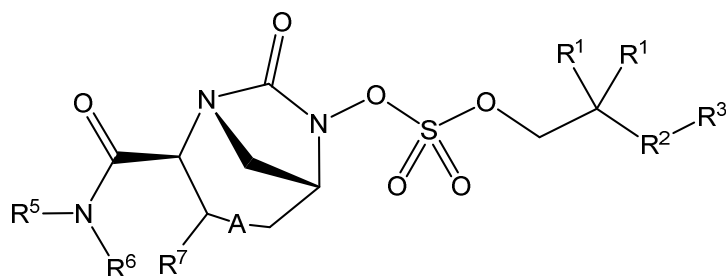


CLAIMS

1. A compound of Formula (1):



(1)

or a pharmaceutically acceptable salt thereof, wherein,

each R^1 is independently selected from C_{1-6} alkyl, or each R^1 and the geminal carbon atom to which they are bonded forms a C_{3-6} cycloalkyl ring, a C_{3-6} heterocycloalkyl ring, a substituted C_{3-6} cycloalkyl ring, or a substituted C_{3-6} heterocycloalkyl ring;

R^2 is selected from a single bond, C_{1-6} alkanediyl, C_{1-6} heteroalkanediyl, C_{5-6} cycloalkanediyl, C_{5-6} heterocycloalkanediyl, C_6 arenediyl, C_{5-6} heteroarenediyl, substituted C_{1-6} alkanediyl, substituted C_{1-6} heteroalkanediyl, substituted C_{5-6} cycloalkanediyl, substituted C_{5-6} heterocycloalkanediyl, substituted C_6 arenediyl, and substituted C_{5-6} heteroarenediyl;

R^3 is selected from C_{1-6} alkyl, $-O-C(O)-R^4$, $-S-C(O)-R^4$, $-NH-C(O)-R^4$, $-O-C(O)-O-R^4$, $-S-C(O)-O-R^4$, $-NH-C(O)-O-R^4$, $-C(O)-O-R^4$, $-C(O)-S-R^4$, $-C(O)-NH-R^4$, $-O-C(O)-O-R^4$, $-O-C(O)-S-R^4$, $-O-C(O)-NH-R^4$, $-S-S-R^4$, $-S-R^4$, $-NH-R^4$, $-CH(-NH_2)(-R^4)$, C_{5-6} heterocycloalkyl, C_{5-6} heteroaryl, substituted C_{5-6} cycloalkyl, substituted C_{5-6} heterocycloalkyl, substituted C_{5-6} aryl, substituted C_{5-6} heteroaryl, and $-CH=C(R^4)_2$, wherein,

R^4 is selected from hydrogen, C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{5-8} cycloalkyl, C_{5-8} heterocycloalkyl, C_{5-10} cycloalkylalkyl, C_{5-10} heterocycloalkylalkyl, C_{6-8} aryl, C_{5-8} heteroaryl, C_{7-10} arylalkyl, C_{5-10} heteroarylalkyl, substituted C_{1-8} alkyl, substituted C_{1-8} heteroalkyl, substituted C_{5-8} cycloalkyl, substituted C_{5-8} heterocycloalkyl, substituted C_{5-10} cycloalkylalkyl, substituted C_{5-10} heterocycloalkylalkyl, substituted C_{6-8} aryl, substituted C_{5-8} heteroaryl, substituted C_{7-10} arylalkyl, and substituted C_{5-10} heteroarylalkyl;

R^5 is selected from hydrogen, C_{1-6} alkyl, C_{5-8} cycloalkyl, C_{6-12} cycloalkylalkyl, C_{2-6} heteroalkyl, C_{5-8} heterocycloalkyl, C_{6-12} heterocycloalkylalkyl, substituted C_{1-6} alkyl, substituted C_{5-8} cycloalkyl, substituted C_{6-12} cycloalkylalkyl, substituted C_{2-6} heteroalkyl, substituted C_{5-8} heterocycloalkyl, and substituted C_{6-12} heterocycloalkylalkyl;

