4.78 (m, 2 H), 4.60-3.70 (br, 4 H), 3.95-3.80 (m, 2 H), 3.36-3.20 (m, 2 H), 2.68 (q, J = 7.4 Hz, 2 H), 2.60-2.30 (m, 2 H), 1.98-1.90 (m, 2 H), 1.62-1.55 (m, 2 H), 1.33 (t, J = 7.4 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{28}N_6O_2S$ [M + H]$^+$ 441.2, found 441.



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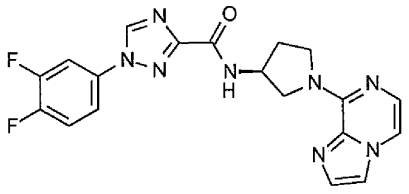
Compound 1.013: ^{1}H NMR (400 MHz, CD_3OD) δ 9.10 (s, 1 H), 7.92-7.88 (m, 2 H), 7.71 (s, 1 H), 7.53 (s, 2 H), 7.35 (t, J = 8.8 Hz, 2 H), 6.89 (dd, J = 2.4, 4.7 Hz, 1 H), 4.95-4.80 (m, 1 H), 4.78-3.80 (br, 4 H), 2.68 (q, J = 7.4 Hz, 2 H), 2.60-2.35 (m, 2 H), 1.33 (t, J = 7.4 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{22}FN_7O$ [M + H]$^+$ 420.2, found 420.



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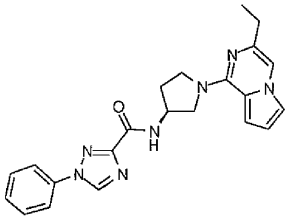
Compound 1.014: ^{1}H NMR (400 MHz, CD_3OD) δ 9.14 (s, 1 H), 8.05 (s, 1 H), 7.96-7.88 (m, 2 H), 7.81 (s, 1 H), 7.75-7.71 (m, 1 H), 7.52 (q, J = 8.6 Hz, 1 H), 7.19 (d, J = 5.5 Hz, 1 H), 4.98-4.80 (m, 1 H), 4.80-3.80 (br, 4 H), 2.62-2.40 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{16}F_2N_8O$ [M + H]$^+$ 411.2, found 411.



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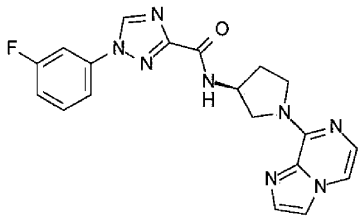
Compound 1.015: ^{1}H NMR (400 MHz, CD_3OD) δ 9.14 (s, 1 H), 9.05 (d, *J* = 6.7 Hz, 1 H), 7.88 (d, *J* = 7.4 Hz, 2 H), 7.71 (s, 1 H), 7.60-7.46 (m, 5 H), 6.89 (dd, *J* = 2.8, 4.7 Hz, 1 H), 4.95-4.80 (m, 1 H), 4.78-3.80 (br, 4 H), 2.68 (q, *J* = 7.4 Hz, 2 H), 2.60-2.40 (m, 2 H), 1.33 (t, *J* = 7.4 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{23}N_7O$ $[M + H]^+$ 402.2, found 402.



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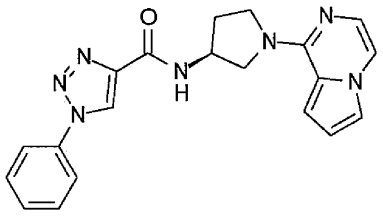
Compound 1.016: ^{1}H NMR (400 MHz, DMSO) δ 9.45 (s, 1 H), 8.95 (d, *J* = 7.0 Hz, 1 H), 7.87-7.75 (m, 4 H), 7.65 (q, *J* = 6.2 Hz, 1 H), 7.50 (s, 1 H), 7.31 (t, *J* = 2.4 Hz, 1 H), 7.26 (d, *J* = 4.3 Hz, 1 H), 4.65-4.55 (m, 1 H), 4.40-3.75 (br, 4 H), 2.30-2.04 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ $[M + H]^+$ 393.2, found 393.



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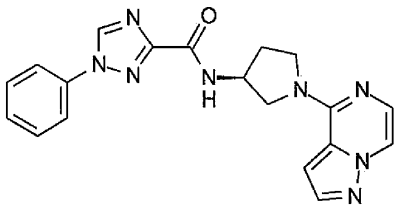
Compound 1.017: ^{1}H NMR (400 MHz, CD_3OD) δ 9.03 (d, *J* = 6.7 Hz, 1 H), 8.97 (s, 1 H), 7.89 (d, *J* = 8.2 Hz, 2 H), 7.79 (dd, *J* = 1.2, 2.7 Hz, 1 H), 7.74 (d, *J* = 5.9 Hz, 1 H), 7.65-7.50 (m, 4 H), 6.95 (dd, *J* = 2.8, 4.7 Hz, 1 H), 6.87 (d, *J* = 5.9 Hz, 1 H), 5.00-4.80 (m, 1H), 4.70-3.70 (br, 4 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ $[M + H]^+$ 374.2, found 374.



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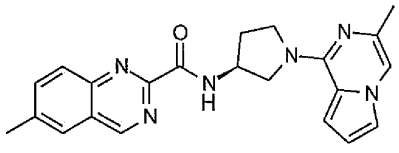
Compound 1.018: ^{1}H NMR (400 MHz, CD_3OD) δ 9.13 (s, 1 H), 8.16 (d, *J* = 2.4 Hz, 1 H), 8.09 (d, *J* = 5.8 Hz, 1 H), 7.86 (d, *J* = 7.8 Hz, 2 H), 7.60-7.46 (m, 4 H), 7.19 (d, *J* = 5.5 Hz, 1 H), 4.95-4.80 (m, 1 H), 4.78-3.80 (br, 4 H), 2.62-2.40 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{18}N_8O$ $[M + H]^+$ 375.2, found 375.



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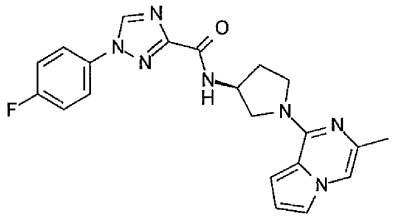
Compound 1.019: ^{1}H NMR (400 MHz, CD_3OD) δ 9.55 (s, 1 H), 8.11 (d, *J* = 9.4 Hz, 1 H), 7.98 (d, *J* = 9.4 Hz, 2 H), 7.53 (dd, *J* = 1.2, 2.4 Hz, 1 H), 7.55 (d, *J* = 4.8 Hz, 1 H), 7.50 (s, 1 H), 6.89 (dd, *J* = 2.3, 4.8 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 2.63 (s, 3 H), 2.60-2.40 (m, 2 H), 2.31 (d, *J* = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{22}N_6O$ $[M + H]^+$ 387.2, found 387.



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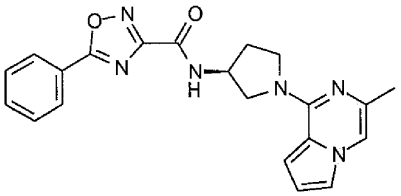
Compound 1.020: ^{1}H NMR (400 MHz, CD_3OD) δ 9.10 (s, 1 H), 9.07 (d, *J* = 6.2 Hz, 1 H), 7.92-7.88 (m, 2 H), 7.68 (dd, *J* = 1.2, 2.6 Hz, 1 H), 7.53 (d, *J* = 4.4 Hz, 1 H), 7.50 (s, 1 H), 7.34 (t, *J* = 8.6 Hz, 2 H), 6.89 (dd, *J* = 2.4, 4.4 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 2.60-2.40 (m, 2 H), 2.31 (d, *J* = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}FN_7O$ $[M + H]^+$ 406.2, found 406.



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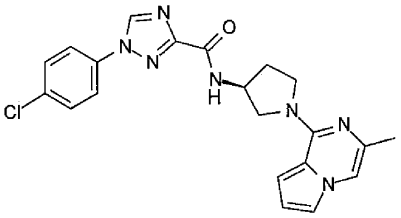
Compound 1.021: ^{1}H NMR (400 MHz, DMSO) δ 9.39 (d, *J* = 7.0 Hz, 1 H), 8.16 (d, *J* = 7.0 Hz, 2 H), 7.73 (t, *J* = 7.4 Hz, 1 H), 7.66 (t, *J* = 7.9 Hz, 2 H), 7.41 (s, 1 H), 7.37 (s, 1 H), 6.77 (d, *J* = 4.3 Hz, 1 H), 6.56 (dd, *J* =2.8, 4.3 Hz, 1 H), 4.63-4.50 (m, 1 H), 4.10-3.75 (br, 4 H), 2.30-2.04 (m, 2 H), 2.07 (s, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}N_6O_2$ $[M + H]^+$ 389.2, found 389.



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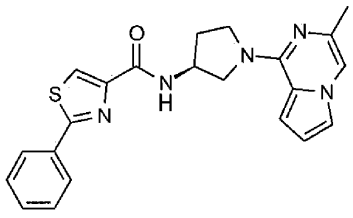
Compound 1.022: ^{1}H NMR (400 MHz, DMSO) δ 9.42 (s, 1 H), 8.91 (d, *J* = 6.6 Hz, 1 H), 7.95 (d, *J* = 7.0 Hz, 2 H), 7.67 (d, *J* = 7.0 Hz, 2 H), 7.40 (m, 2 H), 6.76 (d, *J* = 4.3 Hz, 1 H), 6.55 (dd, *J* =2.2, 4.3 Hz, 1 H), 4.63-4.50 (m, 1 H), 4.10-3.75 (m, 4 H), 2.30-2.04 (m, 2 H), 2.07 (s, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}ClN_7O$ $[M + H]^+$ 422.2, found 422.



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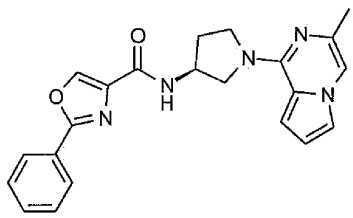
Compound 1.023: ^{1}H NMR (400 MHz, CD_3OD) δ 8.87 (d, *J* = 6.6 Hz, 1 H), 8.26 (s, 1 H), 8.06-8.03 (m, 2 H), 7.68 (dd, *J* = 1.2, 2.7 Hz, 1 H), 7.54-7.45 (m, 5 H), 6.88 (dd, *J* = 2.4, 6.7 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 2.60-2.40 (m, 2 H), 2.31 (d, *J* = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5OS$ $[M + H]^+$ 404.2, found 404.



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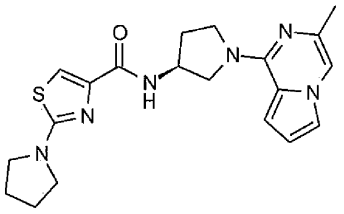
Compound 1.024: ^{1}H NMR (400 MHz, CD_3OD) δ 8.74 (d, *J* = 6.7 Hz, 1 H), 8.49 (s, 1 H), 8.10-8.06 (m, 2 H), 7.68 (dd, *J* = 1.2, 2.7 Hz, 1 H), 7.57-7.50 (m, 4 H), 6.88 (dd, *J* = 2.7, 4.7 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 2.58-2.48 (m, 1 H), 2.48-2.38 (br, 1 H), 2.31 (d, *J* = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5O_2$ $[M + H]^+$ 388.2, found 388.



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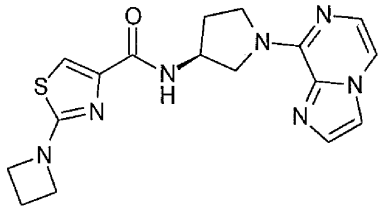
Compound 1.025: ^{1}H NMR (400 MHz, CD_3OD) δ 7.67 (dd, J = 1.2, 2.3 Hz, 1 H), 7.52 (d, J = 4.6 Hz, 1 H), 7.49 (s, 1 H), 7.36 (s, 1 H), 6.87 (dd, J = 2.7, 4.7 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 3.50-3.40 (m, 3H), 2.58-2.48 (m, 1 H), 2.48-2.38 (br, 1 H), 2.30 (d, J = 0.7 Hz, 3 H), 2.10-2.00 (m, 4H); MS: (ES) *m/z* calculated for $C_{20}H_{24}N_6OS$ [M + H]$^+$ 397.2, found 397.



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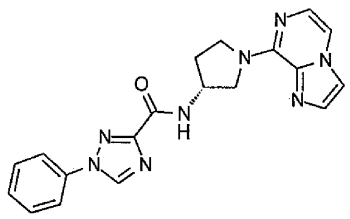
Compound 1.026: ^{1}H NMR (400 MHz, DMSO) δ 8.03 (d, J = 7.1 Hz, 1 H), 7.85 (d, J = 1.2 Hz, 1 H), 7.74 (d, J = 4.7 Hz, 1 H), 7.48 (d, J = 0.8 Hz, 1 H), 7.41 (s, 1 H), 7.23 (d, J = 4.3 Hz, 1 H), 4.53-4.40 (m, 2 H), 4.40-3.80 (br, 7 H), 2.40-2.30 (m, 2 H), 2.25-2.10 (m, 1 H), 2.10-2.00 (m, 1 H); MS: (ES) *m/z* calculated for $C_{17}H_{19}N_7OS$ [M + H]$^+$ 370.2, found 370.



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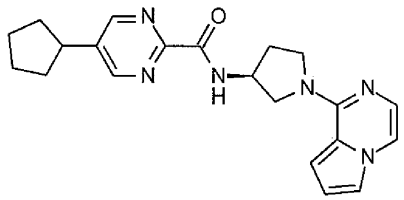
Compound 1.027: ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.54 (s, 1 H), 7.74 (td, J = 1.1, 7.5 Hz, 2 H), 7.56-7.48 (m, 4 H), 7.47-7.40 (m, 2 H), 7.37 (d, J = 8.2 Hz, 1 H), 7.33 (d, J = 4.3 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-4.35 (br, 1 H), 4.30-4.15 (br, 3 H), 3.45-3.30 (m, 1H), 2.90-2.75 (m, 1 H), 2.50-2.38 (m, 1 H), 2.25-2.15 (m, 1 H); MS: (ES) *m/z* calculated for $C_{19}H_{18}N_8O$ [M + H]$^+$ 375.2, found 375.



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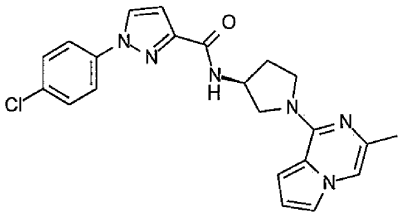
Compound 1.028: ^{1}H NMR (400 MHz, CD_3OD) δ 8.83 (s, 2 H), 7.78 (q, J = 1.1 Hz, 1 H), 7.73 (d, J = 5.8 Hz, 1 H), 7.57 (d, J = 3.9 Hz, 1 H), 6.94 (dd, J = 2.7, 4.7 Hz, 1 H), 6.86 (d, J = 5.9 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 3.20-3.10 (m, 1H), 2.60-2.48 (m, 1 H), 2.48-2.38 (br, 1 H), 2.22-2.12 (m, 2 H), 1.95-1.60 (m, 6 H); MS: (ES) *m/z* calculated for $C_{21}H_{24}N_6O$ [M + H]$^+$ 377.2, found 377.



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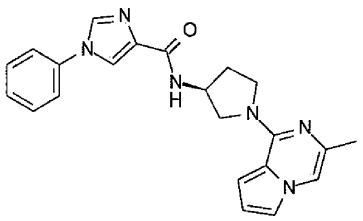
Compound 1.029: ^{1}H NMR (400 MHz, CD_3OD) δ 8.78 (d, J = 7.0 Hz, 0.5 H), 8.33 (d, J = 2.7 Hz, 1 H), 7.87 (td, J = 2.4, 9.0 Hz, 2 H), 7.67 (q, J = 1.2 Hz, 1 H), 7.51 (td, J = 3.1, 9.0 Hz, 4 H), 6.98 (d, J = 2.8 Hz, 1 H), 6.87 (q, J = 2.8, 1.9 Hz, 1 H), 4.50-3.50 (br, 5 H), 2.58-2.48 (m, 1 H), 2.48-2.38 (br, 1 H), 2.30 (d, J = 0.7 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}ClN_6O$ [M + H]$^+$ 421.2, found 421.



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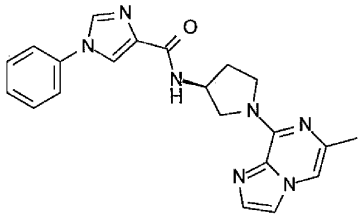
Compound 1.030: ^{1}H NMR (400 MHz, CD_3OD) δ 8.23 (d, J = 1.6 Hz, 1 H), 8.15 (d, J = 1.6 Hz, 1 H), 7.67 (q, J = 1.2 Hz, 1 H), 7.62-7.45 (m, 6 H), 6.88 (q, J = 2.3 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.60 (br, 4 H), 2.58-2.48 (m, 1 H), 2.48-2.38 (br, 1 H), 2.30 (d, J = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{22}N_6O$ $[M + H]^+$ 387.2, found 387.



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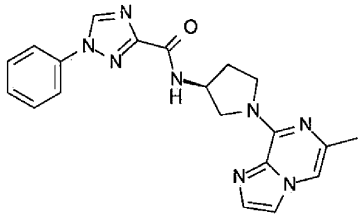
Compound 1.031: ^{1}H NMR (400 MHz, DMSO) δ 8.35 (d, J = 1.2 Hz, 1 H), 8.27 (d, J = 1.6 Hz, 1 H), 8.24 (d, J = 7.4 Hz, 1 H), 7.77 (d, J = 0.8 Hz, 1 H), 7.73 (t, J = 1.2 Hz, 1 H), 7.71 (s, 1 H), 7.57 (s, 1 H), 7.52 (t, J = 12.8 Hz, 2 H), 7.44 (d, J = 0.8 Hz, 1 H), 7.38 (t, J = 7.4 Hz, 1 H), 4.60-4.50 (m, 1 H), 4.40-3.80 (br, 4 H), 2.22-2.00 (m, 5 H); MS: (ES) *m/z* calculated for $C_{21}H_{21}N_7O$ $[M + H]^+$ 388.2, found 388.



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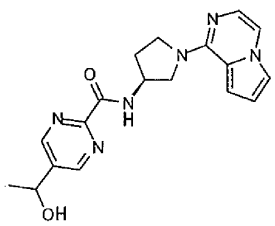
Compound 1.032: ^{1}H NMR (400 MHz, DMSO) δ 8.90 (d, J = 7.1 Hz, 1 H), 7.90 (d, J = 8.2 Hz, 2 H), 7.77 (d, J = 1.2 Hz, 1 H), 7.58 (t, J = 5.8 Hz, 3 H), 7.44 (t, J = 8.2 Hz, 2 H), 4.63-4.50 (m, 1 H), 4.40-3.80 (br, 4 H), 2.30-2.05 (m, 5 H); MS: (ES) *m/z* calculated for $C_{20}H_{20}N_8O$ $[M + H]^+$ 389.2, found 389.



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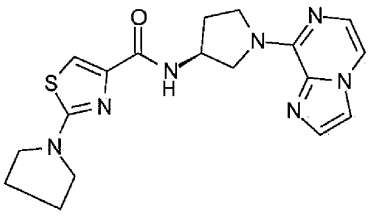
Compound 1.033: ^{1}H NMR (400 MHz, CD_3OD) δ 8.93 (s, 2 H), 7.79 (dd, J = 1.2, 2.7 Hz, 1 H), 7.74 (d, J = 5.9 Hz, 1 H), 7.58 (d, J = 3.5 Hz, 1 H), 6.94 (dd, J = 2.7, 5.7 Hz, 1 H), 6.87 (d, J = 5.9 Hz, 1 H), 5.02-4.95 (q, J = 6.6 Hz, 1 H), 4.80-3.60 (br, 5 H), 2.62-2.38 (m, 2 H), 1.53 (d, J = 6.6 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{18}H_{20}N_6O_2$ $[M + H]^+$ 353.2, found 353.



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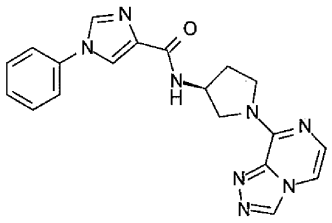
Compound 1.034: ^{1}H NMR (400 MHz, DMSO) δ 8.23 (d, J = 7.0 Hz, 1 H), 8.17 (s, 1 H), 8.00 (d, J = 5.5 Hz, 1 H), 7.81 (s, 1 H), 7.33 (s, 1 H), 7.27 (d, J = 5.5 Hz, 1 H), 4.70-4.58 (m, 1 H), 4.57-3.60 (br, 8 H), 2.40-2.05 (m, 2 H), 2.00-1.80 (m, 4 H); MS: (ES) *m/z* calculated for $C_{18}H_{21}N_7OS$ $[M + H]^+$ 384.2, found 384.



