CLAIMS

1. A peptide of 16 to 26 amino acid residues in length comprising the following amino acid sequence: $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S, G or A; X_2 is S or G; X_3 is V or I, X_4 is W or L; X_5 is W, K, A or L; and X_6 is W, K, L or A (SEQ ID NO:12).

2. The peptide of claim 1, which comprises the following amino acid sequence: SGSWLRDVWTWLQSKL (SEQ ID NO:1), GSSWLRDVWTWLQSKL (SEQ ID NO:2), GSSWLRDVWTWLQSAL (SEQ ID NO:3), GSSWLRDVWTKLQSWL (SEQ ID NO:4), GSSWLRDIWTKLQSWL (SEQ ID NO:5), GSSWLRDIWTALQSWL (SEQ ID NO:6), GSSWLRDILTALQSLL (SEQ ID NO:7), AGSWLRDIWTWLQSAL (SEQ ID NO:8), or AGSWLRDILTLLQSAL (SEQ ID NO:9).

3. The peptide of claim 1, which comprises the following amino acid sequence:

a. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V; X_4 is W; X_5 is W or K; and X_6 is W, K or A (SEQ ID NO:13);

b. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V, X_4 is W; X_5 is W; and X_6 is K or A (SEQ ID NO:14);

c. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W or A; and X_6 is W or K (SEQ ID NO:15);

d. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W, K or A; and X_6 is W, K or A (SEQ ID NO:16);

e. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W or A; and X_6 is W, K or A (SEQ ID NO:17); or

f. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W, K or A; and X_6 is W or K (SEQ ID NO:19).

4. The peptide of any one of claims 1 to 3, wherein the amino acid residues are L amino acids, D amino acids, or a mixture of D and L amino acids.

5. A peptide of 16 to 26 amino acid residues in length comprising the following amino acid sequence:

a. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is W, F, Y or H; and X_6 is W, F, Y or H (SEQ ID NO:27);

b. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is W, F, Y or H; and X_6 is K, Y, R, H, N, Q, S, or T (SEQ ID NO:28);

c. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is W, F, Y or H; and X_6 is A, C, G, P, S, I, L, V or T (SEQ ID NO:29);

d. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is K, Y, R, H, N, Q, S, or T; and X_6 is W, F, Y or H (SEQ ID NO:30);

e. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is K, Y, R, H, N, Q, S, or T; and X_6 is K, Y, R, H, N, Q, S, or T (SEQ ID NO:31);

f. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is K, Y, R, H, N, Q, S, or T; and X_6 is A, C, G, P, S, I, L, V or T (SEQ ID NO:32);

g. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is A, C, G, P, S, I, L, V or T; and X_6 is W, F, Y or H (SEQ ID NO:33);

h. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is A, C, G, P, S, I, L, V or T; and X_6 is K, Y, R, H, N, Q, S, or T (SEQ ID NO:34);

i. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is A, C, G, P, S, T; X_2 is A, C, G, P, S, T; X_3 is A, I, L, P or V; X_4 is W, F, Y, H, A, I, L, P or V; X_5 is A, C, G, P, S, I, L, V or T; and X_6 is A, C, G, P, S, I, L, V or T (SEQ ID NO:35);

j. $X_1X_2SWLRDX3X_4TX_5LQSX_6L$, wherein X_1 is G, P, or A; X_2 is G, P, or A; X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is W, Y, or F; X_6 is K, R, Q, E or N (SEQ ID NO:36);

k. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S, T, A or Q; X_2 is G, P, or A; X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is W, Y, or F; and X_6 is K, R, Q, E or N (SEQ ID NO:37);

l. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is G, P, or A; X_2 is G, P, or A; X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is K, R, Q, E or N; and X_6 is W, Y, or F (SEQ ID NO:38);

m. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S, T, A or Q; X_2 is G, P, or A; and X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is K, R, Q, E or N; and X_6 is W, Y, or F (SEQ ID NO:39);

n. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S, T, A or Q; X_2 is G, P, or A; X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is A, S, G or T; and X_6 is W, Y, or F (SEQ ID NO:40); or

o. $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is G, P, or A; X_2 is G, P, or A; X_3 is V, I, L or M; X_4 is W, F, Y or H; X_5 is A, S, G or T; and X_6v W, Y, or F (SEQ ID NO:18).

6. A pegylated peptide comprising a peptide of any one of claims 1-5 linked to one, two or more polyethylene glycol (PEG) polymers.

7. The pegylated peptide of claim 6, wherein the one, two or more PEG polymers is linked to the N-terminus or C-terminus of the peptide.

8. A pegylated peptide comprising the following structure: NH_2-PEG12-Amide-PEG12-peptide, wherein the peptide is 16 to 26 amino acid residues in length and comprises the amino acid sequence: $X_1X_2SWLRDX_3X_4TX_5LQSX_6L$, wherein X_1 is S, G or A; X_2 is S or G; X_3 is V or I, X_4 is W or L; X_5 is W, K, A or L; and X_6 is W, K, L or A (SEQ ID NO:12).

9. The pegylated peptide of claim 8, which peptide comprises the following amino acid sequence: SGSWLRDVWTWLQSKL (SEQ ID NO:1), GSSWLRDVWTWLQSKL (SEQ ID NO:2), GSSWLRDVWTWLQSAL (SEQ ID NO:3), GSSWLRDVWTKLQSWL (SEQ ID NO:4), GSSWLRDIWTKLQSWL (SEQ ID NO:5), GSSWLRDIWTALQSWL (SEQ ID NO:6), GSSWLRDILTALQSLL (SEQ ID NO:7), AGSWLRDIWTWLQSAL (SEQ ID NO:8), or AGSWLRDILTLLQSAL (SEQ ID NO:9).