R^6 is selected from hydrogen, C_{1-6} alkyl, C_{5-8} cycloalkyl, C_{6-12} cycloalkylalkyl, C_{2-6} heteroalkyl, C_{5-8} heterocycloalkyl, C_{6-12} heterocycloalkylalkyl, substituted C_{1-6} alkyl, substituted C_{5-8} cycloalkyl, substituted C_{6-12} cycloalkylalkyl, substituted C_{2-6} heteroalkyl, substituted C_{5-8} heterocycloalkyl, and substituted C_{6-12} heterocycloalkylalkyl; and

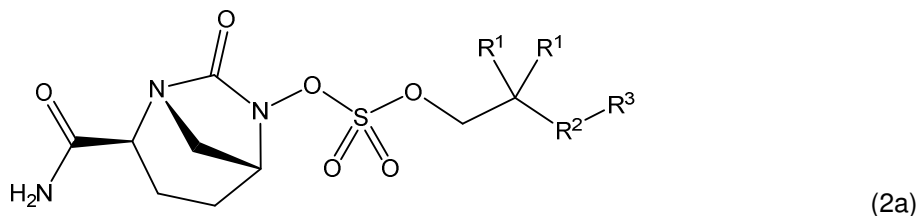
A is a single bond (–) and R^7 is hydrogen, or A is a double bond (=) and R^7 is C_{1-3} alkyl.

2. The compound of claim 1, wherein each R¹ is independently C₁₋₆ alkyl, or each R¹ together with the geminal carbon atom to which they are bonded form a C₅₋₆ cycloalkyl ring, a substituted C₅₋₆ cycloalkyl ring, a C₅₋₆ heterocycloalkyl ring, or a substituted C₅₋₆ heterocycloalkyl ring.

3. The compound of claim 1, wherein R² is independently selected from a single bond, C₁₋₂ alkanediyl, and substituted C₁₋₂ alkanediyl.

4. The compound of claim 1, wherein R³ is -C(O)-O-R⁴, wherein R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, C₅₋₇ cycloalkyl, C₅₋₇ heterocycloalkyl, C₆ aryl, C₇₋₉ arylalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, substituted C₅₋₆ cycloalkyl, substituted C₅₋₆ heterocycloalkyl, substituted C₆ aryl, and C₇₋₉ arylalkyl.

5. The compound of claim 1, wherein the compound has the structure of Formula (2a):



or a pharmaceutically acceptable salt thereof.

6. The compound of claim 5, wherein,
each R¹ is independently selected from C₁₋₃ alkyl, or each R¹ together with the geminal carbon atom to which they are bonded form a C₃₋₆ cycloalkyl ring, a substituted C₃₋₆ cycloalkyl ring, a C₃₋₆ heterocycloalkyl ring, or a substituted C₃₋₆ heterocycloalkyl ring;

R² is a single bond;

R³ is -C(O)-O-R⁴; and

R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, C₇₋₉ arylalkyl, C₅₋₇ heterocycloalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, substituted C₇₋₉ arylalkyl, and substituted C₅₋₇ heterocycloalkyl.

7. The compound of claim 5, wherein the compound is selected from:

3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl benzoate (2);

ethyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (3);

benzyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (4);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl benzoate (6);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl propionate (7);

benzyl 4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl adipate (8);

6-(4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutoxy)-6-oxohexanoic acid (9);

methyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (10);

isopropyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (11);

hexyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (12);

heptyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (13);

tert-butyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (14);

2-methoxyethyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (15);

oxetan-3-yl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (16);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclohexanecarboxylate (17);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclopropanecarboxylate (18);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclobutanecarboxylate (19);

(1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl 1*H*-imidazole-1-sulfonate (34);

ethyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (35);

hexyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (36);

heptyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (37);

2-methoxyethyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (38);

5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,4,4-tetramethylpentyl propionate (39);

5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,4,4-tetramethylpentyl benzoate (40);

5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,4,4-tetramethylpentyl 2,6-dimethylbenzoate (41);

(1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl ((3-methyl-2-oxotetrahydrofuran-3-yl)methyl) sulfate (42);

3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl pivalate (43);

3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl 3-chloro-2,6-dimethoxybenzoate (44);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,3,3-tetramethylbutyl 2,6-dimethylbenzoate (45);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,3,3-tetramethylbutyl benzoate (46);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,3,3-tetramethylbutyl propionate (47);