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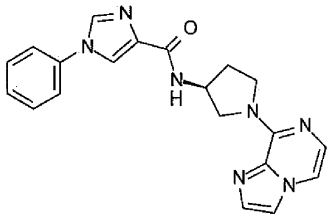
Compound 1.035: ^{1}H NMR (400 MHz, DMSO) δ 9.20 (s, 1 H), 8.38 (d, J = 7.4 Hz, 1 H), 8.35 (d, J = 1.2 Hz, 1 H), 8.28 (d, J = 1.2 Hz, 1 H), 7.74 (m, 3 H), 7.52 (t, J = 7.9 Hz, 2 H), 7.38 (t, J = 2.4 Hz, 1 H), 7.28 (d, J = 4.3 Hz, 1 H), 4.70-4.50 (m, 1 H), 4.40-3.80 (br, 4 H), 2.30-2.05 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{18}N_8O$ $[M + H]^+$ 375.2, found 375.



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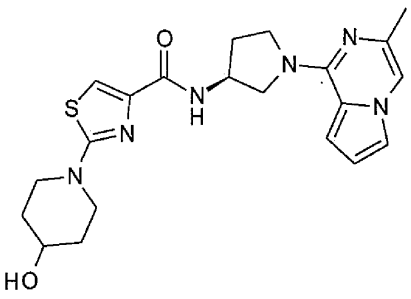
Compound 1.036: ^{1}H NMR (400 MHz, DMSO) δ 8.35 (d, J = 1.2 Hz, 1 H), 8.27 (d, J = 1.2 Hz, 1 H), 8.26 (d, J = 7.4 Hz, 1 H), 7.87 (d, J = 0.8 Hz, 1 H), 7.76-7.70 (m, 3 H), 7.56-7.48 (m, 3 H), 7.38 (t, J = 7.8 Hz, 1 H), 7.25 (d, J = 4.7 Hz, 1 H), 4.70-4.50 (m, 1 H), 4.40-3.80 (br, 4 H), 2.30-2.05 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ $[M + H]^+$ 374.2, found 374.



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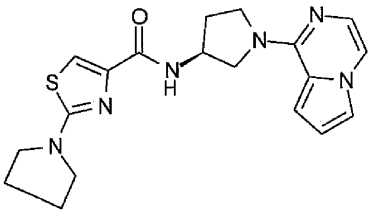
Compound 1.037: ^{1}H NMR (400 MHz, CD_3OD) δ 7.37 (s, 1 H), 7.28 (q, J = 1.2 Hz, 1 H), 7.25 (s, 1 H), 6.86 (d, J = 4.3 Hz, 1 H), 6.57 (dd, J = 2.7, 4.3 Hz, 1 H), 5.48 (s, 2 H), 4.70-4.60 (m, 1 H), 4.22-3.78 (m, 8 H), 3.28-3.10 (m, 1 H), 2.40-2.28 (m, 1 H), 2.22-2.12 (m, 4 H), 1.96-1.88 (m, 2 H); 1.62-1.52 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{26}N_6O_2S$ $[M + H]^+$ 427.2, found 427.



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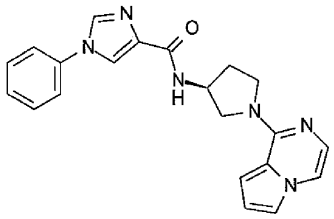
Compound 1.038: ^{1}H NMR (400 MHz, DMSO) δ 7.96 (d, J = 7.4 Hz, 1 H), 7.53 (d, J = 4.7 Hz, 1 H), 7.50 (q, J = 1.2 Hz, 1 H), 7.31 (s, 1 H), 6.94 (d, J = 4.7 Hz, 1 H), 6.82 (d, J = 4.3 Hz, 1 H), 6.61 (q, J = 2.3 Hz, 1 H), 4.60-4.46 (m, 1 H), 4.10-4.00 (m, 1 H), 3.98-3.84 (m, 1 H), 3.84-3.70 (m, 2 H), 3.38 (t, J = 6.6 Hz, 4 H), 2.30-2.00 (m, 2 H), 2.00-1.92 (m, 4 H); MS: (ES) *m/z* calculated for $C_{19}H_{22}N_6OS$ $[M + H]^+$ 383.2, found 383.



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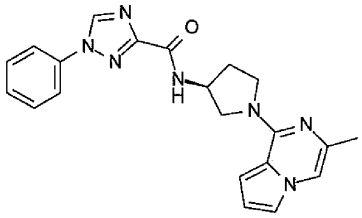
Compound 1.039: ^{1}H NMR (400 MHz, CD_3OD) δ 8.23 (d, J = 1.1 Hz, 1 H), 8.15 (d, J = 1.6 Hz, 1 H), 7.79 (dd, J = 1.2, 2.8 Hz, 1 H), 7.73 (d, J = 5.5 Hz, 1 H), 7.64-7.52 (m, 5 H), 7.50-7.42 (m, 1 H), 6.94 (dd, J = 2.3, 4.3 Hz, 1 H), 6.86 (d, J = 5.5 Hz, 1 H), 5.00-4.80 (m, 1H), 4.50-3.50 (br, 4 H), 2.58-2.48 (m, 1 H), 2.48-2.35 (br, 1 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}N_6O$ $[M + H]^+$ 373.2, found 373.



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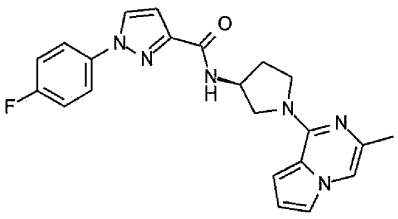
Compound 1.040: ^{1}H NMR (400 MHz, CD_3OD) δ 9.14 (s, 1 H), 7.88 (td, J = 1.2, 6.2 Hz, 2 H), 7.68 (q, J = 1.2 Hz, 1 H), 7.62-7.44 (m, 6 H), 6.88 (dd, J = 2.3, 4.3 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.60 (br, 4 H), 2.60-2.38 (m, 2 H), 2.30 (d, J = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{21}N_7O$ $[M + H]^+$ 388.2, found 388.



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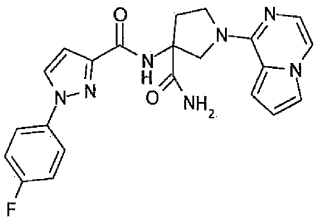
Compound 1.041: ^{1}H NMR (400 MHz, CD_3OD) δ 8.75 (d, J = 7.0 Hz, 1 H), 8.28 (d, J = 2.7 Hz, 1 H), 7.88 (m, 2 H), 7.68 (q, J = 1.2 Hz, 1 H), 7.52 (d, J = 4.3 Hz, 1 H), 7.49 (s, 1 H), 7.27-7.22 (m, 2 H), 6.96 (d, J = 2.4 Hz, 1 H), 6.87 (dd, J = 2.7, 4.3 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.60 (br, 4 H), 2.60-2.38 (m, 2 H), 2.30 (d, J = 1.1 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}FN_6O$ $[M + H]^+$ 405.2, found 405.



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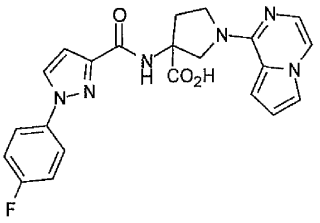
Compound 1.042: ^{1}H NMR (400 MHz, CD_3OD) δ 8.30 (d, J = 2.4 Hz, 1 H), 7.88 (m, 2 H), 7.78 (q, J = 1.2 Hz, 1 H), 7.72 (d, J = 5.9 Hz, 1 H), 7.55 (d, J = 3.9 Hz, 1 H), 7.30-7.22 (m, 2 H), 6.99 (d, J = 2.7 Hz, 1 H), 6.93 (dd, J = 2.7, 4.3 Hz, 1 H), 6.83 (d, J = 5.5 Hz, 1 H), 4.60-3.80 (br, 4 H), 2.90-2.80 (m, 1 H), 2.78-2.68 (m, 1 H); MS: (ES) *m/z* calculated for $C_{22}H_{20}FN_7O_2$ $[M + H]^+$ 434.2, found 434.



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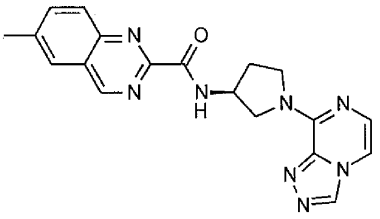
Compound 1.043: ^{1}H NMR (400 MHz, CD_3OD) δ 8.29 (d, J = 2.7 Hz, 1 H), 7.89 (m, 2 H), 7.78 (dd, J = 1.2, 2.7 Hz, 1 H), 7.73 (d, J = 5.4 Hz, 1 H), 7.55 (d, J = 3.5 Hz, 1 H), 7.30-7.22 (m, 2 H), 6.97 (d, J = 2.7 Hz, 1 H), 6.94 (dd, J = 2.8, 4.3 Hz, 1 H), 6.84 (d, J = 5.5 Hz, 1 H), 4.60-3.80 (br, 4 H), 2.90-2.82 (m, 1 H), 2.80-2.70 (m, 1 H); MS: (ES) *m/z* calculated for $C_{22}H_{19}FN_6O_3$ $[M + H]^+$ 435.2, found 435.



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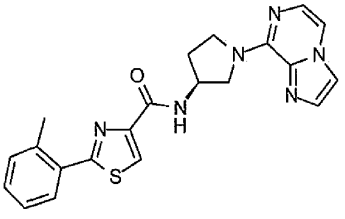
Compound 1.044: ^{1}H NMR (400 MHz, DMSO) δ 9.62 (s, 1 H), 9.31 (t, J = 3.9 Hz, 1 H), 8.08-8.00 (m, 2 H), 8.00-7.92 (m, 1 H), 7.85 (d, J = 5.1 Hz, 1 H), 7.29 (d, J = 5.0 Hz, 1 H), 4.82-4.70 (m, 1H), 4.70-3.60 (br, 4 H), 2.56 (s, 3H), 2.40-2.20 (br, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{18}N_8O$ $[M + H]^+$ 375.2, found 375.



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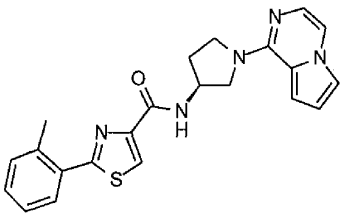
Compound 1.045: ^{1}H NMR (400 MHz, CD_3OD) δ 8.33 (s, 1 H), 8.04 (d, J = 1.2 Hz, 1 H), 7.92 (d, J = 5.5 Hz, 1 H), 7.81 (d, J = 1.2 Hz, 1 H), 7.73 (dd, J =1.5, 7.8 Hz, 1 H), 7.42-7.26 (m, 3 H), 7.16 (d, J = 5.5 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.60 (br, 4 H), 2.60-2.38 (m, 2 H), 2.55 (s, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}N_6OS$ $[M + H]^+$ 405.2, found 405.



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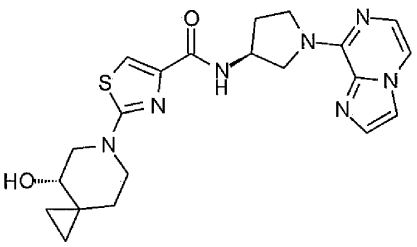
Compound 1.046: ^{1}H NMR (400 MHz, CD_3OD) δ 8.74 (d, J = 6.7 Hz, 1 H), 8.34 (s, 1 H), 7.78 (dd, J = 1.2, 2.7 Hz, 1 H), 7.76-7.70 (m, 2 H), 7.57 (d, J = 4.3 Hz, 1 H), 7.42-7.26 (m, 3 H), 6.93 (dd, J =2.8, 4.7 Hz, 1 H), 6.84 (d, J = 5.9 Hz, 1 H), 5.00-4.80 (m, 1H), 4.60-3.60 (br, 4 H), 2.60-2.36 (m, 2 H), 2.55 (s, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5OS$ $[M + H]^+$ 404.2, found 404.



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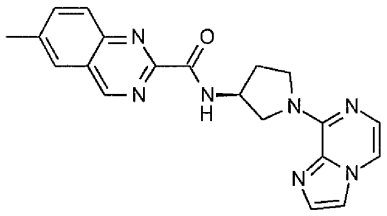
Compound 1.047: ^{1}H NMR (400 MHz, DMSO) δ 7.88 (d, J = 7.4 Hz, 1 H), 7.66 (s, 1 H), 7.54 (d, J = 4.3 Hz, 1 H), 7.29 (s, 1 H), 7.14 (s, 1 H), 7.04 (d, J = 4.3 Hz, 1 H), 4.65 (s, 1 H), 4.32-4.26 (m, 1 H), 4.20-3.56 (br, 4 H), 3.40-3.18 (m, 3 H), 3.08-3.00 (m, 2 H), 2.04-1.94 (m, 1 H), 1.90-1.80 (m, 1 H), 1.52-1.42 (m, 1 H), 1.16-0.98 (m, 1 H), 0.31 (d, J = 4.3 Hz, 2 H), 0.02(d, J = 5.1 Hz, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{25}N_7O_2S$ $[M + H]^+$ 440.2, found 440.



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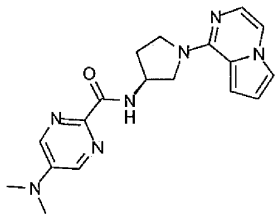
Compound 1.048: ^{1}H NMR (400 MHz, CD_3OD) δ 9.48 (s, 1 H), 8.02 (d, J = 1.6 Hz, 2 H), 7.98-7.88 (m, 3 H), 7.78 (s, 1 H), 7.17 (d, J = 5.8 Hz, 1 H), 5.00-3.80 (br, 4 H), 2.60 (s, 3H), 2.65-2.40 (br, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ $[M + H]^+$ 374.2, found 374.



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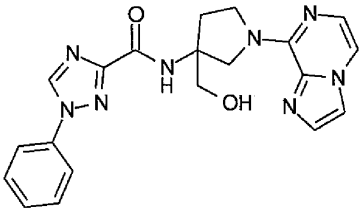
Compound 1.049: ^{1}H NMR (400 MHz, CD_3OD) δ 8.27 (s, 2 H), 7.75 (t, J = 1.1, 1 H), 7.70 ((d, J = 5.5, 1 H), 7.55 (s, 1 H), 6.91 (dt, J = 1.8, 2.6 Hz, 1 H), 6.83 (d, J = 5.5 Hz, 1 H), 5.00-4.80 (m, 1H), 4.65-3.70 (br, 4 H), 3.10 (s, 6 H), 2.60-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{18}H_{21}N_7O$ $[M + H]^+$ 352.2, found 352.



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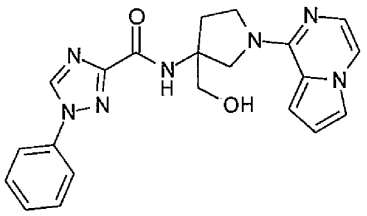
Compound 1.050: ^{1}H NMR (400 MHz, CD_3OD) δ 9.12 (s, 1 H), 8.02 (d, J = 1.1 Hz, 1 H), 7.90 (d, J = 5.9 Hz, 1 H), 7.84 (dd, J = 1.5, 8.8 Hz, 2 H), 7.79 (s, 1 H), 7.55 (t, J = 7.3 Hz, 2 H), 7.46 (t, J = 7.3 Hz, 1 H), 7.13 (d, J = 5.5 Hz, 1 H), 4.02 (s, 2 H), 4.60-3.80 (br, 4 H), 2.80-2.70 (m, 1 H), 2.58-2.48 (m, 1 H); MS: (ES) *m/z* calculated for $C_{20}H_{20}N_8O_2$ $[M + H]^+$ 405.2, found 405.



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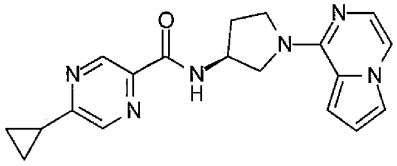
Compound 1.051: ^{1}H NMR (400 MHz, CD_3OD) δ 9.12 (s, 1 H), 7.85 (td, *J* = 1.5, 7.4 Hz, 2 H), 7.76 (d, *J* = 2.2 Hz, 1 H), 7.70 (d, *J* = 5.5 Hz, 2 H), 7.55 (m, 2 H), 7.46 (m, 1 H), 6.92 (s, 1 H), 6.83 (d, *J* = 5.5 Hz, 1 H), 4.60-3.80 (br, 4 H), 4.02 (s, 2 H), 2.82-2.70 (m, 1 H), 2.58-2.48 (m, 1 H); MS: (ES) *m/z* calculated for $C_{21}H_{21}N_7O_2$ $[M + H]^+$ 404.2, found 404.



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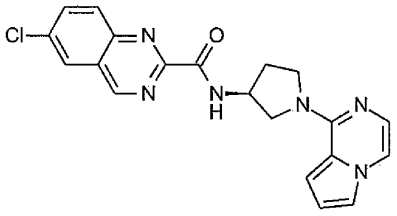
Compound 1.052: ^{1}H NMR (400 MHz, DMSO) δ 8.96 (d, *J* = 7.3 Hz, 1.5 H), 8.64 (d, *J* = 1.5 Hz, 1 H), 7.52 (d, *J* = 4.8 Hz, 1 H), 7.48 (s, 1 H), 6.93 (d, *J* = 4.7 Hz, 1 H), 6.81 (d, *J* = 4.3 Hz, 1 H), 6.60 (dd, *J* = 2.6, 4.1 Hz, 1 H), 4.65-4.55 (m, 1 H), 4.10-4.01 (m, 1 H), 3.95-3.88 (m, 1 H), 3.85-3.78 (m, 1 H), 2.48-2.08 (m, 3 H), 1.14-1.10 (m, 2 H), 1.05-1.01 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{25}N_7O_2S$ $[M + H]^+$ 349.2, found 349.



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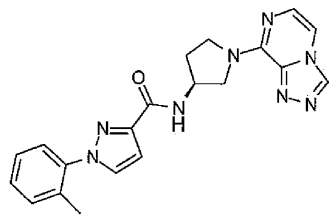
Compound 1.053: ^{1}H NMR (400 MHz, CD_3OD) δ 9.60 (s, 1 H), 8.26(s, 1 H), 8.17 (d, *J* = 9.1 Hz, 1 H), 8.07 (dd, *J* = 1.8, 9.1 Hz, 1 H), 7.76 (d, *J* = 1.5 Hz, 1 H), 7.72 (d, *J* = 5.8 Hz, 1 H), 7.57 (s, 1 H), 6.93 (m, 1 H), 6.85 (d, *J* = 5.8 Hz, 1 H), 5.06-4.84 (m, 1 H), 4.82-3.60 (br, 4 H), 2.65-2.40 (br, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{17}ClN_6O$ $[M + H]^+$ 393.2, found 393.



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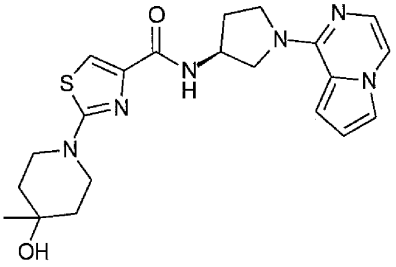
Compound 1.054: ^{1}H NMR (400 MHz, CD_3OD) δ 9.30 (s, 1 H), 7.91 (d, *J* = 5.8 Hz, 1 H), 7.88 (s, 1 H), 7.40-7.28 (m, 4 H), 7.17 (m, 1 H), 6.95 (s, 1 H), 4.94-4.70 (m, 4 H), 4.24-3.84 (m, 3 H), 2.62-2.38 (m, 2 H), 2.20 (s, 3 H); MS: (ES) *m/z* calculated for $C_{20}H_{20}N_8O$ $[M + H]^+$ 389.2, found 389.



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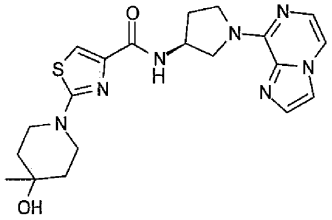
Compound 1.055: ^{1}H NMR (400 MHz, DMSO) δ 8.07 (d, J = 7.3 Hz, 1 H), 7.51 (d, J = 4.8 Hz, 1 H), 7.48 (dd, J = 1.4, 2.5 Hz, 1 H), 7.35 (d, J = 1.1 Hz, 1 H), 6.93 (d, J = 4.8 Hz, 1 H), 6.82 (d, J = 4.1 Hz, 1 H), 6.60 (dd, J = 2.6, 4.4 Hz, 1 H), 5.73 (d, J = 1.1 Hz, 1 H), 4.58-4.45 (m, 1 H), 4.43 (s, 1 H),), 4.08-4.00 (m, 1 H), 3.95-3.85 (m, 1 H), 3.82-3.72 (m, 2 H), 3.68-3.58 (m, 2 H), 3.40-3.28 (m, 2 H), 2.25-2.05 (m, 2 H), 1.60-1.50 (m, 4 H), 1.24 (s, 3 H); MS: (ES) m/z calculated for $C_{21}H_{26}N_6O_2S$ $[M + H]^+$ 427.2, found 427.



