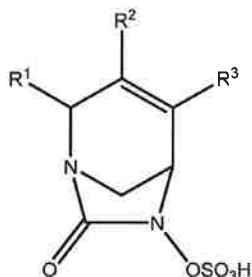


5 Claims

1. A compound according to formula (Ia):



10 or a pharmaceutically acceptable salt thereof, wherein:

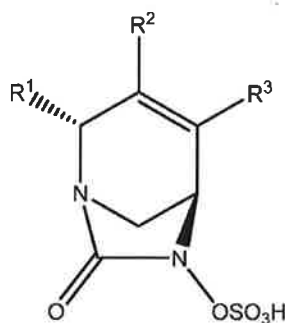
R^1 is $-\text{CONR}'\text{R}''$, $-\text{CN}$, or $\text{C}_1\text{-C}_3$ alkyl, wherein each alkyl is optionally substituted with $\text{C}_1\text{-C}_3$ alkoxy, $-\text{OH}$, $-\text{CN}$, $-\text{NR}'\text{R}''$, or $-\text{CONR}'\text{R}''$;

R^2 and R^3 are independently selected from H, halo, $-\text{CN}$, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_2\text{-C}_6$ alkenyl, $\text{C}_2\text{-C}_6$ alkynyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_6$ alkoxy, $-\text{CONR}'\text{R}''$, or $\text{C}(\text{O})_2\text{R}'$; wherein the alkyl, alkenyl, cycloalkyl, and alkoxy represented by R^2 or R^3 are independently and optionally substituted by one or more halo, $-\text{CN}$, $-\text{OH}$, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_1\text{-C}_3$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ haloalkoxy, $-\text{NR}'\text{R}''$, 5-7 membered heterocycle, $-\text{C}(\text{O})\text{NR}'\text{R}''$ or $-\text{NR}'\text{C}(\text{O})\text{R}''$; and

each R' and R'' are independently selected from hydrogen, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, phenyl, 5 to 6 membered heterocyclyl or a 5 to 6 membered heteroaryl; wherein each alkyl, cycloalkyl, phenyl, heterocyclyl and heteroaryl is optionally and independently substituted with one or more halo, $-\text{CN}$, $-\text{OH}$, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_1\text{-C}_3$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ haloalkoxy, $-\text{C}(\text{O})(\text{C}_1\text{-C}_6 \text{ alkyl})$, $-\text{C}(\text{O})(\text{C}_1\text{-C}_6 \text{ alkoxy})$, $-\text{NH}_2$, $-\text{NH}(\text{C}_1\text{-C}_3 \text{ alkyl})$, $-\text{N}(\text{C}_1\text{-C}_3 \text{ alkyl})_2$, a 5-7 membered heterocyclyl or a 5-7 membered heteroaryl;

provided that R^2 and R^3 are not both hydrogen; and when R^1 is $-\text{C}(\text{O})\text{NR}'\text{R}''$, then
neither of R^2 or R^3 is $-\text{C}(\text{O})\text{NR}'\text{R}''$.

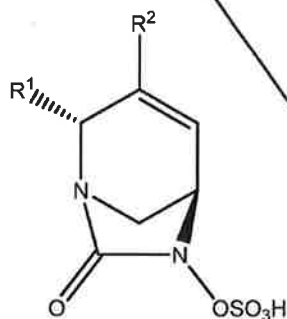
2. The compound of Claim 1, according to formula (III):



or a pharmaceutically acceptable salt thereof.

3. The compound of any of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R² and R³ are independently selected from the group consisting of H, C₁-C₃ alkyl, C₃-C₆ cycloalkyl, and -CONR'R'', wherein the alkyl and cycloalkyl represented by R² and/or R³ are independently and optionally substituted by one or more group selected from halo, -CN, -OH, C₁-C₃ alkyl, C₁-C₃ haloalkyl, C₁-C₃ alkoxy, C₁-C₃ haloalkoxy, -NR'R'', a siderophore, -C(O)NR'R'' and -NR'C(O)R''.

4. The compound of claim 1, according to formula (V):



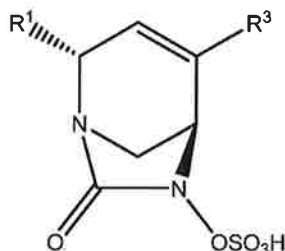
or a pharmaceutically acceptable salt thereof.