(1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl ((3-methyl-2-oxotetrahydro-2*H*-pyran-3-yl)methyl) sulfate (48);

2-(3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl)phenyl acetate (49);

2-(3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl)phenyl pivalate (50);

S-(4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl) ethanethioate (51);

S-(5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentyl) ethanethioate (52);

S-(3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl) ethanethioate (53);

3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl 2,6-dimethylbenzoate (54);

3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl adamantane-1-carboxylate (55);

diethyl 2-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)-2-methylmalonate (56);

propyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (57);

butyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (58);

(5-methyl-2-oxo-1,3-dioxol-4-yl)methyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (59);

4-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl pivalate (60);

ethyl 2-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)-2-ethylbutanoate (61);

4-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl 2,6-dimethylbenzoate (62);

4-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl adamantane-1-carboxylate (63);

4-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-3,3-dimethylbutyl 2,6-dimethoxybenzoate (64);

5-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentyl benzoate (65);

5-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentyl 2,6-dimethoxybenzoate (66);

5-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentyl 2,6-dimethylbenzoate (67);

5-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentyl 2-methylbenzoate (68);

4-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,3,3-tetramethylbutyl 3-chloro-2,6-dimethoxybenzoate (69);

2-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)-2-methylpropane-1,3-diyl dibenzoate (70);

2-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)-2-methylpropane-1,3-diyl diacetate (71);

5-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2,4,4-tetramethylpentyl 2,6-dimethoxybenzoate (72);

ethyl 3-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylbutanoate (73);

(1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl ((3,5,5-trimethyl-2-oxotetrahydrofuran-3-yl)methyl) sulfate (74);

a pharmaceutically acceptable salt of any of the foregoing; and

a combination of any of the foregoing.

8. The compound of claim 5, wherein the compound is selected from:

ethyl 3-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (3);

benzyl 3-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (4);

methyl 3-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (10);

isopropyl 3-((((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (11);

hexyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (12);

heptyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (13);

tert-butyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (14);

2-methoxyethyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (15);

oxetan-3-yl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (16);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclohexanecarboxylate (17);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclopropanecarboxylate (18);

ethyl 1-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)methyl)cyclobutanecarboxylate (19);

hexyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (36);

heptyl 5-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-4,4-dimethylpentanoate (37);

(1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl ((3-methyl-2-oxotetrahydrofuran-3-yl)methyl) sulfate (42);

S-(3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropyl) ethanethioate (53);

propyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (57);

butyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (58);

(5-methyl-2-oxo-1,3-dioxol-4-yl)methyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate (59);

a pharmaceutically acceptable salt of any of the foregoing; and

a combination of any of the foregoing.

9. The compound of claim 5, wherein,

each R^1 is independently selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;

R^2 is selected from single bond, methane-diyl, and ethane-diyl; and

R^3 is selected from $-C(O)-O-R^4$ and $-S-C(O)-R^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{5-7} cycloalkyl, C_{5-7} heterocycloalkyl, C_6 aryl, C_{7-9} arylalkyl, substituted C_{1-8} alkyl,

substituted C₁₋₈ heteroalkyl, substituted C₅₋₆ cycloalkyl, substituted C₅₋₆ heterocycloalkyl, substituted C₆ aryl, and C₇₋₉ arylalkyl.

10. The compound of claim 5, wherein,
each R¹ is independently selected from C₁₋₃ alkyl, or each R¹ together with the carbon atom to which they are bonded form a C₃₋₆ cycloalkyl ring;
R² is a single bond; and
R³ is -C(O)-O-R⁴, where R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, C₅₋₇ cycloalkyl, C₅₋₇ heterocycloalkyl, C₆ aryl, C₇₋₉ arylalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, substituted C₅₋₆ cycloalkyl, substituted C₅₋₆ heterocycloalkyl, substituted C₆ aryl, and C₇₋₉ arylalkyl.

