1 **Supporting Information**

2 **EcDBS1R4 an antimicrobial peptide with *in vitro* fusogenic ability selective to**

3 ***Escherichia coli***

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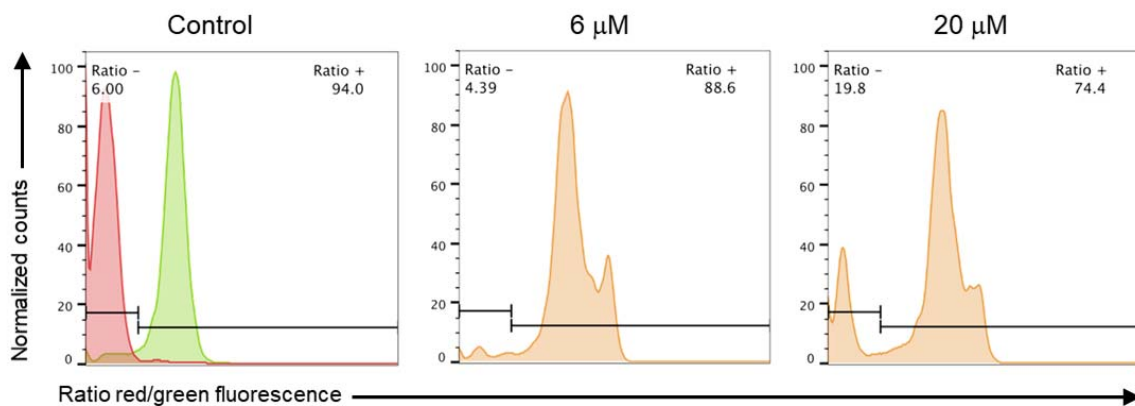
**Figure S1. Membrane surface potential studies of *E. coli* exposed to** EcDBS1R4. Histograms of the fluorescence ratio obtained by flow cytometry for *Escherichia coli* (ATCC 25922) with 0, 6 and 20 µM of EcDBS1R4. For staining, we used 15 µM of 3,3'-diethyloxacarbocyanine iodide ($DiOC_2(3)$), a green 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).
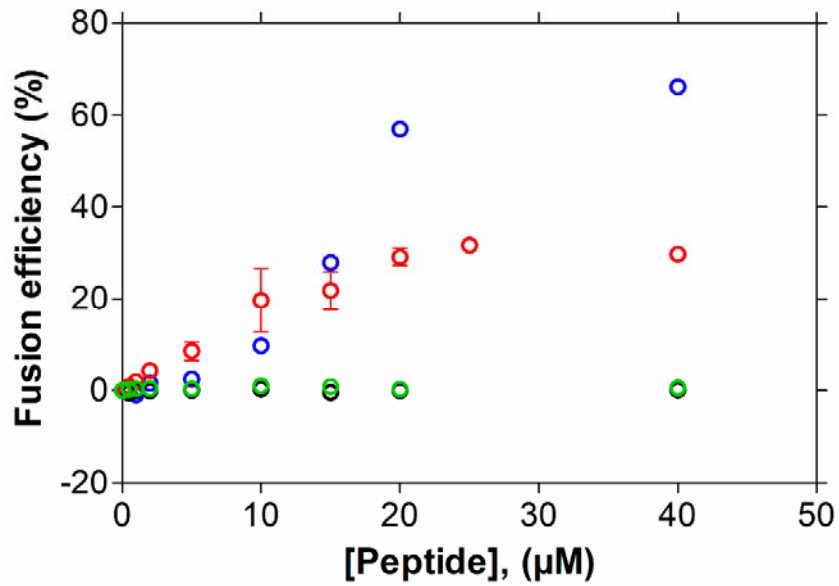
**Figure S2. Fusion / hemifusion efficiency of CL-rich lipid vesicles promoted by titration with EcDBS1R4.** Percentage of fusion efficiency was calculated using equation 8. Lipid vesicles used were POPC (black), POPC:Chol (70:30) (green), POPG:CL (80:20) (blue) and POPE:POPG:CL (20:60:20) (red).

**Table S1.** *In silico* predicted interactions between EcDBS1R4 and anionic/zwitterionic mimetic membranes[2].

| Membrane | Residue number | Peptide | | | Lipid | | | Distance, Å |
|---|---|---|---|---|---|---|---|---|
| | | Residue | Position | Atom | Type | Position | Atom | |
| **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).