5. The compound of claim 4, or a pharmaceutically acceptable salt thereof, wherein R² is methyl, ethyl, isopropyl, or cyclopropyl, wherein each R² is optionally and independently substituted with one or more group selected from -OH and C₁-C₃ alkoxy.

6. The compound of claim 5, or a pharmaceutically acceptable salt thereof, wherein R² is

5 methyl.

7. The compound of any of the preceding claims, according to formula (IV):



or a pharmaceutically acceptable salt thereof.

10

8. The compound of claim 7, or a pharmaceutically acceptable salt thereof, wherein R^3 is C_1 - C_3 alkyl, C_2 - C_6 alkenyl, C_3 - C_6 cycloalkyl, or $-\text{CONR}'\text{R}''$, each of which is optionally and independently substituted with one or more substituent selected from the group consisting of halo, $-\text{CN}$, $-\text{OH}$, C_1 - C_3 alkyl, cyclopropyl, C_1 - C_3 haloalkyl, C_1 - C_3 alkoxy, C_1 - C_3 haloalkoxy, $-\text{NR}'\text{R}''$, a siderophore, $-\text{C}(\text{O})\text{NR}'\text{R}''$ and $-\text{NR}'\text{C}(\text{O})\text{R}''$; and
15 each R' and R'' is independently selected from H and C_1 - C_3 alkyl.

9. The compound of claim 7 or 8, or a pharmaceutically acceptable salt thereof, wherein R^3 is methyl, ethyl, isopropyl, cyclopropyl, $-\text{CONH}_2$, $-\text{CONH}(C_1-C_3 \text{ alkyl})$, or $-\text{CON}(C_1-C_3 \text{ alkyl})_2$, each of which is optionally and independently substituted with one or more group selected from $-\text{OH}$, C_1 - C_3 alkyl, C_1 - C_3 alkoxy, $-\text{NR}'\text{R}''$, $\text{C}(\text{O})\text{NR}'\text{R}''$ and $-\text{NR}'\text{C}(\text{O})\text{R}''$; and
20 each R' and R'' is independently selected from H and C_1 - C_3 alkyl.

10. The compound of any of claims 7-9, or pharmaceutically acceptable salt thereof, wherein
25 R^3 is C_1 - C_3 alkyl, cyclopropyl, $-\text{CONR}'\text{R}''$, wherein each alkyl, and cyclopropyl is optionally and independently substituted with one or more $-\text{OH}$, C_1 - C_3 alkoxy, $-\text{NH}_2$, or $-\text{NHC}(\text{O})(C_1-C_3 \text{ alkyl})$; and
each R' and R'' are independently selected from H, C_1 - C_3 alkyl, and 5-6 membered heterocyclyl, wherein each alkyl and heterocyclyl represented by R' or R'' is optionally and

5 independently substituted with one or more -OH, C₁-C₃ alkyl, or C₁-C₃ alkoxy.

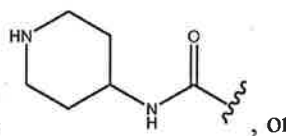
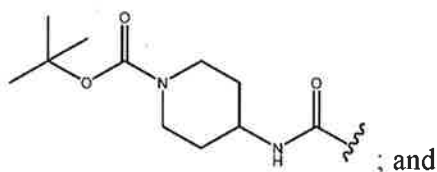
11. The compound of any of claims 7-10, or pharmaceutically acceptable salt thereof, wherein R³ is methyl, -CH₂OCH₃, or -CONH₂.

10 12. The compound of any of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R¹ is -CONR'R'', -CN, or C₁-C₃ alkyl, wherein each alkyl is optionally substituted with C₁-C₃ alkoxy or -OH; and

the R' and R'' of R¹ are independently selected from the group consisting of H, C₁-C₃ alkyl, or a 5-7 membered heterocyclyl, wherein each alkyl and heterocyclyl of R' and R'' is
15 optionally and independently substituted with one or more -OH, C₁-C₃ alkyl, C₁-C₃ alkoxy, -NH₂, -NH(C₁-C₃ alkyl), -N(C₁-C₃ alkyl)₂, or a 5-7 membered heterocyclyl.

13. The compound of any one of the preceding claims, or pharmaceutically acceptable salt thereof, wherein

20 R¹ is -CH₂OCH₃, -CONH(CH₂)-siderophore, -CONH₂,



 represents the point of attachment to the bridged bicyclic core.