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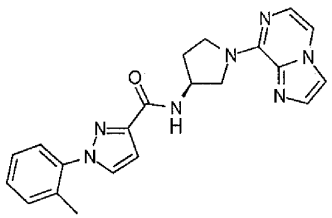
Compound 1.056: ^{1}H NMR (400 MHz, DMSO) δ 8.08 (d, J = 7.3 Hz, 1.4 H), 7.86 (d, J = 1.1 Hz, 1 H), 7.74 (d, J = 4.4 Hz, 1 H), 7.49 (d, J = 1.1 Hz, 1 H), 7.36 (s, 1 H), 7.24 (d, J = 4.8 Hz, 1 H), 5.74 (s, 1 H), 4.58-4.48 (m, 1 H), 4.43 (s, 1 H), 4.38-3.80 (br, 4 H), 3.64-3.54 (m, 2 H), 3.40-3.30 (m, 2 H), 2.25-2.05 (m, 2 H), 1.55-1.51 (m, 4 H), 1.15 (s, 3 H); MS: (ES) m/z calculated for $C_{20}H_{25}N_7O_2S$ $[M + H]^+$ 427.2, found 427.



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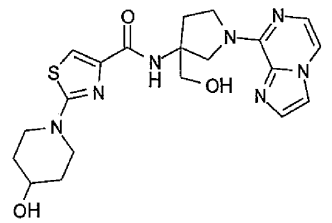
Compound 1.057: ^{1}H NMR (400 MHz, CD_3OD) δ 8.58 (d, J = 7.3 Hz, 1 H), 8.01 (d, J = 0.7 Hz, 1 H), 7.92-7.87 (m, 2 H), 7.78 (d, J = 1.1 Hz, 1 H), 7.40-7.28 (m, 4 H), 7.12 (d, J = 5.8 Hz, 1 H), 6.93 (d, J = 2.2 Hz, 1 H), 4.94-3.80 (m, 5 H), 2.56-2.32 (m, 2 H), 2.20 (s, 3 H); MS: (ES) m/z calculated for $C_{21}H_{21}N_7O$ $[M + H]^+$ 388.2, found 388.



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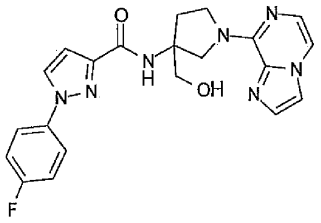
Compound 1.058: ^{1}H NMR (400 MHz, CD_3OD) δ 8.02 (s, 1 H), 7.90 (d, J = 5.5 Hz, 1 H), 7.79 (s, 1 H), 7.35 (s, 2 H), 7.14 (d, J = 5.8 Hz, 1 H), 4.60-3.80 (br, 4 H), 3.94 (s, 2 H), 3.90-3.80 (m, 3 H), 3.32-3.20 (m, 2 H), 2.75-2.65 (m, 1 H), 2.52-2.45 (m, 1 H), 1.97-1.87 (m, 2 H), 1.64-1.50 (m, 2 H); MS: (ES) m/z calculated for $C_{20}H_{25}N_7O_3S[M + H]^+$ 444.2, found 444.



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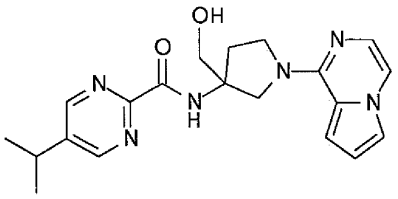
Compound 1.059: ^{1}H NMR (400 MHz, CD_3OD) δ 8.23 (d, J = 2.5 Hz, 1 H), 8.01 (d, J = 1.1 Hz, 1 H), 7.89 (d, J = 5.7 Hz, 1 H), 7.86-7.82 (m, 2 H), 7.78 (s, 1 H), 7.22 (t, J = 8.8 Hz, 2 H), 7.12 (d, J = 5.5 Hz, 1 H), 6.91 (d, J = 2.6 Hz, 1 H),), 4.60-3.80 (br, 4 H), 4.00 (s, 2 H), 2.80-2.70 (m, 1 H), 2.56-2.46 (m, 1 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}FN_7O_2$ $[M + H]^+$ 422.2, found 422.



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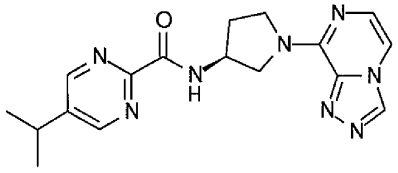
Compound 1.060: ^{1}H NMR (400 MHz, DMSO) δ 8.82 (s, 1 H), 8.51 (s, 1 H), 7.56 (s, 2 H), 6.92 (d, J = 5.1 Hz, 1 H), 6.66 (s, 1 H), 5.17 (t, J = 5.9 Hz, 1 H), 4.26 (d, J = 1.7 Hz, 1 H), 4.00-3.80 (m, 2 H), 3.75 (d, J = 5.5 Hz, 1 H), 3.31 (s, 2 H), 3.10-2.98 (m, 1 H), 2.60-2.48 (m, 1 H), 2.28-2.18 (m, 1 H), 1.26 (d, J = 6.9 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{20}H_{24}N_6O_2$ $[M + H]^+$ 381.2, found 381.



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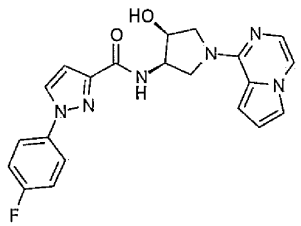
Compound 1.061: ^{1}H NMR (400 MHz, CD_3OD) δ 9.07 (s, 1 H), 8.80 (s, 2 H), 7.66 (d, J = 4.7 Hz, 1 H), 7.28 (d, J = 4.7 Hz, 1 H), 5.00-3.80 (br, 5 H), 3.18-3.00 (m, 1 H), 2.50-2.20 (m, 2 H), 1.34 (d, J = 7.0 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{17}H_{20}N_8O$ $[M + H]^+$ 353.2, found 353.



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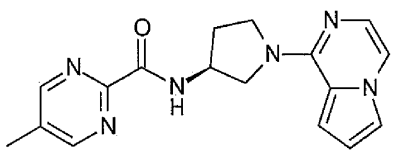
Compound 1.062: ^{1}H NMR (400 MHz, CD_3OD) δ 8.29 (d, J = 2.6 Hz, 1 H), 7.89-7.84 (m, 2 H), 7.77 (d, J = 1.5 Hz, 1 H), 7.72 (d, J = 5.9 Hz, 1 H), 7.57 (d, J = 4.4 Hz, 1 H), 7.26 (t, J = 8.8 Hz, 2 H), 6.98 (d, J = 2.2 Hz, 1 H), 6.92 (t, J = 3.0 Hz, 1 H), 6.84 (d, J = 5.8 Hz, 1 H), 4.85 (m, 1 H), 4.64 (m, 1 H), 4.70-3.60 (br, 4 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}FN_6O_2$ $[M + H]^+$ 407.2, found 407.



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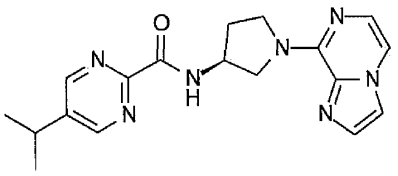
Compound 1.063: ^{1}H NMR (400 MHz, CD_3OD) δ 8.75 (s, 2 H), 7.76 (s, 1 H), 7.71 (d, J = 5.5 Hz, 1 H), 7.54 (s, 1 H), 6.91 (s, 1 H), 6.85 (d, J = 5.8 Hz, 1 H), 5.00 -3.60 (br, 5 H), 2.65-2.30 (br, 2 H), 2.40 (s, 3 H); MS: (ES) *m/z* calculated for $C_{17}H_{18}N_6O$ $[M + H]^+$ 323.2, found 323.



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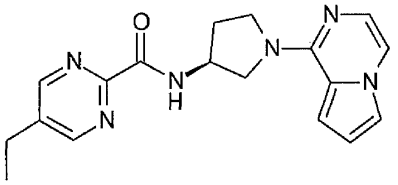
Compound 1.064: ^{1}H NMR (400 MHz, DMSO) δ 8.97 (d, J = 7.3 Hz, 1 H), 8.82 (s, 2 H), 7.86 (s, 1 H), 7.74 (d, J = 4.8 Hz, 1 H), 7.49 (s, 1 H), 7.24 (d, J = 4.4 Hz, 1 H), 4.58 (m, 1 H), 4.40-3.80 (br, 4 H), 3.03 (m, 1 H), 2.30-2.05 (m, 2 H), 1.26 (d, J = 7.0 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{18}H_{21}N_7O$ $[M + H]^+$ 352.2, found 352.



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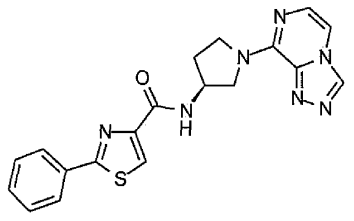
Compound 1.065: ^{1}H NMR (400 MHz, CD_3OD) δ 8.80 (s, 2 H), 7.76 (m, 1 H), 7.71 (d, J = 5.8 Hz, 1 H), 7.54 (s, 1 H), 6.92 (dd, J = 2.6, 4.4 Hz, 1 H), 6.84 (d, J = 5.5 Hz, 1 H), 5.00 -3.60 (br, 5 H), 2.81 (q, J = 7.4 Hz, 2 H), 2.65-2.30 (br, 2 H), 1.33 (t, J = 7.4 Hz, 3 H); MS: (ES) *m/z* calculated for $C_{17}H_{18}N_6O$ $[M + H]^+$ 337.2, found 337.



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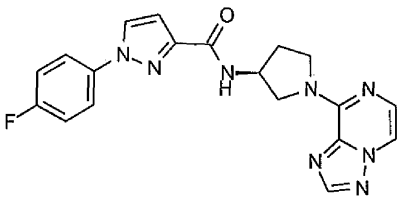
Compound 1.066: ^{1}H NMR (400 MHz, CD_3OD) δ 9.31 (s, 1 H), 8.85 (d, J = 3.6 Hz, 1 H), 8.24 (s, 1 H), 8.02 (d, J = 3.6 Hz, 2 H), 7.92 (d, J = 5.4 Hz, 1 H), 7.47 (s, 3 H), 7.19 (d, J = 5.4 Hz, 1 H), 5.00-3.80 (m, 5 H), 2.60-2.40 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}N_7OS$ $[M + H]^+$ 392.2, found 392.



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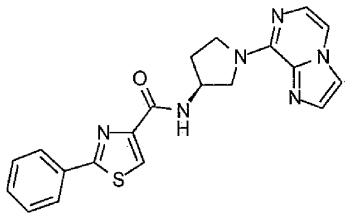
Compound 1.067: ^{1}H NMR (400 MHz, DMSO) δ 8.55 (d, J = 7.0 Hz, 1 H), 8.52 (d, J = 2.6 Hz, 1 H), 8.46 (s, 1 H), 8.13 (d, J = 4.4 Hz, 1 H), 7.97-7.92 (m, 2 H), 7.57 (d, J = 4.4 Hz, 1 H), 7.36 (t, J = 6.6 Hz, 2 H), 6.89 (d, J = 2.2 Hz, 1 H), 4.66-4.58 (m, 1 H), 4.58-3.60 (br, 4 H), 2.38-2.05 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ $[M + H]^+$ 393.2, found 393.



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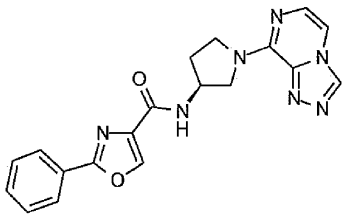
Compound 1.068: ^{1}H NMR (400 MHz, CD_3OD) δ 8.82 (d, J = 6.3 Hz, 1 H), 8.23 (s, 1 H), 8.03-8.01 (m, 3 H), 7.92-7.90 (m, 1 H), 7.88 (s, 1 H), 7.48-7.45 (m, 3 H), 7.15 (d, J = 5.8 Hz, 1 H), 4.98-3.80 (m, 5 H), 2.60-2.40 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}N_6OS$ [M + H]$^+$ 391.2, found 391.



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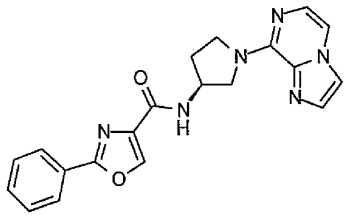
Compound 1.069: ^{1}H NMR (400 MHz, CD_3OD) δ 9.26 (s, 1 H), 8.70 (d, J = 5.9 Hz, 0.5 H), 8.45 (s, 1 H), 8.04 (d, J = 5.5 Hz, 2 H), 7.86 (d, J = 5.5 Hz, 1 H), 7.49 (m, 3 H), 7.21 (d, J = 5.5 Hz, 1 H), 5.00-3.80 (m, 5 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}N_7O_2$ [M + H]$^+$ 376.2, found 376.



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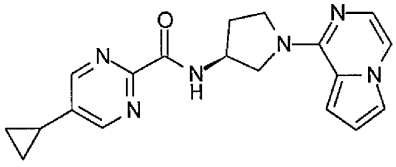
Compound 1.070: ^{1}H NMR (400 MHz, CD_3OD) δ 8.71 (d, J = 6.3 Hz, 1 H), 8.46 (s, 1 H), 8.06-8.02 (m, 3 H), 7.91 (d, J = 5.5 Hz, 1 H), 7.80 (s, 1 H), 7.49 (m, 3 H), 7.15 (d, J = 5.9 Hz, 1 H), 5.00-3.80 (m, 5 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}N_6O_2$ [M + H]$^+$ 375.2, found 375.



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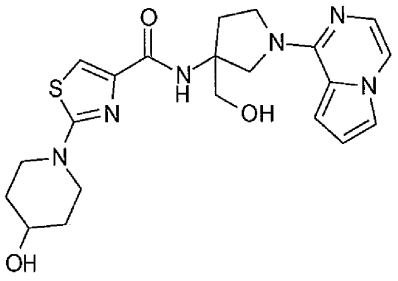
Compound 1.071: ^{1}H NMR (400 MHz, CD_3OD) δ 8.64 (s, 2 H), 7.76 (m, 1 H), 7.71 (d, J = 5.4 Hz, 1 H), 7.54 (s, 1 H), 6.92 (dd, J = 2.6, 4.4 Hz, 1 H), 6.84 (d, J = 5.5 Hz, 1 H), 5.00 -3.60 (br, 5 H), 2.65-2.30 (br, 2 H), 2.07-2.02 (m, 1 H), 1.23-1.18 (m, 2 H), 0.96-0.91 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{20}N_6O$ [M + H]$^+$ 349.2, found 349.



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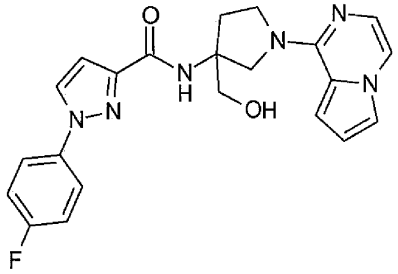
Compound 1.072: ^{1}H NMR (400 MHz, CD_3OD) δ 8.07 (s, 1 H), 7.80-7.76 (m, 1 H), 7.72 (d, J = 5.6 Hz, 1 H), 7.56 (d, J = 4.4 Hz, 1 H), 7.37 (s, 1 H), 6.94 (dd, J = 2.4, 4.4 Hz, 1 H), 6.85 (d, J = 6.0 Hz, 1 H), 4.80-4.60 (br, 1 H), 4.50-4.20 (br, 2 H), 4.02-3.80 (m, 4 H), 3.35-3.25 (m, 4 H), 2.78-2.66 (m, 1 H), 2.56-2.45 (m, 1 H), 1.98-1.88 (m, 2 H), 1.64-1.52 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{26}N_6O_3S$ $[M + H]^+$ 443.2, found 443.



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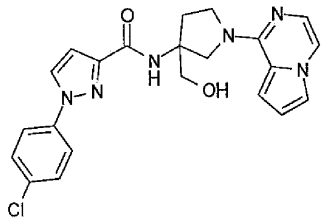
Compound 1.073: ^{1}H NMR (400 MHz, CD_3OD) δ 8.22 (d, J = 2.6 Hz, 1 H), 7.86-7.82 (m, 2 H), 7.42 (d, J = 4.7 Hz, 1 H), 7.38 (t, J = 1.5 Hz, 1 H), 7.21 (dt, J = 2.2, 8.4 Hz, 2 H), 6.98 (d, J = 4.4 Hz, 1 H), 6.91 (d, J = 2.5 Hz, 1 H), 6.86 (d, J = 4.7 Hz, 1 H), 6.64 (dd, J = 2.5, 4.0 Hz, 1 H), 4.34 (d, J = 11.4 Hz, 1 H), 4.15 (d, J = 11.4 Hz, 1 H), 4.02-3.88 (m, 4 H), 2.65-2.55 (m, 1 H), 2.45-2.36 (m, 1 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}FN_6O_2$ $[M + H]^+$ 421.2, found 421.



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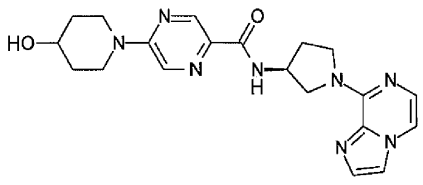
Compound 1.074: ^{1}H NMR (400 MHz, CD_3OD) δ 8.28 (d, J = 2.5 Hz, 1 H), 7.85 (dd, J = 2.2, 6.9 Hz, 2 H), 7.48 (dd, J = 2.2, 6.9 Hz, 2 H), 7.42 (d, J = 5.2 Hz, 1 H), 7.39 (dd, J = 1.1, 2.6 Hz, 1 H), 6.98 (d, J = 4.4 Hz, 1 H), 6.93 (d, J = 2.6 Hz, 1 H), 6.86 (d, J = 5.1 Hz, 1 H), 6.65 (dd, J = 2.5, 4.1 Hz, 1 H), 4.34 (d, J = 11.4 Hz, 1 H), 4.15 (d, J = 11.4 Hz, 1 H), 4.02-3.88 (m, 4 H), 2.65-2.55 (m, 1 H), 2.45-2.36 (m, 1 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}ClN_6O_2$ $[M + H]^+$ 437.2, found 437.



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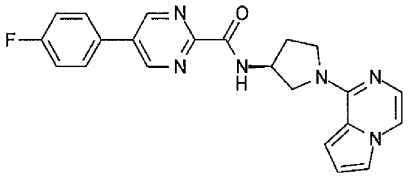
Compound 1.075: ^{1}H NMR (400 MHz, CD_3OD) δ 8.64 (s, 1 H), 8.17 (s, 1 H), 7.75 (s, 1 H), 7.66 (d, J = 4.8 Hz, 1 H), 7.51 (s, 1 H), 7.22 (d, J = 4.4 Hz, 1 H), 4.75--4.68 (m, 1 H), 4.40-4.32 (m, 1 H), 4.30-3.80 (m, 4 H), 3.40-3.20 (m, 4 H), 2.42-2.32 (m, 1 H), 2.26-2.16 (m, 1 H), 1.98-1.90 (m, 2 H), 1.58-1.50 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{24}N_8O_2$ $[M + H]^+$ 409.2, found 409.



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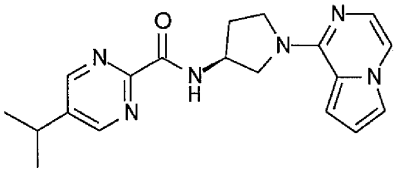
Compound 1.076: ^{1}H NMR (400 MHz, CD_3OD) δ 9.17 (s, 2 H), 7.83 (m, 3 H), 7.71 (d, J = 5.4 Hz, 1 H), 7.56 (s, 1 H), 7.31 (t, J = 8.5 Hz, 2 H), 6.92 (s, 1 H), 6.85 (d, J = 5.9 Hz, 1 H), 5.00 -3.60 (br, 5 H), 2.65-2.30 (br, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{19}FN_6O$ $[M + H]^+$ 403.2, found 403.



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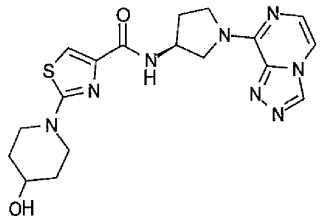
Compound 1.077: ^{1}H NMR (400 MHz, CD_3OD) δ 8.81 (s, 2 H), 7.76 (s, 1 H), 7.71 (d, J = 5.8 Hz, 1 H), 7.55 (s, 1 H), 6.92 (s, 1 H), 6.84 (d, J = 5.9 Hz, 1 H), 5.00 -3.60 (br, 5 H), 3.18-3.00 (m, 1 H), 2.65-2.30 (br, 2 H), 1.36 (d, J = 7.0 Hz, 6 H); MS: (ES) *m/z* calculated for $C_{19}H_{22}N_6O$ $[M + H]^+$ 351.2, found 351.



