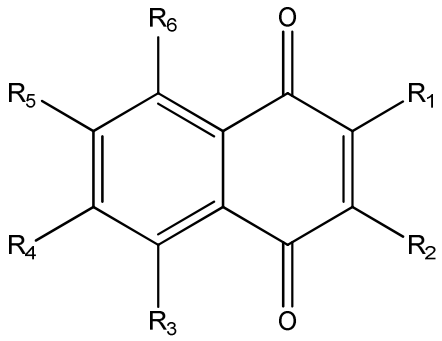
WHAT IS CLAIMED IS:

1. A compound for use in the treatment of a coronavirus infection, the compound being represented by Formula I:



Formula I

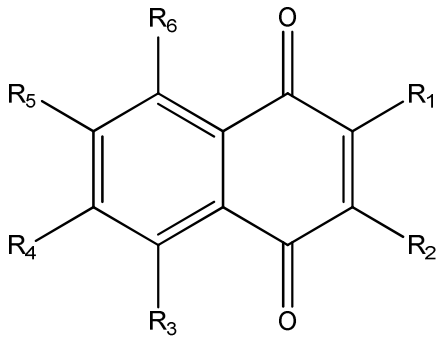
wherein R_1-R_6 are each independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, heteroalicyclic, halo, hydroxy, alkoxy, aryloxy, thiohydroxy, thioalkoxy, thioaryloxy, sulfinyl, sulfonyl, sulfonate, sulfate, cyano, nitro, azide, phosphonyl, phosphinyl, carbonyl, thiocarbonyl, a urea group, a thiourea group, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, S-thiocarbamyl, C-amido, N-amido, C-carboxy, O-carboxy, sulfonamido, guanyl, guanidinyl, hydrazine, hydrazide, thiohydrazide, and amino, or alternatively, R_1 and R_2 together form a five- or six-membered aromatic or aliphatic ring.

2. The compound for use according to claim 1, wherein the compound is shikonin or a glycoside of shikonin, or an ester thereof.

3. The compound for use according to any one of claims 1 to 2, wherein said treatment is of a subject in which inhibiting inflammation would be beneficial.

4. A pharmaceutical composition comprising:

a compound represented by Formula I:



Formula I

wherein R_1-R_6 are each independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, heteroalicyclic, halo, hydroxy, alkoxy, aryloxy, thiohydroxy, thioalkoxy, thioaryloxy, sulfinyl, sulfonyl, sulfonate, sulfate, cyano, nitro, azide, phosphonyl, phosphinyl, carbonyl, thiocarbonyl, a urea group, a thiourea group, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, S-thiocarbamyl, C-amido, N-amido, C-carboxy, O-carboxy, sulfonamido, guanyl, guanidinyl, hydrazine, hydrazide, thiohydrazide, and amino, or alternatively, R_1 and R_2 together form a five- or six-membered aromatic or aliphatic ring; and

at least one phospholipid,

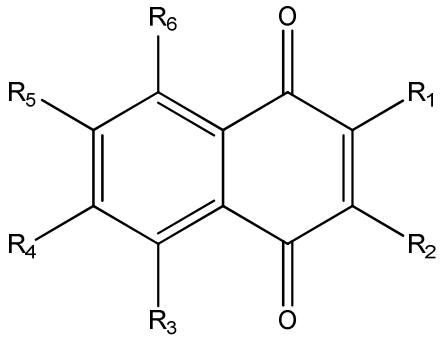
wherein a weight ratio of said at least one phospholipid to said compound in the composition is in a range of from 10:1 to 1:10.

5. The composition of claim 4, further comprising liposomes.

6. The composition of any one of claims 4 to 5, further comprising at least one additional active agent selected from the group consisting of a vitamin, N-acetyl cysteine, an anticoagulant, an anti-inflammatory agent, an antipyretic agent, an antiviral agent, and a protease inhibitor.

7. The composition of any one of claims 4 to 6, being for use in the treatment of a coronavirus infection.

8. A compound represented by Formula I:



Formula I

wherein R_1-R_6 are each independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, heteroalicyclic, halo, hydroxy, alkoxy, aryloxy, thiohydroxy, thioalkoxy, thioaryloxy, sulfinyl, sulfonyl, sulfonate, sulfate, cyano, nitro, azide, phosphonyl, phosphinyl, carbonyl, thiocarbonyl, a urea group, a thiourea group, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, S-thiocarbamyl, C-amido, N-amido, C-carboxy, O-carboxy, sulfonamido, guanyl, guanidinyl, hydrazine, hydrazide, thiohydrazide, and amino, or alternatively, R_1 and R_2 together form a five- or six-membered aromatic or aliphatic ring, for use in inhibiting a coronavirus 3CL protease.

9. The compound for use of claim 8, wherein the compound is shikonin or a glycoside of shikonin, or an ester thereof.

10. The compound for use of any one of claims 8 to 9, wherein said inhibiting is by administering the compound to a subject in need thereof.

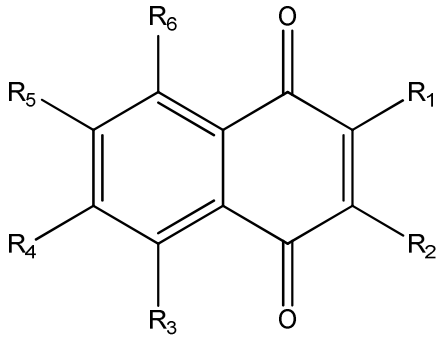
11. The compound for use of claim 10, further comprising inhibiting inflammation and/or autophagy in said subject.

12. The compound for use of claim 10 or 11, wherein the compound is part of a composition which further comprises phospholipids, and a weight ratio of said phospholipids to the compound in said composition is in a range of from 10:1 to 1:10.

13. The compound for use of any one of claims 10 to 12, wherein the compound is part of a composition which further comprises liposomes.

14. A compound that exhibits at least two of:
(i) inhibition of an activity of a 3CL protease of said coronavirus;
(ii) inhibition of inflammation in said subject; and
(iii) inhibition of autophagy in said subject,
for use in treating a coronavirus infection in a subject in need thereof.

15. The compound for use of claim 14, being represented by Formula I:



Formula I

wherein R_1-R_6 are each independently selected from the group consisting of hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl, heteroaryl, heteroalicyclic, halo, hydroxy, alkoxy, aryloxy, thiohydroxy, thioalkoxy, thioaryloxy, sulfinyl, sulfonyl, sulfonate, sulfate, cyano, nitro, azide, phosphonyl, phosphinyl, carbonyl, thiocarbonyl, a urea group, a thiourea group, O-carbamyl, N-carbamyl, O-thiocarbamyl, N-thiocarbamyl, S-thiocarbamyl, C-amido, N-amido, C-carboxy, O-carboxy, sulfonamido, guanyl, guanidinyl, hydrazine, hydrazide, thiohydrazide, and amino, or alternatively, R_1 and R_2 together form a five- or six-membered aromatic or aliphatic ring.