25 14. The compound of any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R¹ is -CH₂OCH₃ or -CONH₂.

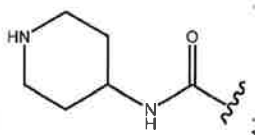
15. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein.

5

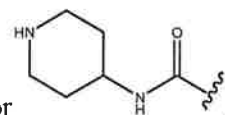
R^1 is $-\text{CH}_2\text{OCH}_3$; $-\text{CONH}_2$, or

R^2 is $-\text{H}$ or $-\text{CH}_3$; and

R^3 is $-\text{H}$, $-\text{CH}_3$, or $-\text{CONH}_2$;

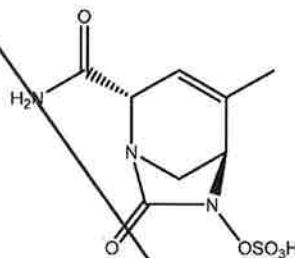


provided that R^2 and R^3 are not both H; and when R^1 is $-\text{CONH}_2$, or
then R^3 is not $-\text{CONH}_2$.



10

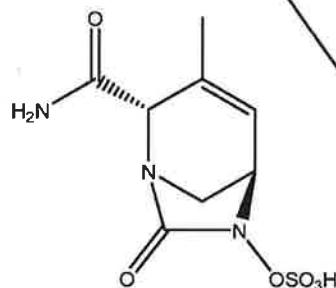
16. The compound:



or a pharmaceutically acceptable salt thereof.

15

17. The compound:



or a pharmaceutically acceptable salt thereof.

18. A compound of claim 1, selected from the group consisting of:

20

(2S,5R)-2-carbamoyl-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;

(2S,5R)-2-cyano-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;

- 5 (2S,5R)-4-methyl-7-oxo-2-(piperidinium-4-ylcarbamoyl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate;
(2S,5R)-2-carbamoyl-4-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;
(2S,5R)-2-cyano-4-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate
10 sodium salt;
(2S,5R)-2-(2-aminoethylcarbamoyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate;
(2S,5R)-2-(methoxymethyl)-7-oxo-4-(prop-1-en-2-yl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;
15 (2S,5R)-2-((5-hydroxy-4-oxo-1,4-dihydropyridin-2-yl)methylcarbamoyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;
(2S,5R)-2-carbamoyl-4-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;
(2S,5R)-2-carbamoyl-3-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium
20 sulfate;
(2S,5R)-2-carbamoyl-3-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;
(2S,5R)-4-carbamoyl-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate, monosodium salt;
25 (2S,5R)-2,4-bis(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate Sodium salt;
(2S,5R)-2-(1-(tert-butoxycarbonyl)piperidin-4-ylcarbamoyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate sodium salt;
(2S,5R)-4-(dimethylcarbamoyl)-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate sodium salt;
30 (2S,5R)-2-(hydroxymethyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate Sodium Salt;
(2S,5R)-3-methyl-7-oxo-2-(piperidin-1-ium-4-ylcarbamoyl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate;
35 (2S,5R)-2-carbamoyl-3-(hydroxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl

- 5 hydrogen sulfate sodium salt;
(2S,5R)-4-(2-amino-2-oxoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl
hydrogen sulfate sodium salt;
(2S,5R)-4-carbamoyl-2-(hydroxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl
hydrogen sulfate sodium salt;
10 (2S,5R)-2-carbamoyl-3,4-dimethyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen
sulfate sodium salt;
(2S,5R)-2-carbamoyl-3-ethyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen
sulfate sodium salt;
(2S,5R)-4-(2-aminoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl
15 hydrogen sulfate;
(2S,5R)-2-carbamoyl-3-cyclopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen
sulfate sodium salt;
(2S,5R)-4-(2-acetamidoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl
sulfate sodium salt;
20 (2S,5R)-2-(methoxymethyl)-4-(methylcarbamoyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-
6-yl hydrogen sulfate sodium salt;
(2S,5R)-2-carbamoyl-4-cyclopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen
sulfate sodium salt;
(2S,5R)-3-(2-methoxyethyl)-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-
25 6-yl hydrogen sulfate sodium salt; and
(2S,5R)-2-(((1,5-dihydroxy-4-oxo-1,4-dihydropyridin-2-yl)methyl)carbamoyl)-4-methyl-
7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl hydrogen sulfate sodium salt;
or a pharmaceutically acceptable salt thereof.