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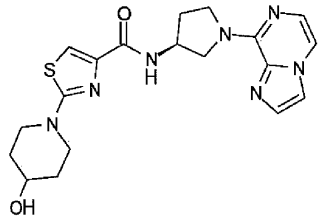
Compound 1.078: ^{1}H NMR (400 MHz, CD_3OD) δ 9.06 (s, 1 H), 7.64 (d, J = 4.8 Hz, 1 H), 7.36 (s, 1 H), 7.26 (d, J = 4.8 Hz, 1 H), 4.73-4.68 (m, 1 H), 4.60-3.60 (br, 4 H), 3.96-3.80 (m, 3 H), 3.35-3.20 (m, 2 H), 2.45-2.35 (m, 1 H), 2.30-2.18 (m, 1 H), 1.95-1.88 (m, 2 H), 1.62-1.50 (m, 2 H); MS: (ES) *m/z* calculated for $C_{18}H_{22}N_8O_2S[M + H]^+$ 415.2, found 415.



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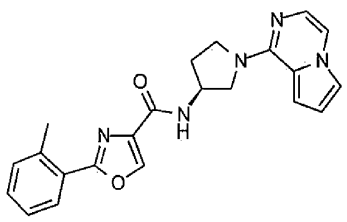
Compound 1.079: ^{1}H NMR (400 MHz, CD_3OD) δ 7.74 (s, 1 H), 7.66 (d, J = 4.7 Hz, 1 H), 7.50 (s, 1 H), 7.36 (s, 1 H), 7.22 (d, J = 4.9 Hz, 1 H), 4.76-4.65 (m, 1 H), 4.40-4.30 (m, 1 H), 4.20-3.75 (m, 4 H), 3.40-3.20 (m, 4 H), 2.42-2.10 (m, 2 H), 1.95-1.85 (m, 2 H), 1.65-1.50 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{23}N_7O_2S[M + H]^+$ 414.2, found 414.



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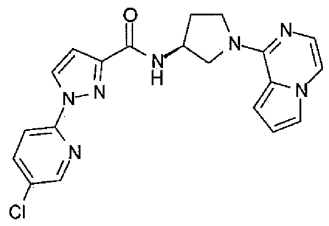
Compound 1.080: ^{1}H NMR (400 MHz, CD_3OD) δ 8.61 (d, J = 6.2 Hz, 1 H), 8.49 (s, 1 H), 7.94 (d, J = 7.7 Hz, 1 H), 7.76 (d, J = 1.1 Hz, 1 H), 7.71 (d, J = 5.4 Hz, 1 H), 7.56 (d, J = 2.9 Hz, 1 H), 7.40-7.26 (m, 3 H), 6.92 (dt, J = 1.8, 2.6 Hz, 1 H), 6.83 (d, J = 5.5 Hz, 1 H), 5.00-3.60 (m, 5 H), 2.66 (s, 3 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5O_2$ $[M + H]^+$ 388.2, found 388.



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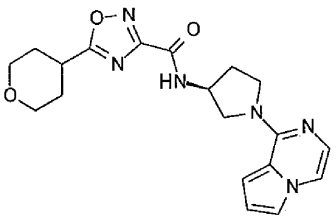
Compound 1.081: ^{1}H NMR (400 MHz, CD_3OD) δ 8.61 (s, 1 H), 8.44 (s, 1 H), 8.07 (d, J = 8.8 Hz, 1 H), 7.99 (d, J = 8.8 Hz, 1 H), 7.77 (s, 1 H), 7.72 (d, J = 5.9 Hz, 1 H), 7.57 (d, J = 4.4 Hz, 1 H), 6.96 (s, 1 H), 6.94-6.91 (m, 1 H), 6.85 (d, J = 5.9 Hz, 1 H), 5.00-3.65 (br, 5 H), 2.60-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}ClN_7O$[M + H]$^+$ 408.2, found 408.



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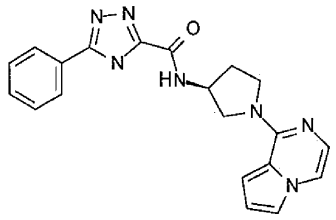
Compound 1.082: ^{1}H NMR (400 MHz, CD_3OD) δ 9.28 (d, J = 5.5 Hz, 1 H), 7.77 (s, 1 H), 7.72 (d, J = 5.9 Hz, 1 H), 7.55 (s, 1 H), 6.92 (s, 1 H), 6.85 (d, J = 5.5 Hz, 1 H), 4.80-3.65 (m, 5 H), 3.99 (d, J = 7.0 Hz, 2 H), 3.59 (t, J = 11.0 Hz, 2 H), 3.41-3.29 (m, 1 H), 2.60-2.30 (m, 2 H), 2.10-1.85 (m, 4 H); MS: (ES) *m/z* calculated for $C_{19}H_{22}N_6O_3$ [M + H]$^+$ 383.2, found 383.



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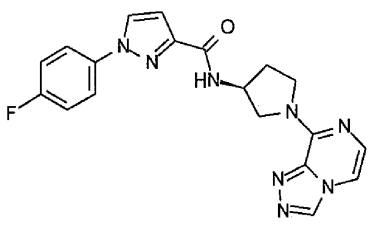
Compound 1.083: ^{1}H NMR (400 MHz, DMSO) δ 11.40 (s, 1 H), 8.05 (d, J = 7.0 Hz, 2 H), 7.91 (s, 1 H), 7.84 (d, J = 4.4 Hz, 1 H), 7.60-7.40 (m, 4 H), 7.00-6.90 (m, 2 H), 4.85-3.50 (br, 5 H), 2.45-2.20 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ [M + H]$^+$ 374.2, found 374.



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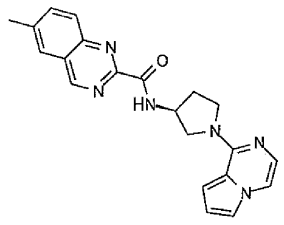
Compound 1.084: ^{1}H NMR (400 MHz, DMSO) δ 9.20 (s, 1 H), 8.57 (d, J = 7.0 Hz, 1 H), 8.52 (d, J = 2.2 Hz, 1 H), 7.97-7.93 (m, 2 H), 7.74 (d, J = 4.4 Hz, 1 H), 7.38 (t, J = 8.8 Hz, 2 H), 7.28 (d, J = 4.4 Hz, 1 H), 6.90 (d, J = 2.5 Hz, 1 H), 4.70-3.50 (m, 5 H), 2.40-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ [M + H]$^+$ 393.2, found 393.



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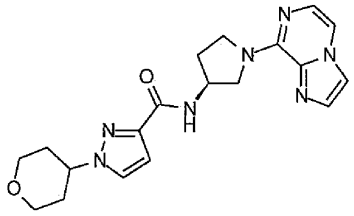
Compound 1.085: ^{1}H NMR (400 MHz, CD_3OD) δ 9.49 (s, 1 H), 8.04 (d, J = 9.1 Hz, 1 H), 7.93 (d, J = 6.9 Hz, 2 H), 7.75 (d, J = 1.5 Hz, 1 H), 7.70 (d, J = 5.9 Hz, 1 H), 7.55 (s, 1 H), 6.92 (s, 1 H), 6.85 (d, J = 5.5 Hz, 1 H), 5.00-3.70 (m, 5 H), 3.30 (s, 3 H), 2.60-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}N_6O$ $[M + H]^+$ 373.2, found 373.



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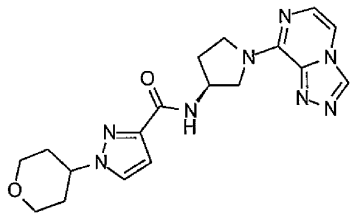
Compound 1.086: ^{1}H NMR (400 MHz, CD_3OD) δ 8.02 (s, 1 H), 7.90 (d, J = 5.9 Hz, 1 H), 7.79 (s, 1 H), 7.73 (d, J = 2.5 Hz, 1 H), 7.14 (d, J = 5.5 Hz, 1 H), 6.72 (d, J = 2.6 Hz, 1 H), 5.00-3.70 (m, 8 H), 3.55 (dt, J = 2.2, 11.7 Hz, 2 H), 2.60-2.30 (m, 2 H), 2.20-1.95 (m, 4 H); MS: (ES) *m/z* calculated for $C_{19}H_{23}N_7O_2$ $[M + H]^+$ 382.2, found 382.



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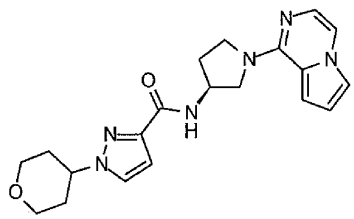
Compound 1.087: ^{1}H NMR (400 MHz, CD_3OD) δ 9.25 (s, 1 H), 7.85 (d, J = 5.1 Hz, 1 H), 7.73 (d, J = 2.6 Hz, 1 H), 7.20 (d, J = 5.5 Hz, 1 H), 6.73 (d, J = 2.5 Hz, 1 H), 5.00-3.60 (m, 8 H), 3.55 (dt, J = 2.2, 11.7 Hz, 2 H), 2.60-2.39 (m, 2 H), 2.20-1.95 (m, 4 H); MS: (ES) *m/z* calculated for $C_{18}H_{22}N_8O_2$ $[M + H]^+$ 383.2, found 383.



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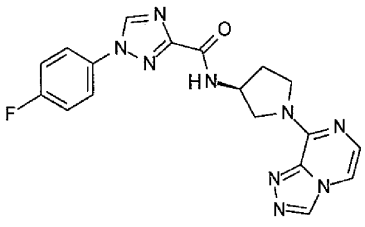
Compound 1.088: ^{1}H NMR (400 MHz, CD_3OD) δ 8.48 (d, J = 6.2 Hz, 1 H), 7.78-7.70 (m, 3 H), 7.55 (s, 1 H), 6.91 (dd, J = 2.5, 4.4 Hz, 1 H), 6.83 (d, J = 5.5 Hz, 1 H), 6.73 (d, J = 2.2 Hz, 1 H), 5.00-3.60 (m, 8 H), 3.55 (dt, J = 2.2, 11.7 Hz, 2 H), 2.60-2.39 (m, 2 H), 2.20-1.95 (m, 4 H); MS: (ES) *m/z* calculated for $C_{20}H_{24}N_6O_2$ $[M + H]^+$ 381.2, found 381.



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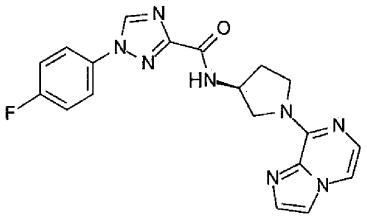
Compound 1.089: ^{1}H NMR (400 MHz, DMSO) δ 9.35 (s, 1 H), 9.20 (s, 1 H), 8.99 (d, J = 7.0 Hz, 1.5 H), 7.95-7.91 (m, 2 H), 7.75 (d, J = 4.4 Hz, 1 H), 7.45 (t, J = 8.5 Hz, 2 H), 7.28 (d, J = 4.4 Hz, 1 H), 4.80-3.50 (m, 5 H), 2.40-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{18}H_{16}FN_9O$ $[M + H]^+$ 394.2, found 394.



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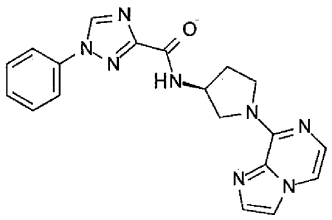
Compound 1.090: ^{1}H NMR (400 MHz, DMSO) δ 9.34 (s, 1 H), 8.91 (d, J = 8.0 Hz, 1 H), 7.95-7.91 (m, 2 H), 7.86 (s, 1 H), 7.75 (d, J = 4.8 Hz, 1 H), 7.50 (s, 1 H), 7.45 (t, J = 7.0 Hz, 2 H), 7.25 (d, J = 4.8 Hz, 1 H), 4.65-4.56 (m, 1 H), 4.50-3.70 (m, 4 H), 2.30-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}FN_8O$ $[M + H]^+$ 393.2, found 393.



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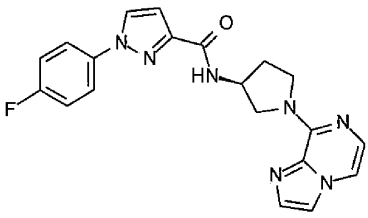
Compound 1.091: ^{1}H NMR (400 MHz, DMSO) δ 9.39 (s, 1 H), 8.92 (d, J = 7.0 Hz, 1 H), 7.90-7.86 (m, 2 H), 7.75 (d, J = 4.4 Hz, 1 H), 7.58 (t, J = 7.4 Hz, 2 H), 7.50 (s, 1 H), 7.46 (t, J = 7.4 Hz, 1 H), 7.25 (d, J = 4.4 Hz, 1 H), 4.62-4.50 (m, 1 H), 4.50-3.70 (m, 4 H), 2.30-2.00 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{18}N_8O$ $[M + H]^+$ 375.2, found 375.



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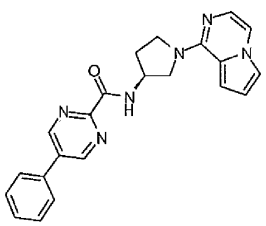
Compound 1.092: ^{1}H NMR (400 MHz, DMSO) δ 8.52 (d, J = 7.7 Hz, 2 H), 7.97 (m, 2 H), 7.86 (s, 1 H), 7.75 (d, J = 4.1 Hz, 1 H), 7.50 (s, 1 H), 7.37 (t, J = 7.0 Hz, 2 H), 7.25 (d, J = 4.4 Hz, 1 H), 6.89 (s, 1 H), 4.62-4.50 (m, 1 H), 4.50-3.70 (m, 4 H), 2.30-2.00 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}FN_7O$ $[M + H]^+$ 392.2, found 392.



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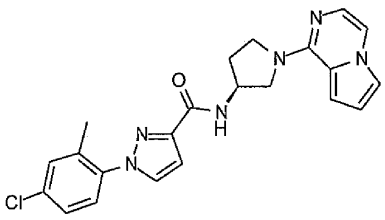
Compound 1.093: ^{1}H NMR (400 MHz, CD_3OD) δ 9.42 (d, J = 7.0 Hz, 0.8 H), 9.18 (s, 2 H), 7.77-7.70 (m, 4 H), 7.58-7.48 (m, 4 H), 6.93 (dd, J = 2.6, 4.4 Hz, 1 H), 6.85 (d, J = 5.5 Hz, 1 H), 5.00-3.65 (br, 5 H), 2.65-2.40 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{20}N_6O[M + H]^+$ 385.2, found 385.



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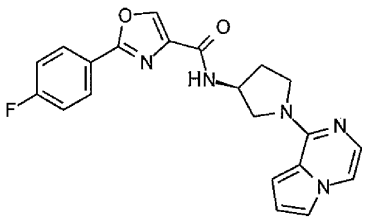
Compound 1.094: ^{1}H NMR (400 MHz, DMSO) δ 8.47 (d, *J* = 7.0 Hz, 1 H), 8.10 (d, *J* = 2.2 Hz, 1 H), 7.52-7.40 (m, 4 H), 6.93 (d, *J* = 4.4 Hz, 1 H), 6.87 (d, *J* = 2.2 Hz, 1 H), 6.80 (d, *J* = 4.0 Hz, 1 H), 6.60 (dd, *J* =2.9, 4.0 Hz, 1 H), 4.62-4.50 (m, 1 H), 4.10-3.70 (m, 4 H), 2.19 (s, 3 H), 2.30-2.00 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}ClN_6O$ $[M + H]^+$ 421.2, found 421.



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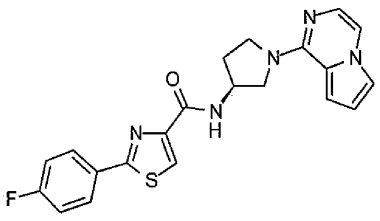
Compound 1.095: ^{1}H NMR (400 MHz, DMSO) δ 8.70 (s, 1 H), 8.53 (d, *J* = 7.0 Hz, 1 H), 8.10 (dd, *J* = 5.5, 8.8 Hz, 2 H), 7.53 (d, *J* = 4.8 Hz, 1 H), 7.49 (s, 1 H), 7.41 (t, *J* = 8.8 Hz, 1 H), 6.95 (d, *J* = 4.4 Hz, 1 H), 6.83 (d, *J* = 4.0 Hz, 1 H), 6.62 (dd, *J* =2.6, 4.1 Hz, 1 H), 4.62-4.50 (m, 1 H), 4.10-3.70 (m, 4 H), 2.30-2.00 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{18}FN_5O_2$ $[M + H]^+$ 392.2, found 392.



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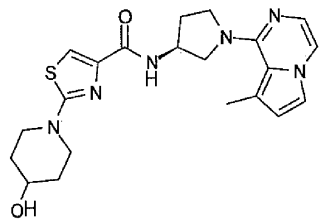
Compound 1.096: ^{1}H NMR (400 MHz, CD_3OD) δ 8.85 (d, *J* = 6.6 Hz, 1 H), 8.23 (s, 1 H), 8.09-8.05 (m, 2 H), 7.76 (s, 1 H), 7.72 (d, *J* = 5.9 Hz, 1 H), 7.56 (s, 1 H), 7.23 (t, *J* = 8.8 Hz, 1 H), 6.93 (dd, *J* = 2.5, 4.4 Hz, 1 H), 6.85 (d, *J* = 5.9 Hz, 1 H), 5.00-3.60 (m, 5 H), 2.60-2.35 (m, 2 H) ; MS: (ES) *m/z* calculated for $C_{21}H_{18}FN_5OS[M + H]^+$ 408.2, found 408.



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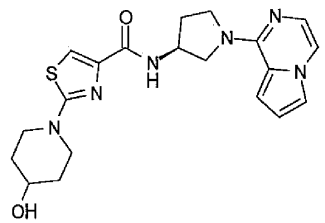
Compound 1.097: ^{1}H NMR (400 MHz, CD_3OD) δ 7.68-7.65 (m, 2 H), 7.38 (s, 1 H), 6.76-6.74 (m, 2 H), 4.75-4.65 (m, 1 H), 4.25-4.15 (m, 1 H), 4.06-3.80 (m, 5 H), 3.35-3.20 (m, 3 H), 2.62 (s, 1 H), 2.50-2.30 (m, 2 H), 1.98-1.90 (m, 2 H), 1.65-1.52 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{26}N_6O_2S[M + H]^+$ 427.2, found 427.



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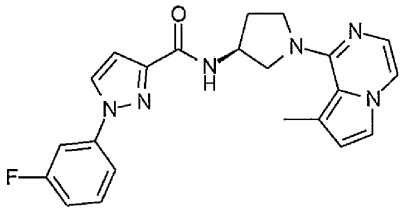
Compound 1.098: ^{1}H NMR (400 MHz, CD_3OD) δ 7.76 (s, 1 H), 7.70 (d, *J* = 5.8 Hz, 1 H), 7.54 (d, *J* = 3.7 Hz, 1 H), 7.39 (s, 1H), 7.53 (dd, *J* = 2.5, 4.0 Hz, 1 H), 6.84 (d, *J* = 5.5 Hz, 1 H), 4.82-4.75 (m, 1 H), 4.70-3.60 (br, 4 H), 3.90-3.80 (m, 2 H), 3.40-3.20 (m, 3 H), 2.52-2.30 (m, 2 H), 1.96-1.90 (m, 2 H), 1.65-1.52 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{24}FN_6O_2S[M + H]^+$ 413.2, found 413.



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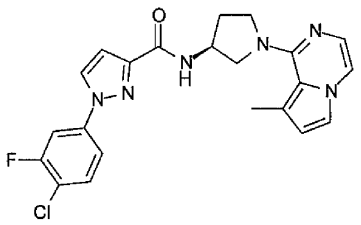
Compound 1.099: ^{1}H NMR (400 MHz, CD_3OD) δ 8.35 (d, J = 2.6 Hz, 1 H), 7.76-7.64 (m, 3 H), 7.53 (dt, J = 6.2, 8.4 Hz, 2 H), 7.13 (dt, J = 2.5, 8.4 Hz, 1 H), 6.95 (d, J = 2.6 Hz, 1 H), 6.77-6.73 (m, 2 H), 4.82-4.75 (m, 1 H), 4.30-4.24 (m, 1 H), 4.08-3.92 (m, 3 H), 2.63 (s, 3 H), 2.52-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}FN_6O$[M + H]$^+$ 405.2, found 405.



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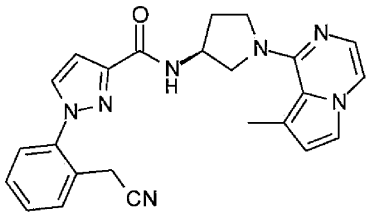
Compound 1.100: ^{1}H NMR (400 MHz, CD_3OD) δ 8.36 (d, J = 2.6 Hz, 1 H), 7.90 (dd, J = 2.6, 10.3 Hz, 1 H), 7.72-7.64 (m, 3 H), 7.61 (t, J = 8.0 Hz, 1 H), 6.95 (d, J = 2.6 Hz, 1 H), 6.77-6.73 (m, 2 H), 4.82-4.75 (m, 1 H), 4.30-4.24 (m, 1 H), 4.08-3.92 (m, 3 H), 2.63 (s, 3 H), 2.52-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{20}ClFN_6O$[M + H]$^+$ 439.2, found 439.