11. The compound of claim 5, wherein,
each R¹ is independently selected from C₁₋₃ alkyl, or each R¹ together with the carbon atom to which they are bonded form a C₃₋₆ cycloalkyl ring;
R² is -(CH₂)₂-; and
R³ is -C(O)-O-R⁴ wherein R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, C₅₋₇ cycloalkyl, C₅₋₇ heterocycloalkyl, C₆ aryl, C₇₋₉ arylalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, substituted C₅₋₆ cycloalkyl, substituted C₅₋₆ heterocycloalkyl, substituted C₆ aryl, and C₇₋₉ arylalkyl.

12. The compound of claim 5, wherein,
each R¹ is selected from C₁₋₃ alkyl, or each R¹ together with the carbon atom to which they are bonded form a C₃₋₆ cycloalkyl ring;
R² is -CH₂-; and
R³ is -S-C(O)-R⁴, wherein R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, C₅₋₇ cycloalkyl, C₅₋₇ heterocycloalkyl, C₆ aryl, C₇₋₉ arylalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, substituted C₅₋₆ cycloalkyl, substituted C₅₋₆ heterocycloalkyl, substituted C₆ aryl, and C₇₋₉ arylalkyl.

13. The compound of claim 5, wherein,
each R¹ together with the carbon atom to which they are bonded form a C₃₋₆ cycloalkyl ring, a C₃₋₆ heterocycloalkyl ring, a C₃₋₆ cycloalkyl ring, or a C₃₋₆ heterocycloalkyl ring;
R² is a single bond; and
R³ is C₁₋₃ alkyl.

14. The compound of claim 5, wherein,
each R¹ is independently selected from C₁₋₃ alkyl;
R² is selected from a single bond and methanediyl; and
R³ is selected from -O-C(O)-R⁴ and -C(O)-O-R⁴, wherein R⁴ is selected from C₁₋₈ alkyl and substituted phenyl.

15. The compound of claim 5, wherein,

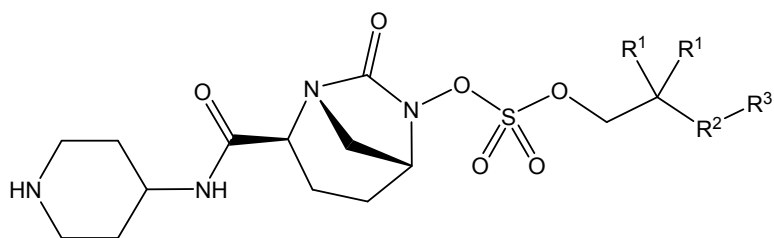
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is a single bond;
 R^3 is $-\text{CH}=\text{C}(\text{R}^4)_2$, wherein each R^4 is $-\text{C}(\text{O})-\text{O}-\text{R}^8$; and
each R^8 is C_{1-4} alkyl.

16. The compound of claim 5, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is selected from a single bond and methanediyl; and
 R^3 is substituted phenyl, wherein the one or more substituents is independently selected from $-\text{CH}_2-\text{O}-\text{C}(\text{O})-\text{R}^4$ and $-\text{O}-\text{C}(\text{O})-\text{R}^4$, wherein R^4 is selected from C_{1-8} alkyl and phenyl.

17. The compound of claim 5, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is selected from $-\text{C}(\text{R}^8)_2-$ and $-\text{CH}_2-\text{C}(\text{R}^8)_2-$, wherein each R^8 is independently selected from C_{1-3} alkyl; and
 R^3 is selected from $-\text{C}(\text{O})-\text{O}-\text{R}^4$ and $-\text{O}-\text{C}(\text{O})-\text{R}^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, substituted C_{1-8} alkyl, substituted C_{1-8} heteroalkyl, and 4(yl-methyl)-5-methyl-1,3-dioxol-2-one.

18. The compound of claim 5, wherein,
each R^1 together with the carbon atom to which they are bonded form a substituted C_{5-6} heterocyclic ring;
 R^2 is a single bond; and
 R^3 is C_{1-3} alkyl.

19. The compound of claim 1, wherein the compound has the structure of Formula (4):



(4)

or a pharmaceutically acceptable salt thereof.