30 19. A pharmaceutical composition comprising a compound of any one of Formulae (I)-(IV),
or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 18, and at least
one pharmaceutically acceptable carrier, diluent, or excipient.

20. A compound of any one of Formulae (I)-(IV), or a pharmaceutically acceptable salt
35 thereof, as claimed in any one of claims 1 to 18, for use as a medicament.

5

21. The use of a compound of any of Formulae (I)-(IV), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 18, in the manufacture of a medicament for use in the treatment of a bacterial infection in a warm-blooded animal such as man.

10

22. A method for treating a bacterial infection in a warm-blooded animal such as man, said method comprising administering to said animal an effective amount of a compound of any of Formulae (I)-(IV), as claimed in any one of claims 1 to 18, or a pharmaceutically acceptable salt thereof.

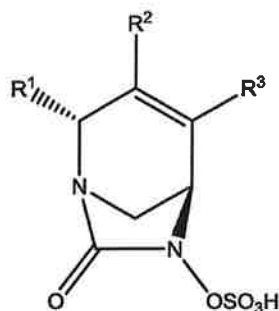
15

23. A compound of any of Formulae (I)-(IV), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 18, for use in treating a bacterial infection in a warm-blooded animal, such as man.

20

The claims defining the invention are as follows:

1. A compound according to formula (III):



or a pharmaceutically acceptable salt thereof, wherein:

R^1 is $-\text{CONR}'\text{R}''$, $-\text{CN}$, or $\text{C}_1\text{-C}_3$ alkyl, wherein each alkyl is substituted with $\text{C}_1\text{-C}_3$ alkoxy or $-\text{OH}^2$;

R^2 and R^3 are independently selected from H, halo, $-\text{CN}$, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_2\text{-C}_6$ alkenyl, $\text{C}_2\text{-C}_6$ alkynyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_6$ alkoxy, $-\text{CONR}'\text{R}''$, or $\text{C}(\text{O})_2\text{R}'$; wherein the alkyl, alkenyl, cycloalkyl, and alkoxy represented by R^2 or R^3 are independently and optionally substituted by one or more halo, $-\text{CN}$, $-\text{OH}$, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_1\text{-C}_3$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ haloalkoxy, $-\text{NR}'\text{R}''$, 5-7 membered heterocycle, $-\text{C}(\text{O})\text{NR}'\text{R}''$ or $-\text{NR}'\text{C}(\text{O})\text{R}''$; and

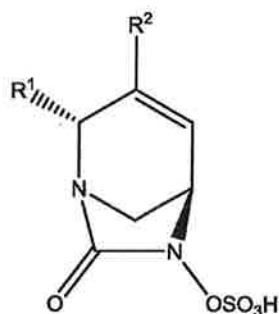
each R' and R'' are independently selected from hydrogen, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, phenyl, 5 to 6 membered heterocyclyl or a 5 to 6 membered heteroaryl; wherein each alkyl, cycloalkyl, phenyl, heterocyclyl and heteroaryl is optionally and independently substituted with one or more halo, $-\text{CN}$, $-\text{OH}$, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_1\text{-C}_3$ haloalkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ haloalkoxy, $-\text{C}(\text{O})(\text{C}_1\text{-C}_6 \text{ alkyl})$, $-\text{C}(\text{O})(\text{C}_1\text{-C}_6 \text{ alkoxy})$, $-\text{NH}_2$, $-\text{NH}(\text{C}_1\text{-C}_3 \text{ alkyl})$, $-\text{N}(\text{C}_1\text{-C}_3 \text{ alkyl})_2$, a 5-7 membered heterocyclyl or a 5-7 membered heteroaryl;

provided that R^2 and R^3 are not both hydrogen; and when R^1 is $-\text{C}(\text{O})\text{NR}'\text{R}''$, then neither of R^2 or R^3 is $-\text{C}(\text{O})\text{NR}'\text{R}''$.