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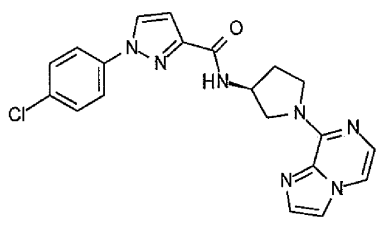
Compound 1.101: ^{1}H NMR (400 MHz, CD_3OD) δ 8.02 (d, J = 2.2 Hz, 1 H), 7.65-7.57 (m, 3 H), 7.54-7.46 (m, 3 H), 6.97 (d, J = 2.2 Hz, 1 H), 6.75-6.72 (m, 2 H), 4.82-4.75 (m, 1 H), 4.28-4.24 (m, 1 H), 4.08-4.00 (m, 1 H), 3.98-3.90 (m, 4 H), 2.61 (s, 3 H), 2.52-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{24}H_{23}N_7O$[M + H]$^+$ 426.2, found 426.



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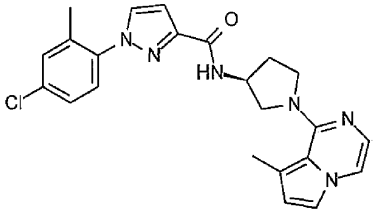
Compound 1.102: ^{1}H NMR (400 MHz, DMSO) δ 8.58 (d, J = 2.6 Hz, 1 H), 8.55 (d, J = 6.9 Hz, 1 H), 7.97 (dd, J = 2.2, 7.0 Hz, 2 H), 7.86 (s, 1 H), 7.75 (d, J = 4.4 Hz, 1 H), 7.58 (dd, J = 2.2, 6.9 Hz, 2 H), 7.50 (s, 1 H), 7.25 (d, J = 4.4 Hz, 1 H), 6.91 (d, J = 2.6 Hz, 1 H), 4.62-4.50 (m, 1 H), 4.50-3.70 (m, 4 H), 2.30-2.00 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}ClN_7O$ [M + H]$^+$ 408.2, found 408.



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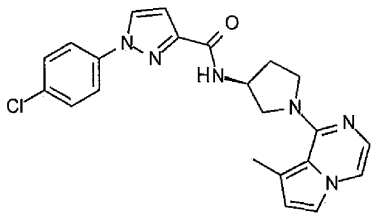
Compound 1.103: ^{1}H NMR (400 MHz, DMSO) δ 8.44 (d, J = 7.3 Hz, 1 H), 8.10 (d, J = 2.2 Hz, 1 H), 7.62 (d, J = 4.8, 2 H), 7.53 (s, 1 H), 7.46-7.40 (m, 2 H), 6.87 (d, J = 4.8 Hz, 1 H), 6.85 (d, J = 2.6 Hz, 1 H), 6.49 (d, J = 2.2 Hz, 1 H), 4.48-4.40 (m, 1 H), 3.70-3.50 (m, 4 H), 2.45 (s, 3 H), 2.20 (s, 3 H), 2.20-1.90 (m, 2 H); MS: (ES) *m/z* calculated for $C_{23}H_{23}ClN_6O$ $[M + H]^+$ 435.2, found 435.



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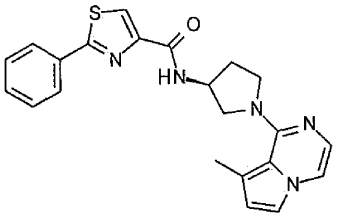
Compound 1.104: ^{1}H NMR (400 MHz, DMSO) δ 11.38 (s, 1 H), 8.78 (d, J = 7.0 Hz, 1 H), 8.59 (d, J = 3.0 Hz, 1 H), 7.95 (d, J = 7.0, 2 H), 7.81 (m, 2 H), 7.61 (d, J = 8.8 Hz, 2 H), 6.92 (s, 1 H), 6.85 (d, J = 5.5 Hz, 1 H), 6.76 (d, J = 2.2 Hz, 1 H), 4.70-4.65 (m, 1 H), 4.18-3.80 (m, 4 H), 2.48 (s, 3 H), 2.38-2.18 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}ClN_6O$ $[M + H]^+$ 421.2, found 421.



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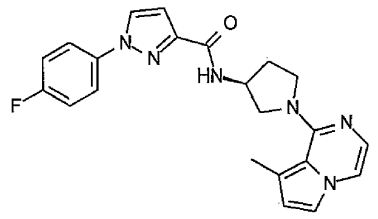
Compound 1.105: ^{1}H NMR (400 MHz, DMSO) δ 11.28 (s, 1 H), 8.82 (d, J = 7.0 Hz, 1 H), 8.33 (s, 1 H), 8.04-8.01 (m, 2 H), 7.82 (m, 2 H), 7.54-7.50 (m, 3 H), 6.86 (d, J = 5.5 Hz, 1 H), 6.76 (d, J = 2.2 Hz, 1 H), 4.75-4.65 (m, 1 H), 4.20-3.60 (m, 4 H), 2.48 (s, 3 H), 2.40-2.20 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5OS$ $[M + H]^+$ 404.2, found 404.



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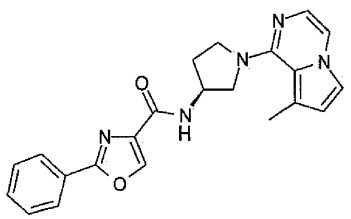
Compound 1.106: ^{1}H NMR (400 MHz, $CDCCl_3$) δ 7.91 (d, J = 7.3 Hz, 1 H), 7.82 (s, 1 H), 7.68 (dd, J = 4.4, 8.8 Hz, 2 H), 7.33 (d, J = 4.8 Hz, 1 H), 7.19 (t, J = 8.8 Hz, 3 H), 7.00 (m, 2 H), 6.50 (s, 1 H), 4.75 (s, 1 H), 3.90-3.56 (m, 4 H), 2.57 (s, 3 H), 2.42-2.38 (m, 1 H), 2.02-1.80 (m, 1 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}FN_6O[M + H]^+$ 405.2, found 405.



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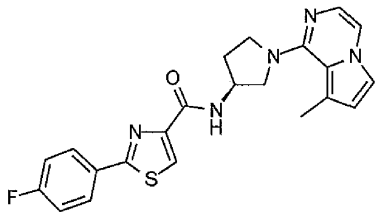
Compound 1.107: ^{1}H NMR (400 MHz, CD_3OD) δ 8.72 (d, J = 8.1 Hz, 1 H), 8.45 (s, 1 H), 8.06 (d, J = 8.1 Hz, 2 H), 7.67 (d, J = 5.5 Hz, 2 H), 7.52 (m, 3 H), 6.76-6.73 (m, 2 H), 4.85-4.75 (m, 1 H), 4.30-4.22 (m, 1 H), 4.10-3.90 (m, 3 H), 2.64 (s, 3 H), 2.55-2.35 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{21}N_5O_2[M + H]^+$ 388.2, found 388.



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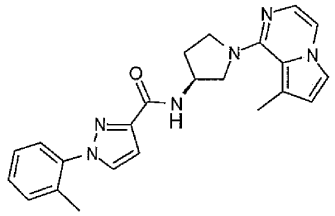
Compound 1.108: ^{1}H NMR (400 MHz, CD_3OD) δ 8.22 (s, 1 H), 8.09 (dd, *J* = 5.1, 8.8 Hz, 2 H), 7.67 (d, *J* = 5.5 Hz, 2 H), 7.24 (t, *J* = 8.8 Hz, 2 H), 6.75 (d, *J* = 5.5 Hz, 2 H), 4.85-4.75 (m, 1 H), 4.30-4.22 (m, 1 H), 4.10-3.90 (m, 3 H), 2.64 (s, 3 H), 2.55-2.35 (m, 2 H) ; MS: (ES) *m/z* calculated for $C_{22}H_{20}FN_5OS[M + H]^+$ 422.2, found 422.



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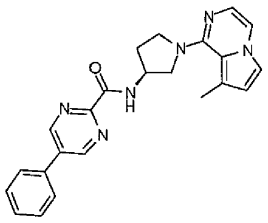
Compound 1.109: ^{1}H NMR (400 MHz, CD_3OD) δ 7.87 (s, 1 H), 7.64 (m, 2 H), 7.40-7.28 (m, 4 H), 6.93 (s, 1 H), 6.74-6.70 (m, 2 H), 4.80-4.70 (m, 1 H), 4.30-4.20 (m, 1 H), 4.10-3.85 (m, 3 H), 2.61 (s, 3 H), 2.50-2.35 (m, 2 H), 2.20 (s, 3 H); MS: (ES) *m/z* calculated for $C_{23}H_{24}N_5O[M + H]^+$ 401.2, found 401.



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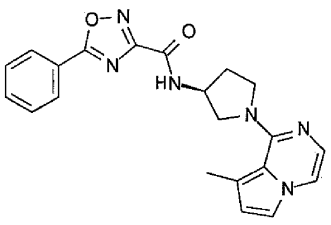
Compound 1.110: ^{1}H NMR (400 MHz, CD_3OD) δ 9.18 (s, 2 H), 7.77 (d, *J* = 7.0 Hz, 2 H), 7.67 (d, *J* = 5.9 Hz, 2 H), 7.57-7.48 (m, 3 H), 6.76-6.72 (m, 2 H), 4.95-4.80 (m, 1 H), 4.32-4.24 (m, 1 H), 4.10-3.90 (m, 3 H), 2.64 (s, 3 H), 2.50-2.35 (m, 2 H); MS: (ES) *m/z* calculated for $C_{23}H_{22}N_6O[M + H]^+$ 399.2, found 399.



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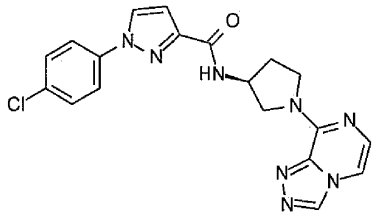
Compound 1.111: ^{1}H NMR (400 MHz, DMSO) δ 9.37 (d, *J* = 7.0 Hz, 1 H), 8.16 (d, *J* = 7.0 Hz, 2 H), 7.75-7.62 (m, 4 H), 7.47 (d, *J* = 2.6 Hz, 1 H), 6.93 (d, *J* = 4.7 Hz, 1 H), 6.51 (d, *J* = 2.6 Hz, 1 H), 4.53-4.48 (m, 1 H), 3.80-3.55 (m, 4 H), 2.48 (s, 3 H), 2.28-1.90 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{20}N_6O_2$ $[M + H]^+$ 389.2, found 389.



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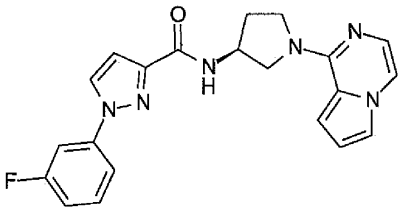
Compound 1.112: ^{1}H NMR (400 MHz, DMSO) δ 9.20 (s, 1 H), 8.61 (m, 2 H), 7.98-7.94 (m, 2 H), 7.74 (d, J = 4.4 Hz, 1 H), 7.59-7.55 (m, 2 H), 7.28 (d, J = 4.8 Hz, 1 H), 6.91 (d, J = 2.6 Hz, 1 H), 4.70-3.55 (m, 5 H), 2.40-2.12 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}ClN_8O$ $[M + H]^+$ 409.2, found 409.



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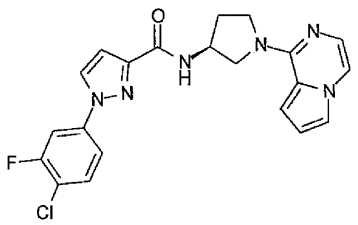
Compound 1.113: ^{1}H NMR (400 MHz, CD_3OD) δ 8.80 (d, J = 5.9 Hz, 1 H), 8.38 (d, J = 2.3 Hz, 1 H), 7.79-7.68 (m, 4 H), 7.59-7.48 (m, 2 H), 7.14 (dt, J = 2.8, 8.6 Hz, 1 H), 6.98 (d, J = 2.4 Hz, 1 H), 6.95 (dd, J = 2.6, 4.4 Hz, 1 H), 6.86 (d, J = 5.5 Hz, 1 H), 4.95-3.70 (br, 5 H), 2.60-2.36 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}FN_6O$ $[M + H]^+$ 391.2, found 391.



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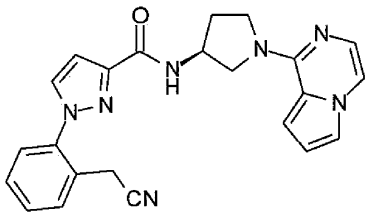
Compound 1.114: ^{1}H NMR (400 MHz, CD_3OD) δ 8.37 (d, J = 2.9 Hz, 1 H), 7.91 (dd, J = 2.6, 10.3 Hz, 1 H), 7.77 (s, 1 H), 7.71-7.68 (m, 2 H), 7.61-7.55 (m, 2 H), 6.97 (d, J = 2.6 Hz, 1 H), 6.92 (dd, J = 2.6, 4.4 Hz, 1 H), 6.84 (d, J = 5.9 Hz, 1 H), 4.95-3.70 (br, 5 H), 2.60-2.36 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{18}ClFN_6O$ $[M + H]^+$ 425.2, found 425.



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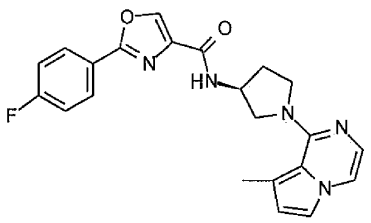
Compound 1.115: ^{1}H NMR (400 MHz, CD_3OD) δ 8.03 (d, J = 2.2 Hz, 1 H), 7.75 (s, 1 H), 7.70 (d, J = 5.5 Hz, 1 H), 7.60-7.48 (m, 5 H), 6.98 (d, J = 2.5 Hz, 1 H), 6.91 (dd, J = 2.6, 4.4 Hz, 1 H), 6.82 (d, J = 5.8 Hz, 1 H), 4.95-3.65 (br, 5 H), 3.93 (s, 2 H), 2.55-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{23}H_{21}N_7O[M + H]^+$ 412.2, found 412.



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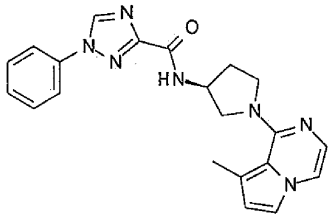
Compound 1.116: ^{1}H NMR (400 MHz, DMSO) δ 8.68 (s, 1 H), 8.54 (d, J = 6.9 Hz, 1 H), 8.08-8.04 (m, 2 H), 7.66 (d, J = 4.4 Hz, 1 H), 7.47-7.38 (m, 3 H), 6.94 (d, J = 4.4 Hz, 1 H), 6.51 (d, J = 2.2 Hz, 1 H), 4.52-4.46 (m, 1 H), 3.70-3.55 (m, 4 H), 2.48 (s, 3 H), 2.26-1.90 (m, 2 H); MS: (ES) *m/z* calculated for $C_{22}H_{20}FN_5O_2$ $[M + H]^+$ 406.2, found 406.



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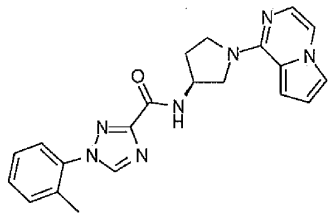
Compound 1.117: ^{1}H NMR (400 MHz, DMSO) δ 9.38 (s, 1 H), 8.88 (d, J = 7.3 Hz, 1 H), 7.90 (d, J = 7.3 Hz, 2 H), 7.65 (d, J = 4.7 Hz, 1 H), 7.59 (t, J = 7.3 Hz, 2 H), 7.47-7.43 (m, 2 H), 6.92 (d, J = 4.7 Hz, 1 H), 6.51 (d, J = 2.6 Hz, 1 H), 4.52-4.48 (m, 1 H), 3.75-3.55 (m, 4 H), 2.48 (s, 3 H), 2.26-1.90 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{21}N_7O$ $[M + H]^+$ 388.2, found 388.



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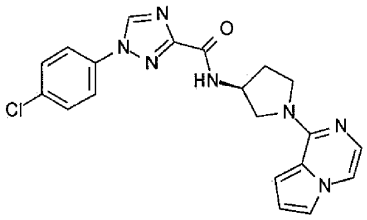
Compound 1.118: ^{1}H NMR (400 MHz, CD_3OD) δ 8.73 (s, 1 H), 7.76 (d, J = 2.6 Hz, 1 H), 7.70 (d, J = 5.5 Hz, 1 H), 7.55 (d, J = 4.0 Hz, 1 H), 7.50-7.32 (m, 4 H), 6.92 (dd, J =2.5, 4.4 Hz, 1 H), 6.83 (d, J = 5.9 Hz, 1 H), 4.95-4.80 (m, 1 H), 4.70-3.70 (br, 5 H), 2.60-2.30 (m, 2 H), 2.22 (s, 3 H); MS: (ES) *m/z* calculated for $C_{21}H_{21}N_7O[M + H]^+$ 388.2, found 388.



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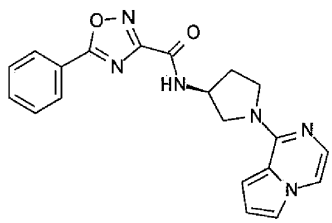
Compound 1.119: ^{1}H NMR (400 MHz, DMSO) δ 9.41 (s, 1 H), 8.92 (d, J = 7.0 Hz, 1 H), 7.94 (d, J = 7.0 Hz, 2 H), 7.66 (d, J = 7.0 Hz, 2 H), 7.50-7.48 (m, 2 H), 6.94 (d, J = 4.8 Hz, 1 H), 6.82 (d, J = 4.4 Hz, 1 H), 6.61 (dd, J = 2.6, 4.4 Hz, 1 H), 4.60-4.58 (m, 1 H), 4.10-3.70 (m, 4 H), 2.26-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}ClN_7O$ $[M + H]^+$ 408.2, found 408.



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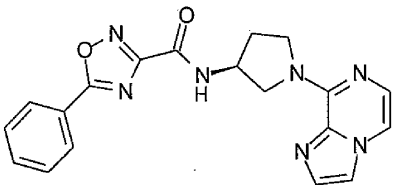
Compound 1.120: ^{1}H NMR (400 MHz, DMSO) δ 9.38 (s, 1 H), 8.15 (d, J = 7.3 Hz, 1 H), 7.74 (t, J = 7.7 Hz, 2 H), 7.65 (t, J = 7.7 Hz, 2 H), 7.54-7.48 (m, 2 H), 6.95 (d, J = 4.8 Hz, 1 H), 6.83 (d, J = 4.0 Hz, 1 H), 6.62 (dd, J = 2.6, 4.0 Hz, 1 H), 4.62-4.58 (m, 1 H), 4.10-3.80 (m, 4 H), 2.28-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{18}N_6O_2$ $[M + H]^+$ 375.2, found 375.



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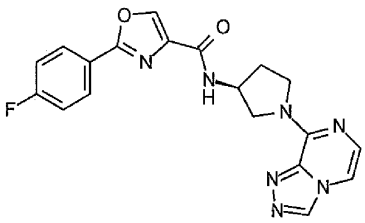
Compound 1.121: ^{1}H NMR (400 MHz, DMSO) δ 9.40 (s, 1 H), 8.15 (d, *J* = 7.0 Hz, 2 H), 7.87 (s, 1 H), 7.76-7.68 (m, 2 H), 7.65 (t, *J* = 8.0 Hz, 1 H), 7.50 (s, 1 H), 7.26 (d, *J* = 4.4 Hz, 1 H), 4.62-4.58 (m, 1 H), 4.50-3.80 (br, 4 H), 2.38-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{17}N_7O_2$ $[M + H]^+$ 376.2, found 376.



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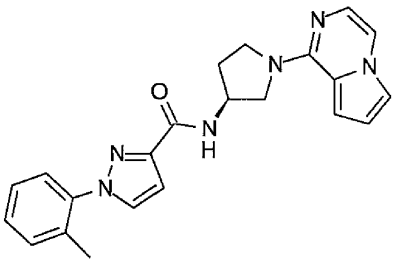
Compound 1.122: ^{1}H NMR (400 MHz, DMSO) δ 9.20 (s, 1 H), 8.71(s, 1 H), 8.63 (d, *J* = 7.0 Hz, 1 H), 8.07-8.03 (m, 2 H), 7.75 (d, *J* = 4.4 Hz, 1 H), 7.38 (t, *J* = 9.0 Hz, 2 H), 7.29 (d, *J* = 4.4 Hz, 1 H), 4.70-3.50 (br, 5 H), 2.38-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{19}H_{16}FN_7O_2$ $[M + H]^+$ 394.2, found 394.