20. The compound of claim 19, wherein,
each R^1 is independently selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;
 R^2 is a single bond; and
 R^3 is $-\text{C}(\text{O})-\text{O}-\text{R}^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{7-10} arylalkyl, C_{5-8} heterocycloalkyl, and substituted C_{5-10} heterocycloalkylalkyl.

$C(O)-NH-R^4$, $-S-S-R^4$, $-S-R^4$, $-NH-R^4$, $-CH(-NH_2)(-R^4)$, C_{5-6} heterocycloalkyl, C_{5-6} heteroaryl, substituted C_{5-6} cycloalkyl, substituted C_{5-6} heterocycloalkyl, substituted C_{5-6} aryl, substituted C_{5-6} heteroaryl, and $-CH=C(R^4)_2$, wherein,

R^4 is selected from hydrogen, C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{5-8} cycloalkyl, C_{5-8} heterocycloalkyl, C_{5-10} cycloalkylalkyl, C_{5-10} heterocycloalkylalkyl, C_{6-8} aryl, C_{5-8} heteroaryl, C_{7-10} arylalkyl, C_{5-10} heteroarylalkyl, substituted C_{1-8} alkyl, substituted C_{1-8} heteroalkyl, substituted C_{5-8} cycloalkyl, substituted C_{5-8} heterocycloalkyl, substituted C_{5-10} cycloalkylalkyl, substituted C_{5-10} heterocycloalkylalkyl, substituted C_{6-8} aryl, substituted C_{5-8} heteroaryl, substituted C_{7-10} arylalkyl, and substituted C_{5-10} heteroarylalkyl.

24. The compound of claim 23, wherein each R^1 is independently selected from C_{1-2} alkyl.

25. The compound of claim 23, wherein R^2 is selected from a single bond, C_{1-6} alkanediyl, C_{5-6} cycloalkanediyl, and C_6 arenediyl.

26. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is a single bond;
 R^3 is $-C(O)-O-R^4$; and
 R^4 is selected from C_{1-10} alkyl and substituted phenyl.

27. The compound of claim 1, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is a single bond;
 R^3 is $-C(O)-O-R^4$; and
 R^4 is selected from C_{1-3} alkyl.

28. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;
 R^2 is selected from single bond, methane-diyl, and ethane-diyl; and
 R^3 is selected from $-C(O)-O-R^4$ and $-S-C(O)-R^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{7-10} arylalkyl, C_{5-8} heterocycloalkyl, and substituted C_{5-10} heterocycloalkylalkyl.

29. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;
 R^2 is a single bond; and

R^3 is $-C(O)-O-R^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{7-10} arylalkyl, C_{5-8} heterocycloalkyl, and substituted C_{5-10} heterocycloalkylalkyl.

30. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;

R^2 is $-(CH_2)_2-$; and

R^3 is $-C(O)-O-R^4$ wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{7-10} arylalkyl, C_{5-8} heterocycloalkyl, and substituted C_{5-10} heterocycloalkylalkyl.

31. The compound of claim 23, wherein,
each R^1 is selected from C_{1-3} alkyl, or each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring;

R^2 is $-CH_2-$; and

R^3 is $-S-C(O)-R^4$, wherein R^4 is selected from C_{1-8} alkyl, C_{1-8} heteroalkyl, C_{7-10} arylalkyl, C_{5-8} heterocycloalkyl, and substituted C_{5-10} heterocycloalkylalkyl.

32. The compound of claim 23, wherein,
each R^1 together with the carbon atom to which they are bonded form a C_{3-6} cycloalkyl ring, a C_{3-6} heterocycloalkyl ring, a C_{3-6} cycloalkyl ring, or a C_{3-6} heterocycloalkyl ring;

R^2 is a single bond; and

R^3 is C_{1-3} alkyl.

33. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is selected from a single bond and methanediyl; and
 R^3 is selected from $-O-C(O)-R^4$ and $-C(O)-O-R^4$, wherein R^4 is selected from C_{1-8} ~~C_{4-10}~~ alkyl and substituted phenyl.

