Supporting Information

EcDBS1R4 an antimicrobial peptide with in vitro fusogenic ability selective to
Escherichia coli

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**Figure S1. Membrane surface potential studies of *E. coli* exposed to EcDBS1R4.**

Histograms of the fluorescence ratio obtained by flow cytometry for *Escherichia coli* (ATCC 25922) with 0, 6 and 20 µM of EcDBS1R4. For staining, we used 15 µM of 3,3’-diethyloxacarbocyanine iodide (DiOC2(3)), a green dye that accumulates on hyperpolarized membranes (green histogram), but that is red-shifted as the dye self-associates under larger membrane potentials\(^1\). 10 µM of the proton ionophore carbonyl cyanide 3-chlorophenylhydrazone (CCCP) was used as a control of total depolarization (red histogram).
Figure S2. Fusion / hemifusion efficiency of CL-rich lipid vesicles promoted by titration with EcDBS1R4. Percentage of fusion efficiency was calculated using equation 8. Lipid vesicles used were POPC (black), POPC:Chol (70:30) (green), POPG:CL (80:20) (blue) and POPE:POPG:CL (20:60:20) (red).
Table S1. *In silico* predicted interactions between EcDBS1R4 and anionic/zwitterionic mimetic membranes\(^2\).

| Membrane          | Residue number | Residue | Peptide Position | Atom | Type | Lipid Position | Atom | Distance, Å |
|-------------------|----------------|---------|------------------|------|------|----------------|------|-------------|
| **POPC**          | 1              | Lys     | 4                | NZ   | POPC | 15             | O14  | 2.7         |
|                   | 2              | Arg     | 9                | NH1  | POPC | 4              | O13  | 3.0         |
|                   | 3              | Val     | 15               | CG2  | POPC | 2              | C15  | 3.4         |
|                   | 4              | Val     | 15               | CG1  | POPC | 3              | C13  | 3.5         |
|                   | 5              | Trp     | 19               | NE1  | POPC | 11             | O13  | 3.2         |
|                   | 6              | Trp     | 19               | NE1  | POPC | 11             | O14  | 3.3         |
| **POPC:Chol (70:30)** | 1              | Lys     | 5                | NZ   | Chol | 1              | O3   | 3.1         |
|                   | 2              | Arg     | 9                | NH1  | POPC | 1              | O22  | 3.0         |
|                   | 3              | Lys     | 13               | NZ   | POPC | 1              | O13  | 3.0         |
| **POPC:POPG (70:30)** | 1              | Met     | 2                | SD   | POPC | 4              | O13  | 3.5         |
|                   | 2              | Lys     | 4                | NZ   | POPC | 12             | O14  | 3.0         |
|                   | 3              | Ala     | 8                | O     | POPG | 1              | OC2  | 3.3         |
|                   | 4              | Ala     | 8                | CB   | POPC | 4              | C15  | 3.7         |
|                   | 5              | Arg     | 9                | NH2  | POPG | 3              | OC2  | 3.1         |
|                   | 6              | Arg     | 9                | NH1  | POPC | 10             | O22  | 2.9         |
|                   | 7              | Arg     | 9                | NH1  | POPC | 10             | O14  | 3.3         |
|                   | 8              | Val     | 15               | O     | POPC | 2              | O12  | 3.7         |
|                   | 9              | Val     | 15               | CG2  | POPC | 6              | C13  | 3.7         |
|                   | 10             | Ala     | 16               | CB   | POPC | 2              | C13  | 3.0         |
|                   | 11             | Trp     | 19               | NE1  | POPC | 9              | O13  | 3.4         |
References

1. Domingues, M. M. et al. Antimicrobial protein rBPI21-induced surface changes on Gram-negative and Gram-positive bacteria. *Nanomedicine Nanotechnology, Biol. Med.* 10, 543–551 (2014).

2. Cardoso, M. H. et al. A polyalanine peptide derived from polar fish with anti-infectious activities. *Sci. Rep.* 6, 21385 (2016).