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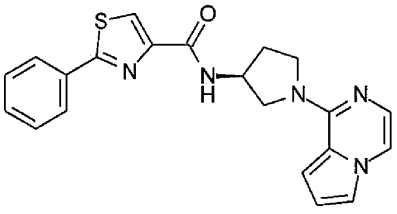
Compound 1.123: ^{1}H NMR (400 MHz, CD_3OD) δ 8.62 (d, *J* = 5.9 Hz, 1 H), 7.88 (d, *J* = 2.5 Hz, 1 H), 7.75 (s, 1 H), 7.70 (d, *J* = 5.9 Hz, 1 H), 7.54 (d, *J* = 3.6 Hz, 1 H), 7.40-7.25 (m, 4 H), 6.94 (d, *J* = 2.2 Hz, 1 H), 6.91 (dd, *J* = 2.6, 4.4 Hz, 1 H), 6.82 (d, *J* = 5.5 Hz, 1 H), 4.95-3.65 (br, 5 H), 2.58-2.30 (m, 2 H), 2.20 (s, 3 H); MS: (ES) *m/z* calculated for $C_{22}H_{22}N_6O[M + H]^+$ 387.2, found 387.



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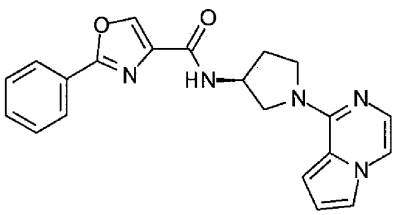
Compound 1.124: ^{1}H NMR (400 MHz, CD_3OD) δ 8.87 (d, *J* = 6.7 Hz, 1 H), 8.26 (s, 1 H), 8.07-8.01 (m, 2 H), 7.79 (dd, *J* = 1.2, 2.7 Hz, 1 H), 7.74 (d, *J* = 5.5 Hz, 1 H), 7.59 (d, *J* = 4.3 Hz, 1 H), 7.51-7.46 (m, 3 H), 6.95 (dd, *J* = 2.3, 4.4 Hz, 1 H), 6.87 (d, *J* = 5.5 Hz, 1 H), 4.95-3.65 (br, 5 H), 2.60-2.38 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}N_5OS$ $[M + H]^+$ 390.2, found 390.



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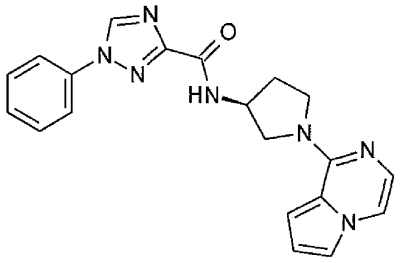
Compound 1.125: ^{1}H NMR (400 MHz, CD_3OD) δ 8.76 (d, *J* = 6.6 Hz, 1 H), 8.49 (s, 1 H), 8.10-8.06 (m, 2 H), 7.79 (dd, *J* = 1.2, 2.4 Hz, 1 H), 7.74 (d, *J* = 5.5 Hz, 1 H), 7.59-7.50 (m, 4 H), 6.95 (dd, *J* = 2.7, 4.2 Hz, 1 H), 6.87 (d, *J* = 5.4 Hz, 1 H), 4.95-3.65 (br, 5 H), 2.60-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}N_5O_2$ $[M + H]^+$ 374.2, found 374.



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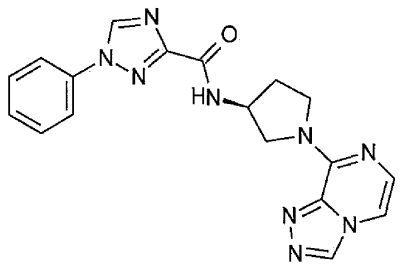
Compound 1.126: ^{1}H NMR (400 MHz, DMSO) δ 11.55 (s, 1 H), 9.35 (s, 1 H), 9.11 (d, *J* = 7.0 Hz, 2 H), 7.85-7.75 (m, 4 H), 7.55-7.35 (m, 4 H), 6.90-6.80 (m, 2 H), 4.80-3.60 (br, 5 H), 2.38-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{20}H_{19}N_7O$ $[M + H]^+$ 374.2, found 374.



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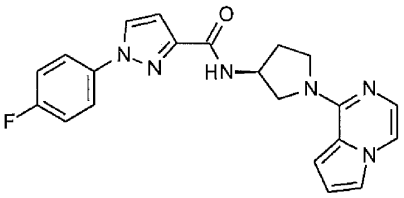
Compound 1.127: ^{1}H NMR (400 MHz, DMSO) δ 9.40 (s, 1 H), 9.20 (s, 1 H), 9.00 (d, *J* = 7.0 H, 1 H), 7.90 (d, *J* = 8.0 Hz, 2 H), 7.75 (d, *J* = 4.7 Hz, 1 H), 7.59 (t, *J* = 7.3 Hz, 2 H), 7.46 (t, *J* = 7.3 Hz, 1 H), 7.29 (d, *J* = 4.4 Hz, 1 H), 4.70-3.50 (br, 5 H), 2.38-2.10 (m, 2 H); MS: (ES) *m/z* calculated for $C_{18}H_{17}N_9O$ $[M + H]^+$ 376.2, found 376.



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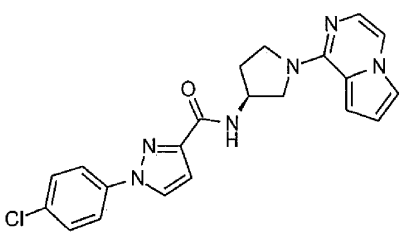
Compound 1.128: ^{1}H NMR (400 MHz, CD_3OD) δ 8.26 (s, 1 H), 7.87 (dd, *J* = 4.8, 9.2 Hz, 2 H), 7.77 (d, *J* = 2.6 Hz, 1 H), 7.71 (d, *J* = 5.5 Hz, 1 H), 7.56 (d, *J* = 4.4 Hz, 1 H), 7.25 (t, *J* = 9.2 Hz, 2 H), 6.95 (d, *J* = 2.5 Hz, 1 H), 6.92 (dd, *J* = 2.6, 4.4 Hz, 1 H), 6.84 (d, *J* = 5.5 Hz, 1 H), 4.95-3.65 (br, 5 H), 2.58-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}FN_6O[M + H]^+$ 391.2, found 391.



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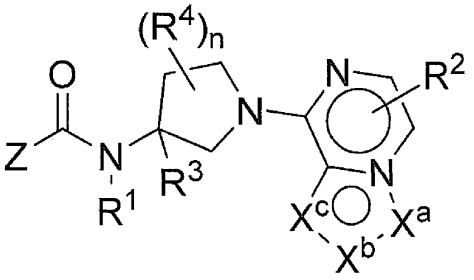
Compound 1.129: ^{1}H NMR (400 MHz, CD_3OD) δ 8.76 (d, *J* = 6.2 Hz, 1 H), 8.31 (s, 1 H), 7.86 (d, *J* = 8.8 Hz, 2 H), 7.77 (d, *J* = 2.5 Hz, 1 H), 7.72 (d, *J* = 5.5 Hz, 1 H), 7.57 (d, *J* = 5.5 Hz, 1 H), 7.50 (d, *J* = 8.8 Hz, 2 H), 6.96 (d, *J* = 2.5, 1 H), 6.93 (dd, *J* = 2.6, 7.0 Hz, 1 H), 6.84 (d, *J* = 5.9 Hz, 1 H), 4.95-4.80 (m, 1 H), 4.70-3.70 (br, 4 H), 2.60-2.30 (m, 2 H); MS: (ES) *m/z* calculated for $C_{21}H_{19}ClN_6O[M + H]^+$ 407.2, found 407.

WHAT IS CLAIMED IS:

1. A compound having formula I



(I)

or a pharmaceutically acceptable salt, hydrate, isotopically enriched or enantiomerically enriched version thereof, wherein

each of ring vertices X^a, X^b and X^c is independently selected from the group consisting of N, NH, N(R^2), CH and C(R^2);

the subscript n is 0, 1 or 2;

Z is monocyclic or fused-bicyclic heteroaryl, having 1-3 heteroatoms as ring members selected from N, O and S; and wherein said heteroaryl group is optionally substituted with from 1 to 5 R^5 substituents;

R^1 is a member selected from the group consisting of H and C_{1-8} alkyl, wherein the alkyl portion is optionally substituted with halogen, $-NR^aR^b$, $-OR^a$, $-CO_2R^a$, and $-CONR^aR^b$;

each R^2 is independently selected from the group consisting of H, halogen, CN, C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

R^3 is a member selected from the group consisting of H, C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-CO_2R^a$, $-X-CO_2R^a$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

each R^4, when present, is a member independently selected from the group consisting of C_{1-8} alkyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$ and $-X-CONR^aR^b$;

each R^5 is a member independently selected from the group consisting of halogen, CN, -X-CN, C_{1-8} alkyl, C_{3-8} cycloalkyl, C_{3-8} cycloalkenyl, C_{3-5} spirocycloalkyl, C_{2-8} alkenyl, C_{2-8} alkynyl, C_{1-8} haloalkyl, C_{1-8} hydroxyalkyl, $-OR^a$, $-CO_2R^a$, $-X-CO_2R^a$, $-NR^aR^b$, $-CONR^aR^b$, $-X-CONR^aR^b$, aryl, 5- or 6-membered heteroaryl, and 3-, 4-, 5- or 6-membered heterocyclic wherein the heteroatoms present as ring vertices of the heteroaryl and heterocyclic rings are selected from N, O and S, and wherein the aryl, heteroaryl and hetereocyclic portions of R^5 are optionally further substituted with 1-3 R^a;

each R^a and R^b is independently selected from the group consisting of hydrogen, hydroxyl, halogen, cyano, C_{1-8} alkyl, C_{1-8} alkoxy,C_{1-8} haloalkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkylalkyl, amino, C_{1-8} alkylamino, di C_{1-8} alkylamino, carboxamide, carboxy C_{1-4} alkyl ester, carboxylic acid, and $-SO_2-$ C_{1-8} alkyl;

each X is a C_{1-4} alkylene linking group or a linking group having the formula $-(CH_2)_mO(CH_2)_p-$, wherein the subscripts m and p are integer of from 0 to 5, and m + p is from 0 to 6, wherein any of the methylene portions of X are optionally substituted with one or two methyl groups.

2. The compound of claim **1**, wherein Z is monocyclic or fused-bicyclic heteroaryl selected from the group consisting of imidazole, pyrazole, 1,2,3-triazole, 1,2,4-triazole, tetrazole, thiazole, oxazole, oxadiazole, pyrimidine, pyrazine, pyridazine, and quinazoline, each of which is optionally substituted with from 1-2 R^5 substituents.

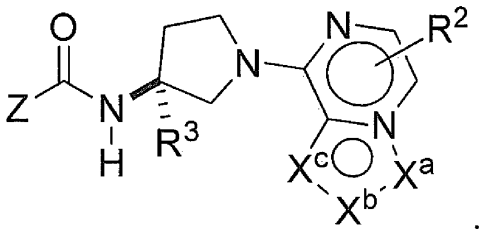
3. The compound of claim **1**, wherein n is 0.

4. The compound of claim **3**, wherein R^1 is H.

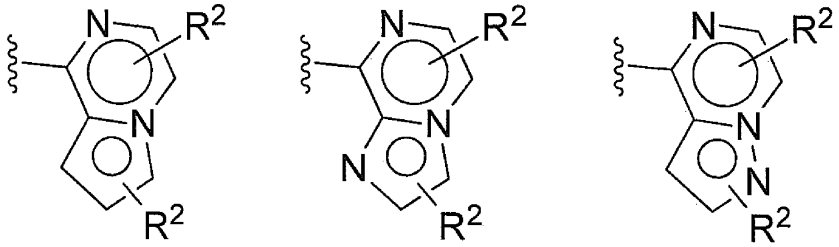
5. The compound of claim **1**, wherein each R^2 is independently selected from the group consisting of H and C_{1-4} alkyl.

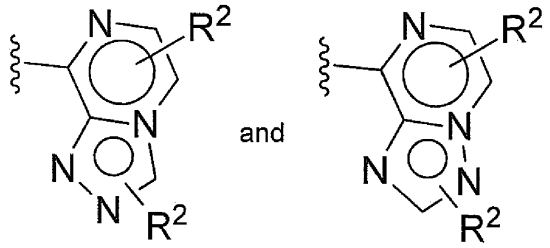
6. The compound of claim **1**, wherein R^3 is selected from the group consisting of H, CH_2OH and $C(O)NH_2$.

7. The compound of claim **1**, having the structure:



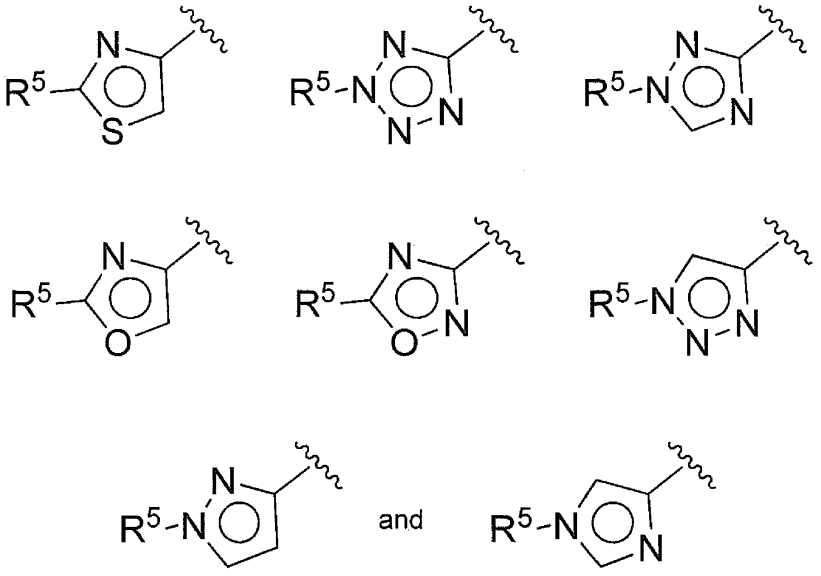
8. The compound of claim **7**, wherein the bicyclic portion having X^a, X^b and X^c as ring vertices is selected from the group consisting of:





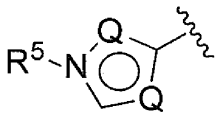
9. A compound of claim **7**, wherein Z is a 5-membered heteroaryl group substituted with one R^5 group selected from an aryl, 5- or 6-membered heteroaryl, C_3-C_8 cycloalkyl, or 3-, 4-, 5-, or 6-membered heterocycloalkyl ring, and optionally with up to two additional R^5 groups which are selected from halogen, C_{1-4} alkyl, C_{1-4} haloalkyl and CH_2CN, wherein the aryl, heteroaryl and heterocyclic portions of R^5 are optionally further substituted with 1-3 R^a.

10. A compound of claim **9**, wherein Z is selected from the group consisting of:



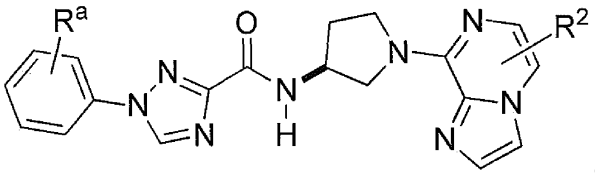
and

11. The compound of claim **7**, wherein Z has the formula:



wherein each Q is independently selected from the group consisting of N, CH, and $C(R^5)$.

12. The compound of claim **1**, having the formula:



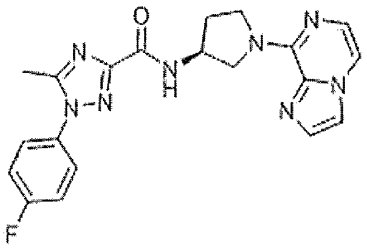
, or a pharmaceutically acceptable salt thereof.

13. The compound of claim **12**, wherein R^a is selected from the group consisting of selected from the group consisting of hydrogen, halogen, cyano, C_{1-8} alkyl and $-SO_2-$ C_{1-8} alkyl.

14. The compound of claim **12**, wherein R^2 is selected from the group consisting of H and C_{1-4} alkyl.

15. The compound of claim **12**, wherein R^a is selected from the group consisting of hydrogen, halogen, cyano, C_{1-8} alkyl and $-SO_2-$ C_{1-8} alkyl; and R^2 is selected from the group consisting of H and C_{1-4} alkyl.

16. The compound of claim **1**, selected from the group consisting of:



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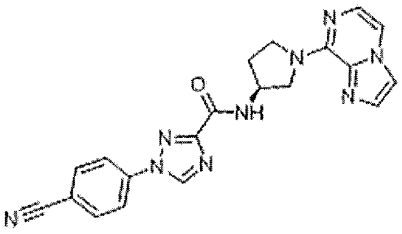

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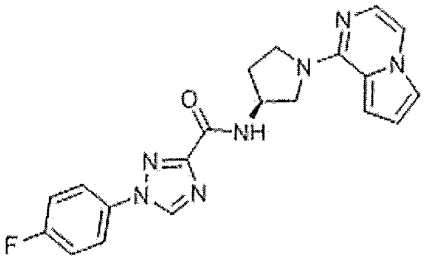

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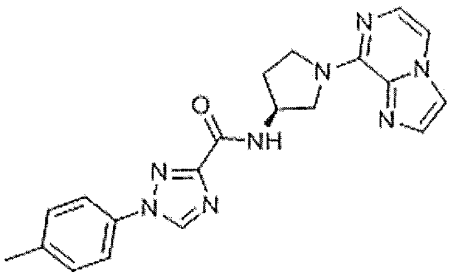

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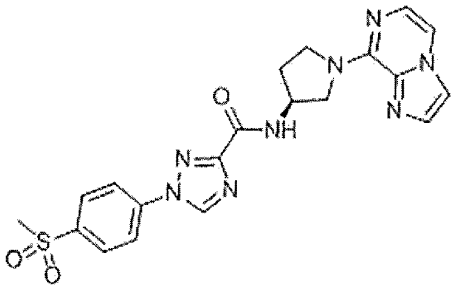

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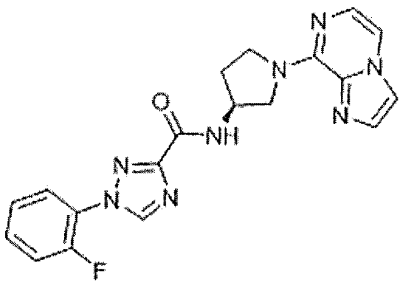

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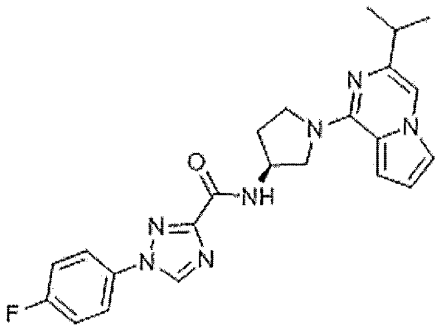

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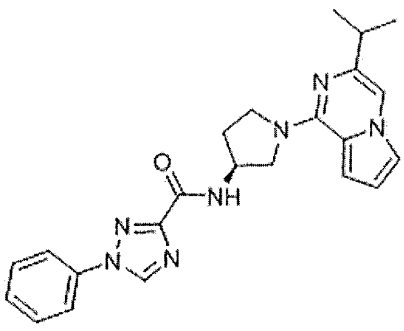

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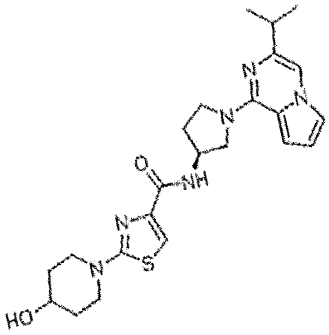