34. The compound of claim 23, wherein,

each R^1 is independently selected from C_{1-3} alkyl;

R^2 is a single bond; and

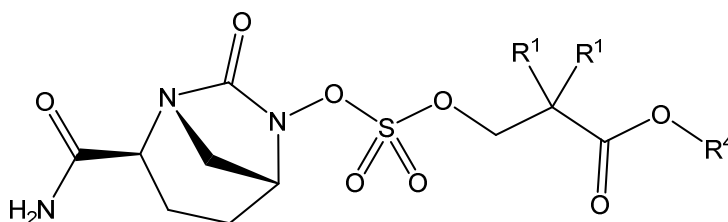
R^3 is $-CH=C(R^4)_2$, wherein each R^4 is $-C(O)-O-R^8$; and
each R^8 is C_{1-4} alkyl.

35. The compound of claim 23, wherein,
each R^1 is independently selected from C_{1-3} alkyl;
 R^2 is selected from a single bond and methanediyl; and
 R^3 is substituted phenyl, wherein the one or more substituents is independently selected from $-CH_2-O-C(O)-R^4$ and $-O-C(O)-R^4$, wherein R^4 is selected from C_{1-8} alkyl and phenyl.

36. The compound of claim 23, wherein,
 each R¹ is independently selected from C₁₋₃ alkyl;
 R² is selected from -C(R⁸)₂- and -CH₂-C(R⁸)₂-, wherein each R⁸ is independently selected from C₁₋₃ alkyl; and
 R³ is selected from -C(O)-O-R⁴ and -O-C(O)-R⁴, wherein R⁴ is selected from C₁₋₈ alkyl, C₁₋₈ heteroalkyl, substituted C₁₋₈ alkyl, substituted C₁₋₈ heteroalkyl, and 4(yl-methyl)-5-methyl-1,3-dioxol-2-one.

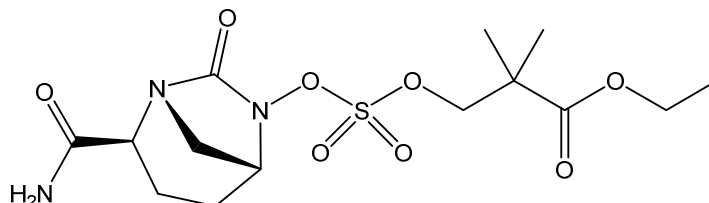
37. The compound of claim 23, wherein,
 each R¹ together with the carbon atom to which they are bonded form a substituted C₅₋₆ heterocyclic ring;
 R² is a single bond; and
 R³ is C₁₋₃ alkyl.

38. The compound of claim 1, having a formula:



or a pharmaceutically acceptable salt thereof, wherein,
 each R¹ can be independently selected from C₁₋₃ alkyl;
 R⁴ can be selected from C₁₋₁₀ alkyl and substituted phenyl.

39. The compound of claim 1, which is ethyl 3-((((1*R*,2*S*,5*R*)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]octan-6-yl)oxy)sulfonyl)oxy)-2,2-dimethylpropanoate):



or a pharmaceutically acceptable salt thereof.

40. A pharmaceutical composition comprising the compound of any one of claims 1 to 39 and a pharmaceutically acceptable vehicle.

41. The pharmaceutical composition of claim 40, further comprising an antibiotic.

42. The pharmaceutical composition of claim 41, wherein the antibiotic comprises a β -lactam antibiotic.

43. The pharmaceutical composition of any one of claims 40 to 42, wherein the pharmaceutical composition is an oral dosage formulation.

44. The pharmaceutical composition of any one of claims 40 to 43, wherein the pharmaceutical composition is an oral dosage form.

45. Use of a compound of any one of claims 1 to 39 or a pharmaceutically acceptable salt thereof in the manufacture of a medicament for the treatment of a bacterial infection.

46. Use according to claim 45 wherein the medicament is for coadministration with a therapeutically effective amount of a β -lactam antibiotic, and wherein the bacteria causing the bacterial infection produces a β -lactamase.

47. Use according to claim 46, wherein the bacterial infection is capable of being treated with a therapeutically effective amount of the β -lactam antibiotic when co-administered with a therapeutically effective amount of avibactam, relebactam, or nacubactam.

48. Use according to any one of claims 45 to 47, wherein the medicament is an oral formulation.