2. The compound of claim 1 or a pharmaceutically acceptable salt thereof, wherein R^2 and R^3 are independently selected from the group consisting of H, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, and $-\text{CONR}'\text{R}''$, wherein the alkyl and cycloalkyl represented by R^2 and/or R^3 are independently and optionally substituted by one or more group selected from halo, $-\text{CN}$, $-\text{OH}$, $\text{C}_1\text{-C}_3$ alkyl, $\text{C}_1\text{-C}_3$ haloalkyl, $\text{C}_1\text{-C}_3$ alkoxy, $\text{C}_1\text{-C}_3$ haloalkoxy, $-\text{NR}'\text{R}''$, a siderophore, $-\text{C}(\text{O})\text{NR}'\text{R}''$ and

-NR'C(O)R''.

3. The compound of claim 1, according to formula (V):

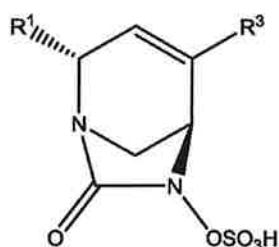


or a pharmaceutically acceptable salt thereof.

4. The compound of claim 3, or a pharmaceutically acceptable salt thereof, wherein R² is methyl, ethyl, isopropyl, or cyclopropyl, wherein each R² is optionally and independently substituted with one or more group selected from -OH and C₁-C₃ alkoxy.

5. The compound of claim 4, or a pharmaceutically acceptable salt thereof, wherein R² is methyl.

6. The compound of claim 1, according to formula (IV):



or a pharmaceutically acceptable salt thereof.

7. The compound of claim 6, or a pharmaceutically acceptable salt thereof, wherein:

R³ is C₁-C₃ alkyl, C₂-C₆ alkenyl, C₃-C₆ cycloalkyl, or -CONR'R'', each of which is optionally and independently substituted with one or more substituent selected from the group consisting of halo, -CN, -OH, C₁-C₃ alkyl, cyclopropyl, C₁-C₃ haloalkyl, C₁-C₃ alkoxy, C₁-C₃

haloalkoxy, -NR'R'', a siderophore, -C(O)NR'R'' and -NR'C(O)R''; and each R' and R'' is independently selected from H and C₁-C₃ alkyl.

8. The compound of claim 6 or 7, or a pharmaceutically acceptable salt thereof, wherein R³ is methyl, ethyl, isopropyl, cyclopropyl, -CONH₂, -CONH(C₁-C₃ alkyl), or -CON(C₁-C₃ alkyl)₂, each of which is optionally and independently substituted with one or more group selected from -OH, C₁-C₃ alkyl, C₁-C₃ alkoxy, -NR'R'', C(O)NR'R'' and -NR'C(O)R''; and each R' and R'' is independently selected from H and C₁-C₃ alkyl.

9. The compound of any one of claims 6-8, or pharmaceutically acceptable salt thereof, wherein:

R³ is C₁-C₃ alkyl, cyclopropyl, -CONR'R'', wherein each alkyl, and cyclopropyl is optionally and independently substituted with one or more -OH, C₁-C₃ alkoxy, -NH₂, or -NHC(O)(C₁-C₃ alkyl); and

each R' and R'' are independently selected from H, C₁-C₃ alkyl, and 5-6 membered heterocyclyl, wherein each alkyl and heterocyclyl represented by R' or R'' is optionally and independently substituted with one or more -OH, C₁-C₃ alkyl, or C₁-C₃ alkoxy.

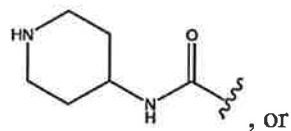
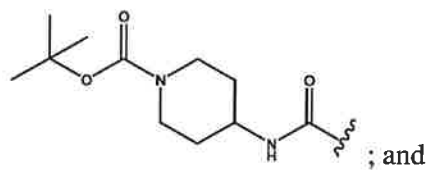
10. The compound of any one of claims 6-9, or pharmaceutically acceptable salt thereof, wherein R³ is methyl, -CH₂OCH₃, or -CONH₂.

11. The compound of any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R¹ is -CONR'R'', -CN, or C₁-C₃ alkyl, wherein each alkyl is substituted with C₁-C₃ alkoxy or -OH; and

the R' and R'' of R¹ are independently selected from the group consisting of H, C₁-C₃ alkyl, or a 5 to 6 membered heterocyclyl, wherein each alkyl and heterocyclyl of R' and R'' is optionally and independently substituted with one or more -OH, C₁-C₃ alkyl, C₁-C₃ alkoxy, -NH₂, -NH(C₁-C₃ alkyl), -N(C₁-C₃ alkyl)₂, or a 5-7 membered heterocyclyl.