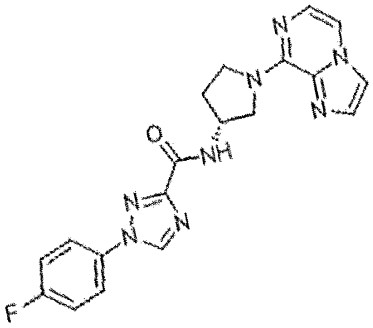

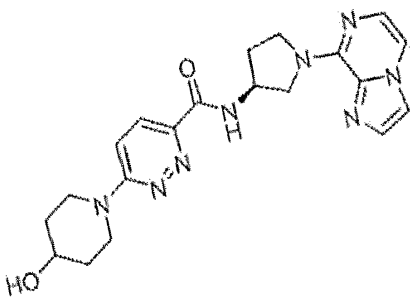

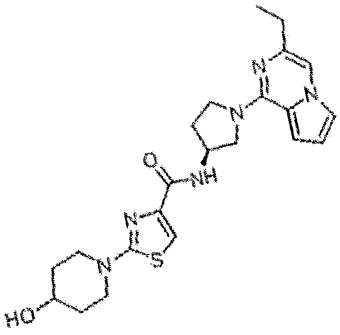

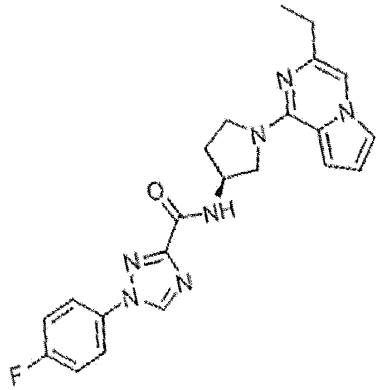

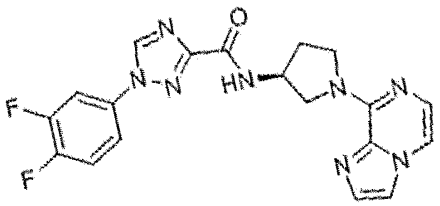

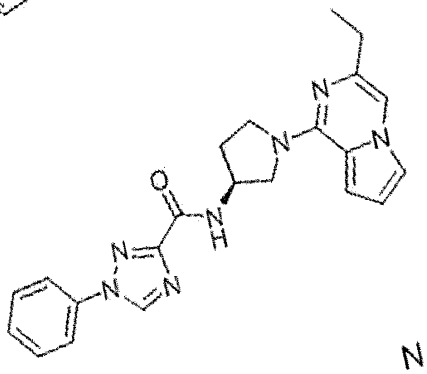

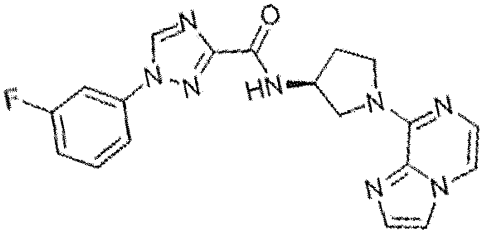

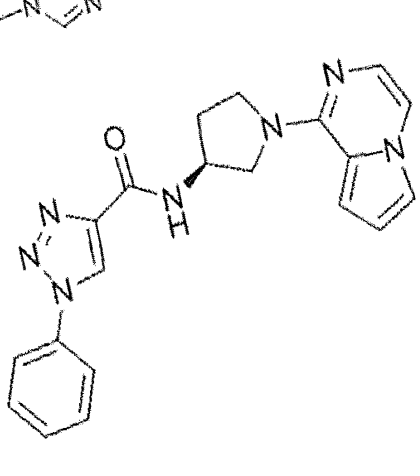

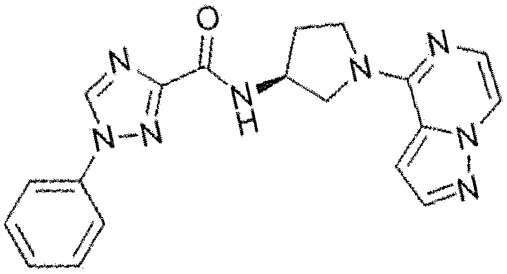

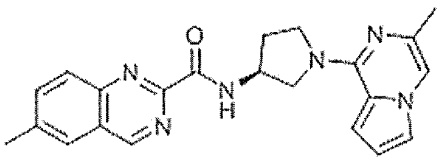

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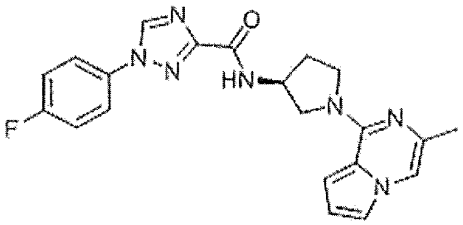

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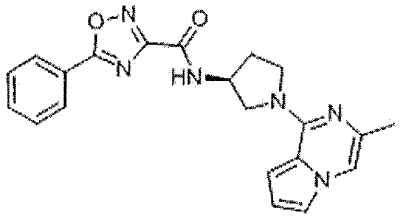

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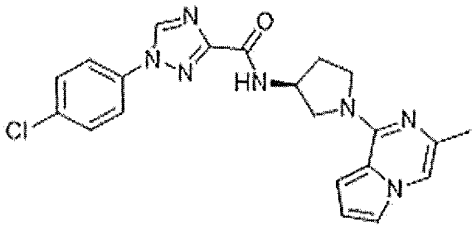

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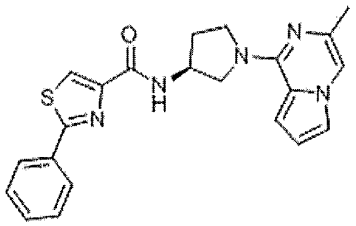

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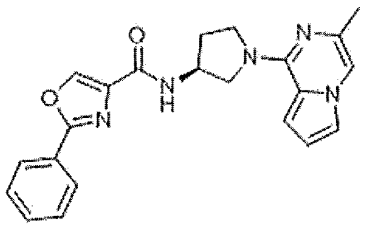

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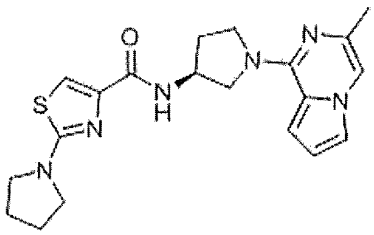

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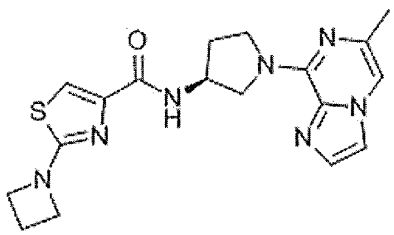

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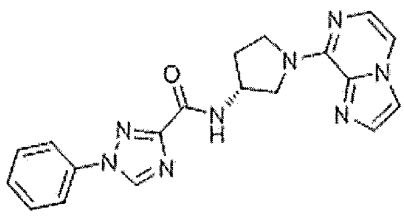

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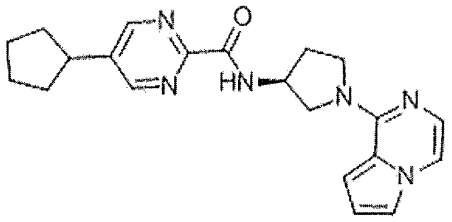

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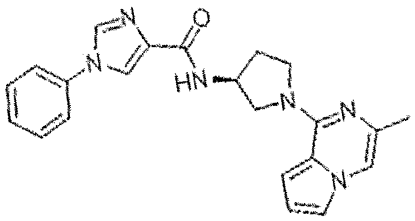

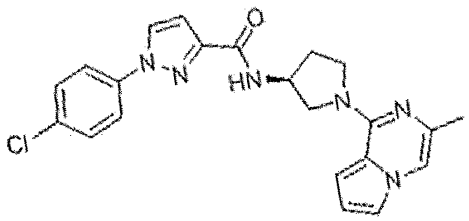

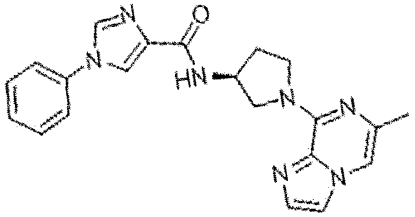

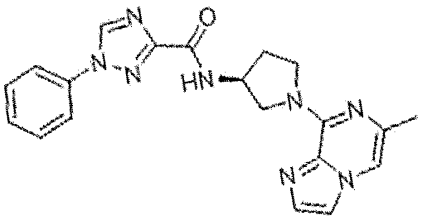

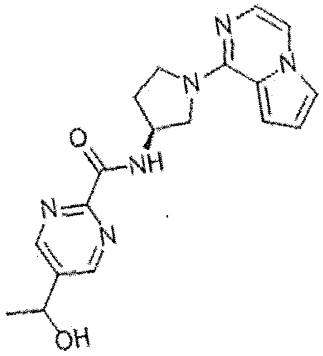

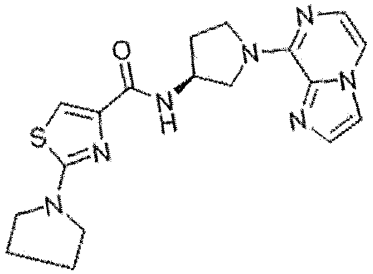

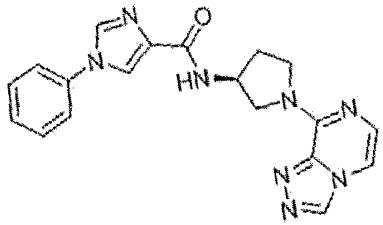

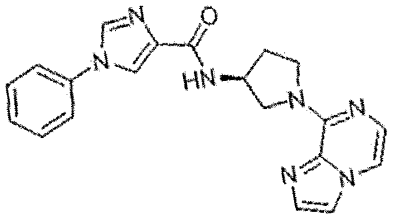

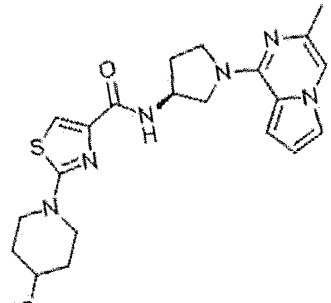

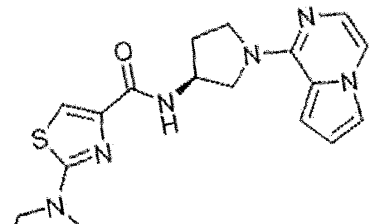

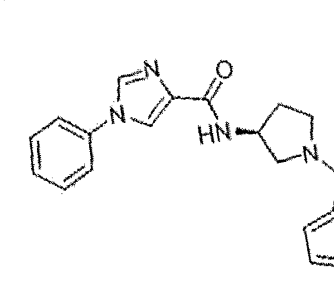

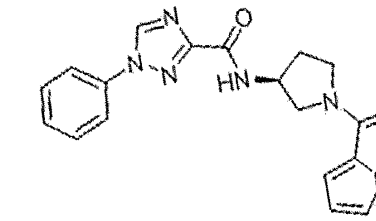

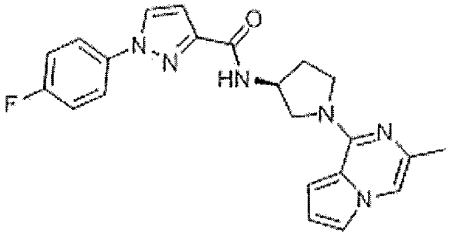

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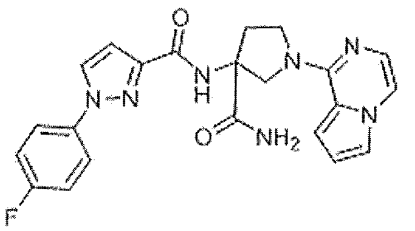

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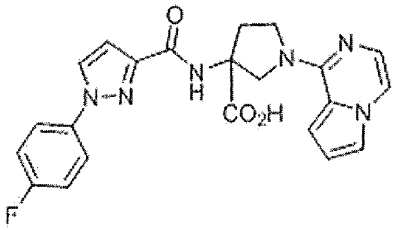

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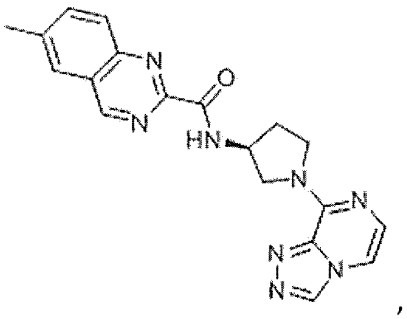

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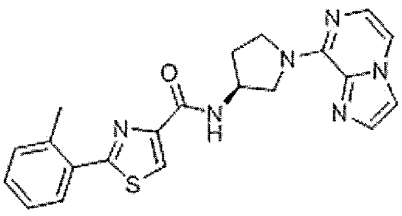

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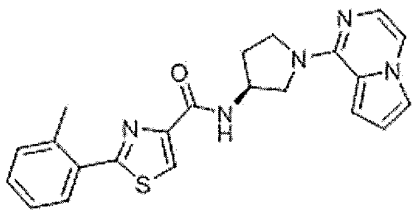

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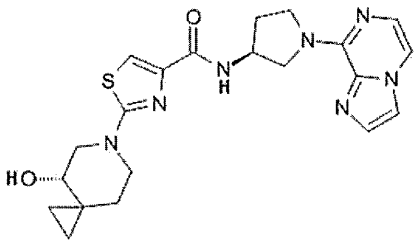

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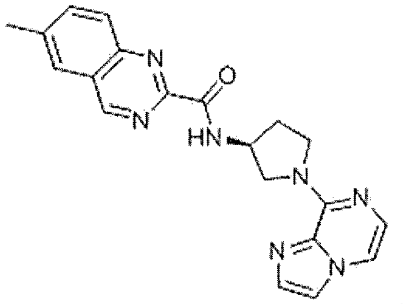

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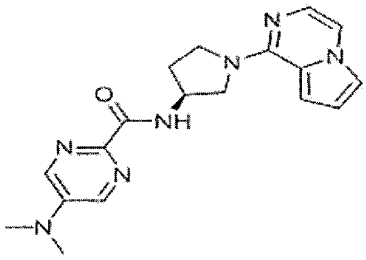

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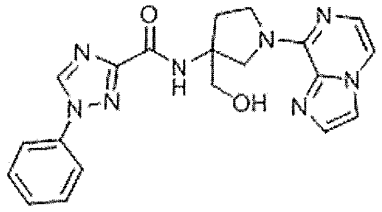

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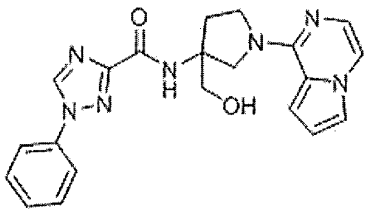

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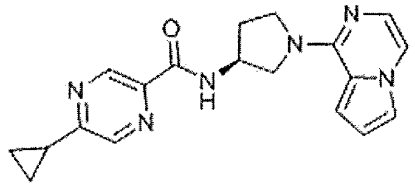

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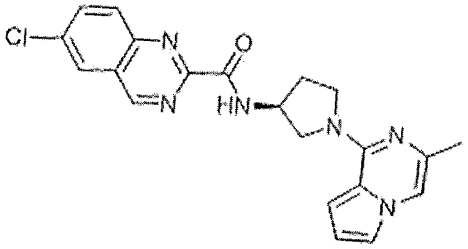

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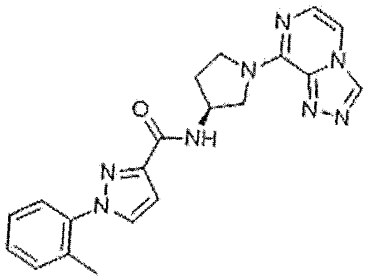

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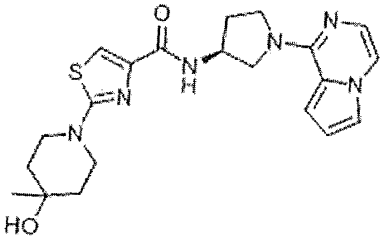

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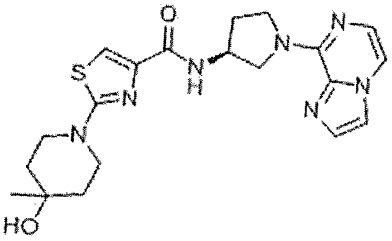

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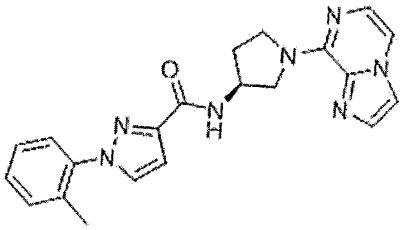

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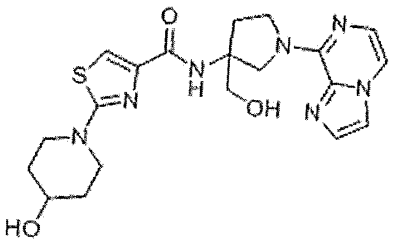

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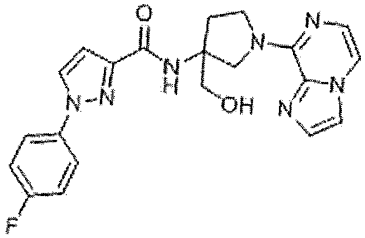

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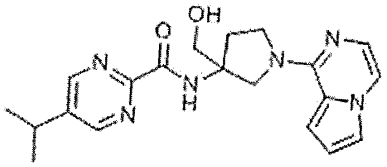

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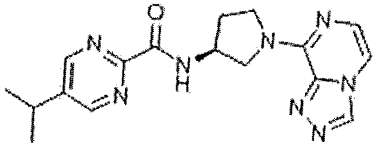

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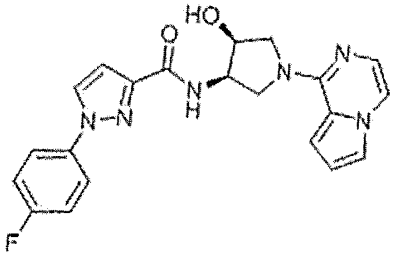

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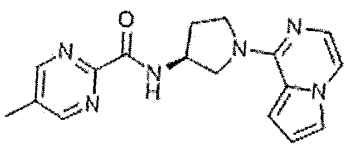

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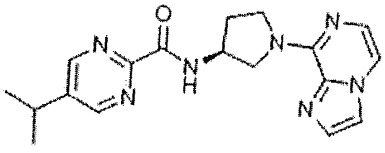

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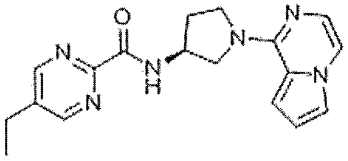

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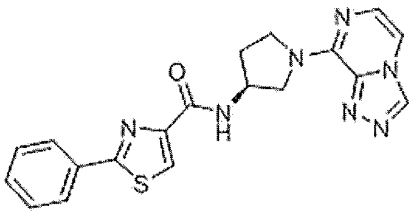

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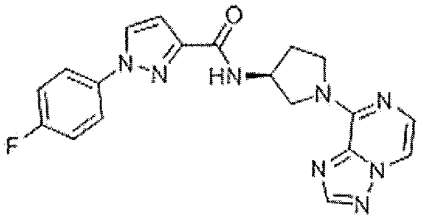

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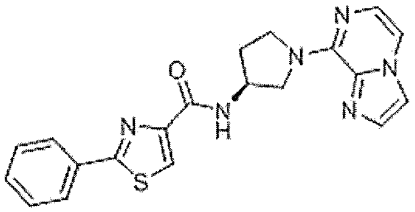

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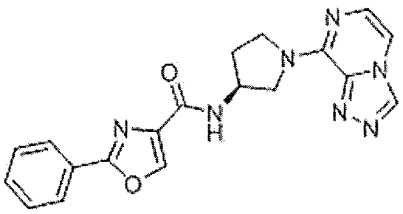

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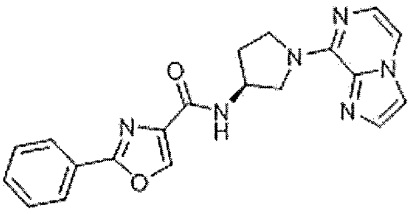

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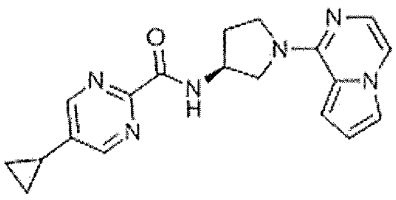

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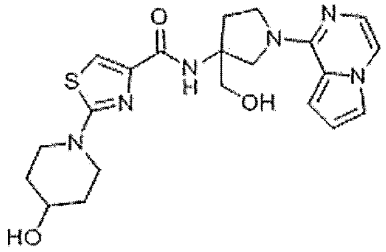

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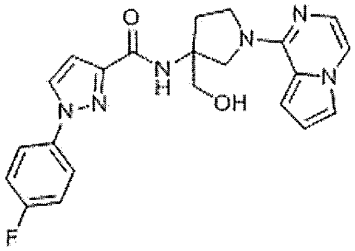

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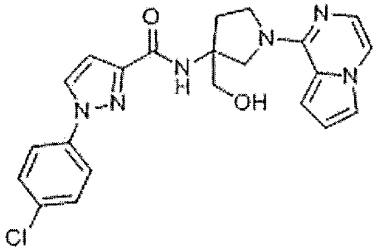

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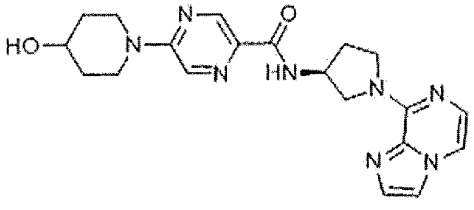