10. The pegylated peptide of claim 8, which peptide comprises the following amino acid sequence:

a. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V; X_4 is W; X_5 is W or K; and X_6 is W, K or A (SEQ ID NO:13);

b. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V, X_4 is W; X_5 is W; and X_6 is K or A (SEQ ID NO:14);

c. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W or A; and X_6 is W or K (SEQ ID NO:15);

d. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W, K or A; and X_6 is W, K or A (SEQ ID NO:16);

e. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W or A; and X_6 is W, K or A (SEQ ID NO:17); or

f. X_1X_2SWLRDX_3X_4TX_5LQSX_6L, wherein X_1 is S or G; X_2 is S or G; X_3 is V or I, X_4 is W; X_5 is W, K or A; and X_6 is W or K (SEQ ID NO:19).

11. The pegylated peptide of claims 8 to 10, wherein the amino acid residues are L amino acids, D amino acids, or a mixture of D and L amino acids.

12. The pegylated peptide of any one of claims 6 to 11, wherein each PEG polymer is in the molecular weight range of 500 to 5000 daltons.

13. The pegylated peptide of any one of claims 6 to 12, wherein the one, two or more PEG polymers is branched, or non-branched.

14. A pegylated peptide comprising the peptide of claim 5 linked to one, two or more polyethylene glycol (PEG) polymers.

15. A composition comprising the peptide of any one of claims 1 to 14 and a carrier.

16. The composition of 15, wherein the carrier is an aqueous solution.

17. A pharmaceutical composition comprising an effective amount peptide of any one of claims 1 to 14 and a pharmaceutically acceptable carrier.

18. The pharmaceutical composition of claim 17, wherein the pharmaceutically acceptable carrier is an aqueous solution.

19. The pharmaceutical composition of claim 18, wherein the aqueous solution is sterile water.

20. The pharmaceutical composition of claim 19, wherein the composition is formulated for topical, subcutaneous, intravenous or intraperitoneal administration.

21. The pharmaceutical composition of claim 20, wherein the composition is a gel formulation.

22. The pharmaceutical composition of claim 21, wherein the effective amount is 0.1% to 5% peptide in the gel formulation.

23. A vial containing: (1) a lyophilized composition comprising 200 mg to 300 mg of the peptide of any one of claims 1 to 14; or (2) a pharmaceutical composition, wherein the pharmaceutical composition comprises 200 mg to 300 mg of the peptide of any one of claims 1 to 14 in a 1 ml aqueous solution.

24. The vial of claim 23, wherein the aqueous solution is sterile water.

25. A disinfecting solution comprising the peptide of any one of claims 1 to 14.

26. Use of an effective amount of a peptide of any one of claims 1 to 14 in the preparation of a medicament for inhibiting growth, replication, or infectivity of a microorganism.

27. Use of a pharmaceutical composition of any one of claims 17 to 22 in the preparation of a medicament for treating a microorganism infection in a subject or preventing a disease in a subject caused by or associated with a microorganism infection.

28. The use of claim 26 or 27, wherein the microorganism is a bacteria.

29. The use of claim 28, wherein the bacteria is Gram-positive or Gram-negative.

30. The use of claim 29, wherein (1) the Gram-positive bacteria is *Staphylococcus aureus*, *enterococci*, *streptococci*, *Clostridium difficile*, *Propionibacterium acnes*, or *Bacillus anthracis*; or (2) the Gram-negative bacteria is *Pseudomonas aeruginosa*, *Moraxella catarrhalis*, or *Haemophilus influenzae*.

31. The use of claim 28, wherein the bacteria is Methicillin-sensitive *Staphylococcus aureus*, Methicillin-resistant *Staphylococcus aureus*, Vancomycin-sensitive *enterococci*, Vancomycin-resistant *enterococci*, penicillin-sensitive *Streptococcus pneumoniae*, penicillin-resistant *Streptococcus pneumoniae*, ciprofloxacin-resistant or clindamycin-resistant.

32. The use of claim 30, wherein the *enterococci* is *Enterococcus faecalis*, or the *streptococci* is *Streptococcus pneumoniae*.

33. The use of claim 26 or 27, wherein the microorganism is a virus.

34. The use of claim 33, wherein the virus is a virus belonging to the *flaviviridae*, *togaviridae*, *filoviridae*, *arenaviridae*, *poxviridae*, *bunyaviridae*, or *retroviridae*, family.

35. The use of claim 33, wherein the virus is a dengue virus, Chikungunya virus, Ebola virus, HIV, or influenza virus.

36. The use of any one of claims 26 to 35, wherein the effective amount is a dose of 10 mg to 300 mg of peptide per day, or 10 mg to 300 mg of peptide two times per day.

37. The use of any one of claims 26 to 36, wherein the composition is to be administered to the subject subcutaneously, topically, intravenously, or intraperitoneally.

38. The use of any one of claims 26 to 36, wherein the subject is human.

39. A method for disinfecting an inanimate object or biological material, comprising contacting the object with the composition of claim 15 or 16, or a wipe containing the peptide of any one of claims 1 to 14.

40. An inanimate surface or biological surface, which comprises a linkage to or a coating with the anti-infective peptide of any one of claims 1 to 14.