12. The compound of any one of the preceding claims, or pharmaceutically acceptable salt thereof, wherein

R^1 is $-\text{CH}_2\text{OCH}_3$, $-\text{CONH}(\text{CH}_2)\text{-siderophore}$, $-\text{CONH}_2$,

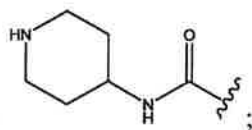


represents the point of attachment to the bridged bicyclic core.

13. The compound of any one of the preceding claims, or a pharmaceutically acceptable salt thereof, wherein R^1 is $-\text{CH}_2\text{OCH}_3$ or $-\text{CONH}_2$.

14. The compound of claim 1, or a pharmaceutically acceptable salt thereof, wherein:

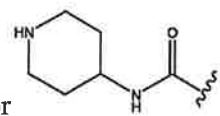
R^1 is $-\text{CH}_2\text{OCH}_3$; $-\text{CONH}_2$, or



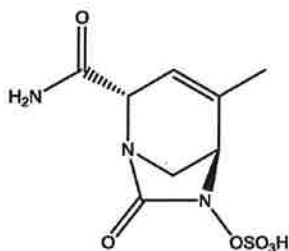
R^2 is $-\text{H}$ or $-\text{CH}_3$; and

R^3 is $-\text{H}$, $-\text{CH}_3$, or $-\text{CONH}_2$;

provided that R^2 and R^3 are not both H; and when R^1 is $-\text{CONH}_2$, or then R^3 is not $-\text{CONH}_2$.

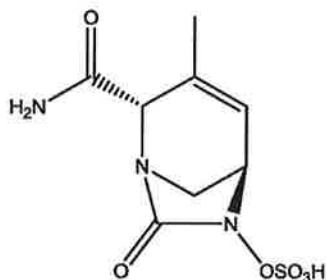


15. The compound:



or a pharmaceutically acceptable salt thereof.

16. The compound:



or a pharmaceutically acceptable salt thereof.

17. A compound of claim 1, selected from the group consisting of:

(2S,5R)-2-carbamoyl-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-cyano-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-methyl-7-oxo-2-(piperidinium-4-ylcarbamoyl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate;

(2S,5R)-2-carbamoyl-4-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-cyano-4-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-(2-aminoethylcarbamoyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate inner salt;

(2S,5R)-2-(methoxymethyl)-7-oxo-4-(prop-1-en-2-yl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-((5-hydroxy-4-oxo-1,4-dihydropyridin-2-yl)methylcarbamoyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-4-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-3-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-3-isopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-carbamoyl-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl

monosodium sulfate;

(2S,5R)-2,4-bis(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-(1-(tert-butoxycarbonyl)piperidin-4-ylcarbamoyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-(dimethylcarbamoyl)-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-(hydroxymethyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-3-methyl-7-oxo-2-(piperidin-1-ium-4-ylcarbamoyl)-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfate;

(2S,5R)-2-carbamoyl-3-(hydroxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-(2-amino-2-oxoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-carbamoyl-2-(hydroxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-3,4-dimethyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-3-ethyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-(2-aminoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sulfuric acid;

(2S,5R)-2-carbamoyl-3-cyclopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-4-(2-acetamidoethyl)-2-carbamoyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-(methoxymethyl)-4-(methylcarbamoyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-2-carbamoyl-4-cyclopropyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;

(2S,5R)-3-(2-methoxyethyl)-2-(methoxymethyl)-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate; and

(2S,5R)-2-(((1,5-dihydroxy-4-oxo-1,4-dihydropyridin-2-yl)methyl)carbamoyl)-4-methyl-7-oxo-1,6-diazabicyclo[3.2.1]oct-3-en-6-yl sodium sulfate;
or a pharmaceutically acceptable salt thereof.

18. A pharmaceutical composition comprising a compound of Formula (Ia), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1-17, and at least one pharmaceutically acceptable carrier, diluent, or excipient.

19. A compound of any one of Formulae (I)-(IV), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 17, for use as a medicament.

20. The use of a compound of any of Formulae (I)-(IV), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 17, in the manufacture of a medicament for use in the treatment of a bacterial infection in a warm-blooded animal such as man.

21. A compound of any of Formulae (I)-(IV), or a pharmaceutically acceptable salt thereof, as claimed in any one of claims 1 to 17, for use in treating a bacterial infection in a warm-blooded animal, such as man.