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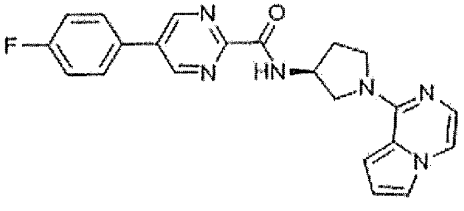

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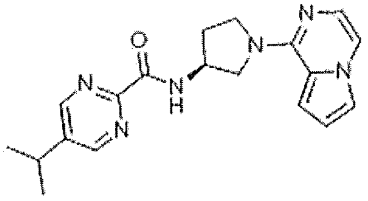

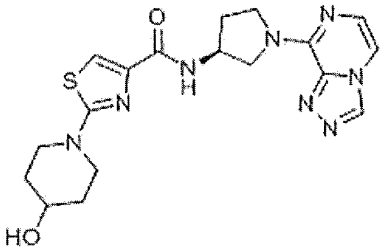

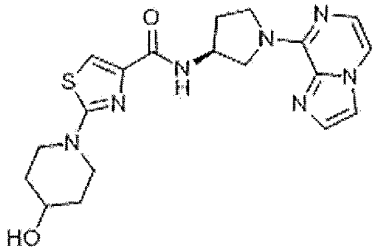

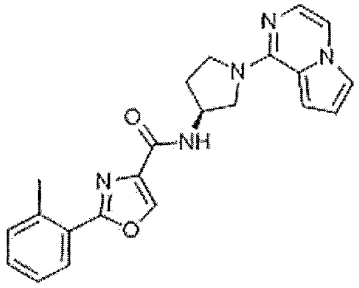

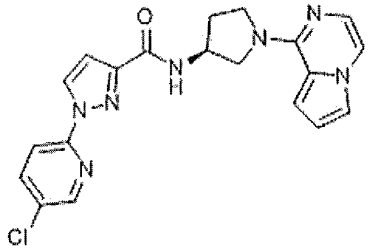

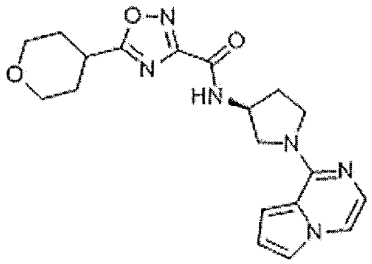

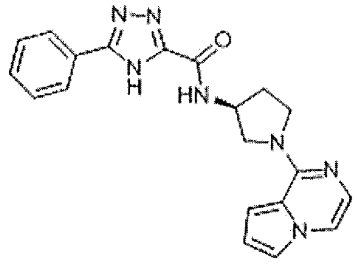

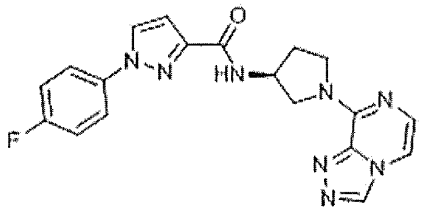

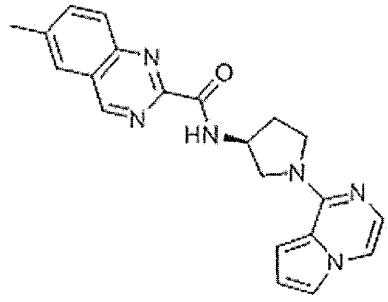

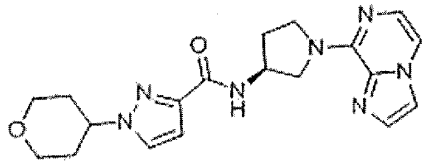

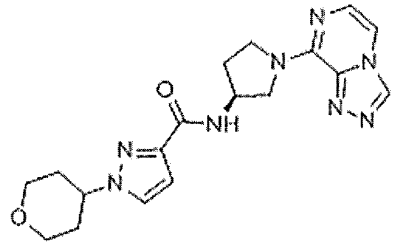

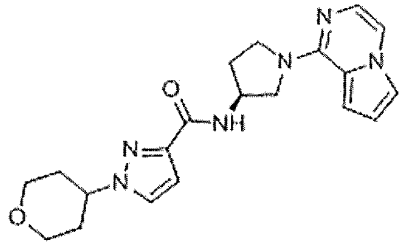

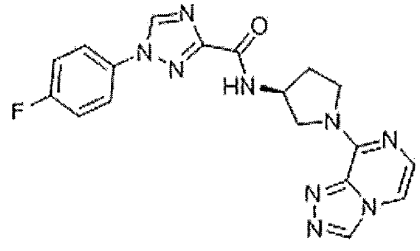

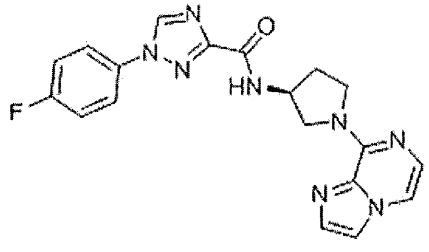

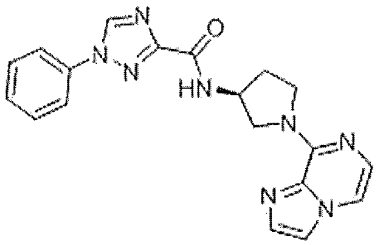

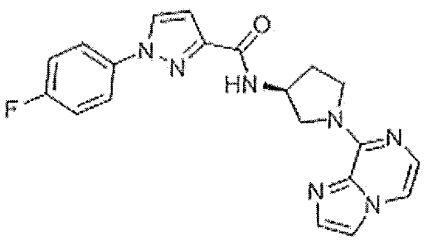

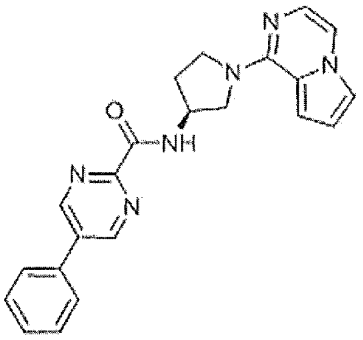

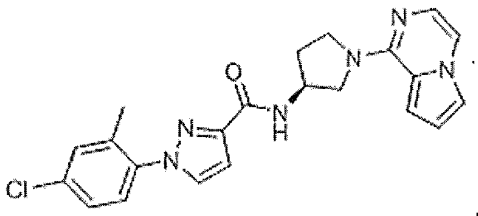

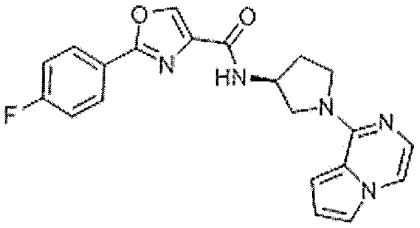

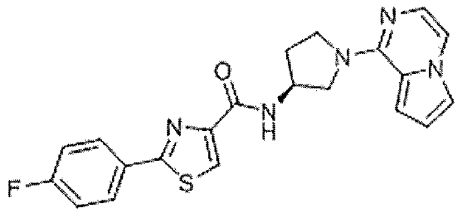

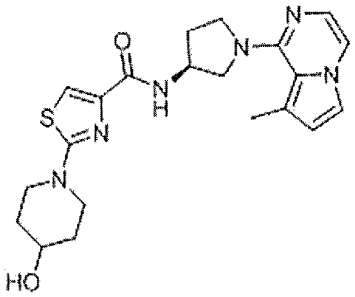

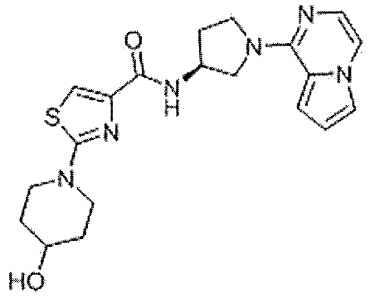

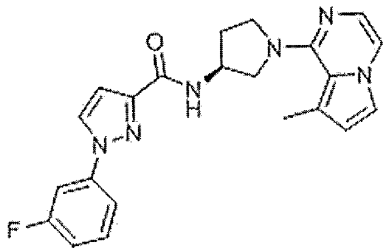

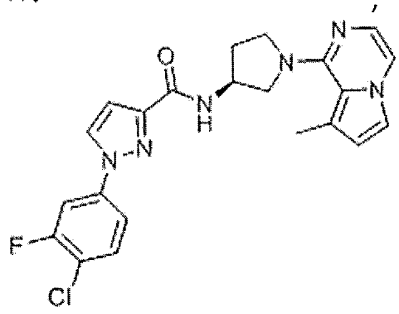

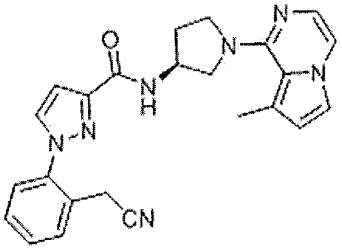

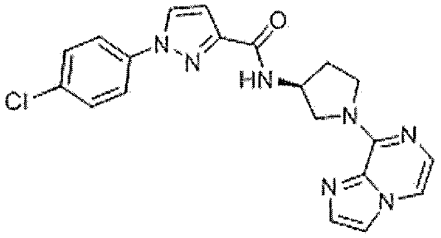

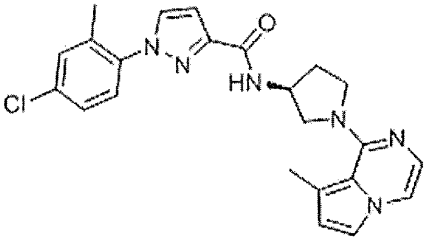

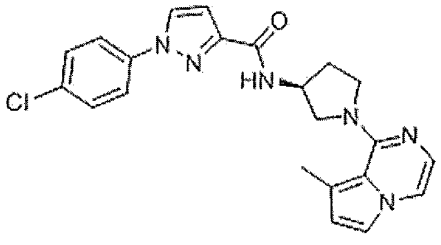

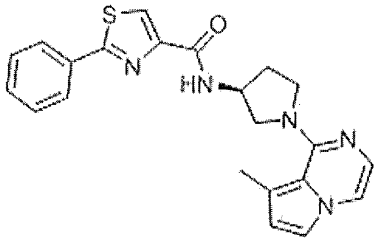

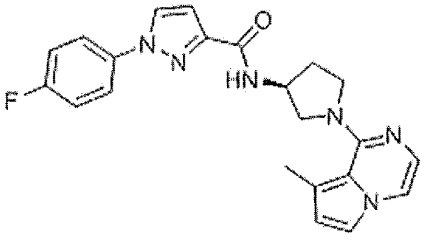

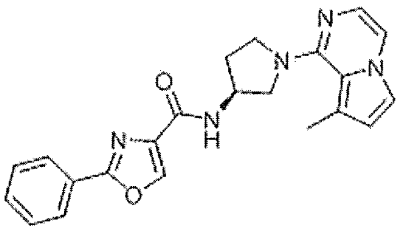

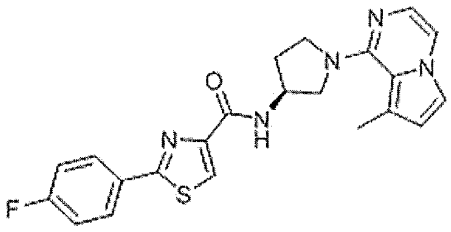

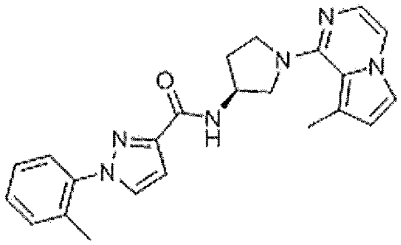

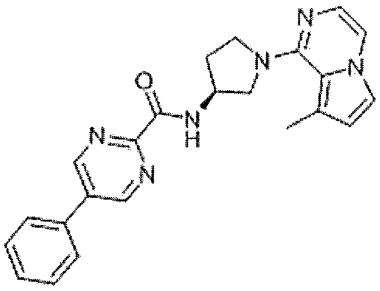

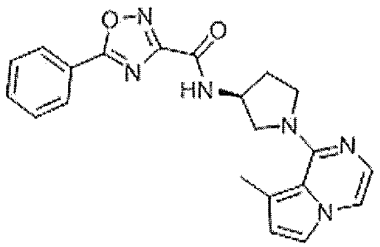

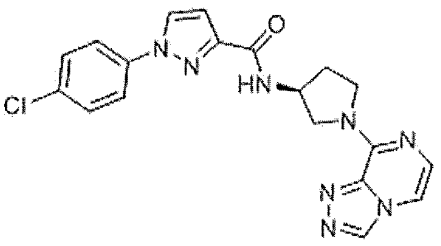

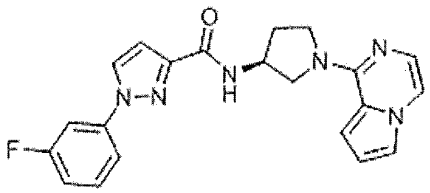

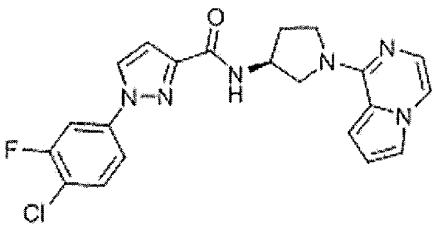

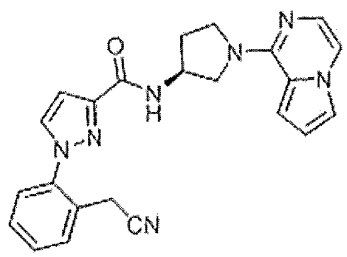

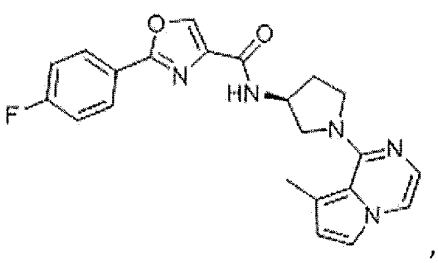

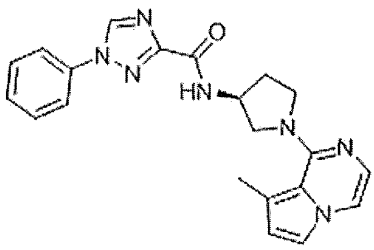

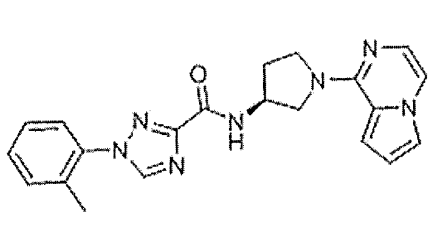

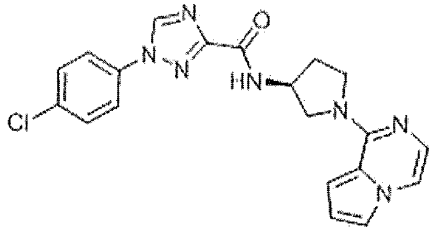
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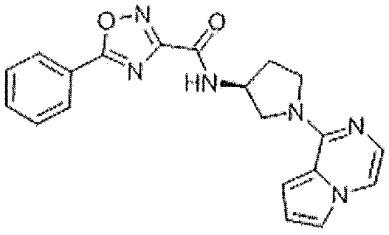
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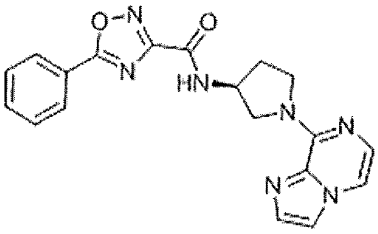
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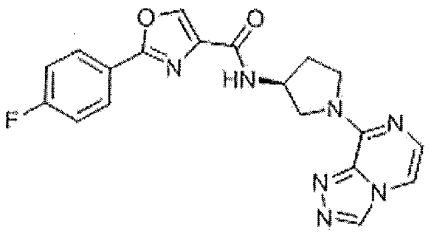
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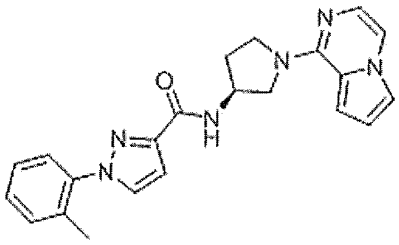
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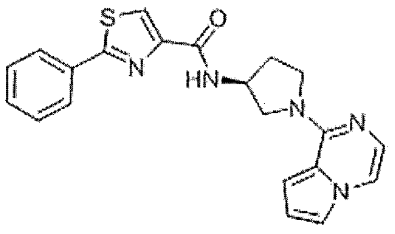
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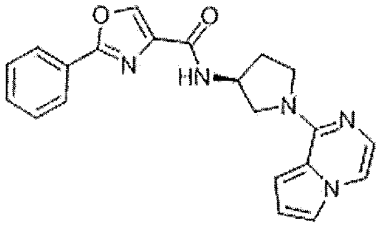
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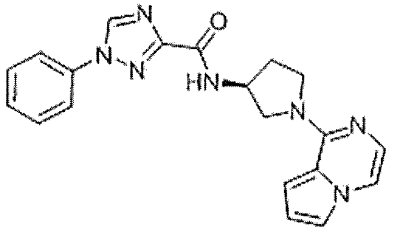
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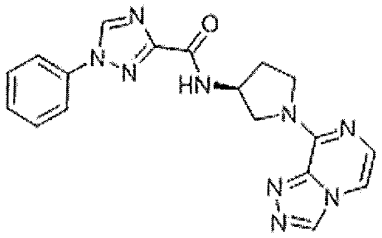
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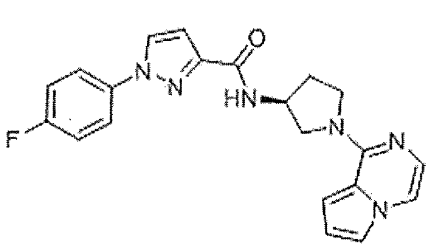
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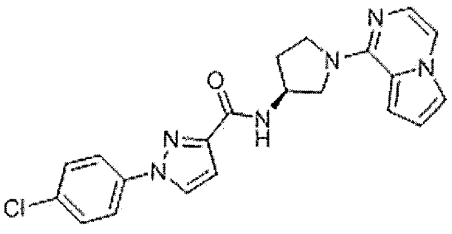
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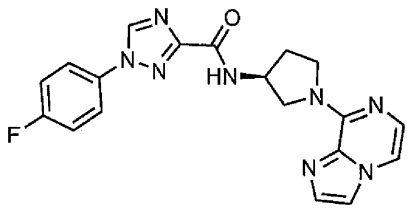
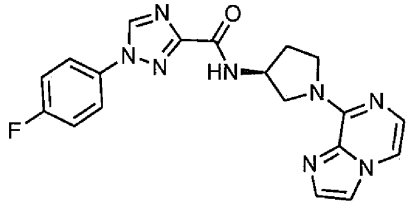
or a pharmaceutically acceptable salt thereof.

17. A compound of claim 1, having the formula:



or a pharmaceutically acceptable salt thereof.

18. A compound of claim 1, having the formula:



19. A pharmaceutical composition comprising a compound of any one of claims **1** to **18** and a pharmaceutically acceptable excipient.

20. A compound of any one of claims **1** to **19** for use in treating a disease or disorder in a mammal.

21. A compound for use according to claim **20**, wherein said disease or disorder is selected from the group consisting of cancer, inflammation and hematopoietic disorders.

22. A compound for use according to claim **21**, wherein said cancer is head and neck cancer.

23. A compound for use according to claim **21**, wherein said cancer is glioblastoma.

24. An *in vitro* method of inhibiting the binding of chemokines I-TAC or SDF-1 to a CXCR7 receptor, comprising contacting a compound of any one of claims **1** to **19** with a cell that expresses the CXCR7 receptor for a time sufficient to inhibit the binding of the chemokines to the CXCR7 receptor.

25. A method for imaging a tumor, organ, or tissue, said method comprising:

detecting a radiolabeled or detectable form of a compound of any one of claims **1** to **19** in a subject who had been administered said compound to determine where said compound is concentrated in said subject.

26. A method in accordance with claim **25**, wherein said compound is radiolabeled.

27. A method for detecting elevated levels of CXCR7 in a sample, said method comprising:

(a) contacting a sample suspected of having elevated levels of CXCR7 with a radiolabeled or detectable form of a compound of any one of claims **1** to **19**;

(b) determining a level of compound that is bound to CXCR7 present in said sample to determine the level of CXCR7 present in said sample; and

(c) comparing the level determined in step (b) with a control sample to determine if elevated levels of CXCR7 are present in said sample.

28. A method in accordance with claim **27**, wherein said compound is radiolabeled.

29. Use of a compound of any one of claims **1** to **19** in the manufacture of a medicament for the treatment of a disease or disorder selected from the group consisting of cancer, inflammation and hematopoietic disorders.