Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Systemically interfering with immune response by a fluorescent cationic dendrimer delivered gene suppression

Dongxu Shen,[a] Fan Zhou,[a] Zejun Xu,[b] Bicheng He,[a] Miao Li,[a]

Jie Shen,*[a] Meizhen Yin,*[b] and Chunju An*[a]

[a] Department of Entomology, China Agricultural University, 100193 Beijing, China,

E-mail: shenjie@cau.edu.cn; anchunju@cau.edu.cn

[b] State Key Laboratory of Chemical Resource Engineering, Key Laboratory of Carbon Fiber and Functional Polymers, Ministry of Education, Beijing University of Chemical Technology, 100029 Beijing, China, E-mail: yinmz@mail.buct.edu.cn

Table S1. Nucleotide sequences of used primers

Gene	Forward primer	Reverse primer
Amplification of the 821-bp fragment for serpin-3 labeling		
serpin-3	5'-TTGCCCACGAGTCCTACA-3'	5'-GCCATCGGCCAAGGTGGGGTCG-3'
Synthesis of dsRNA		
serpin-3	5'-TAATACGACTCACTATAGGCTTCCATAACCCTCCTGC -3'	5'-TAATACGACTCACTATAGGACACGCTGTCCAAGTGCG -3'
GFP	5'-TAATACGACTCACTATAGGCACAAGTTCAGCGTGTCCG -3'	5'-TAATACGACTCACTATAGGGTTCACCTTGATGCCGTTC -3'
	Sequence for T7 promoter is underlined.	
qRT-PCR analysis		
serpin-3	5'-ATTGCAGCACAAATCGCCCC-3'	5'-GTGGGCAACTGCTGCAAACT-3'
lectin	5'-GTCGTCGTACCTGGCCATCA-3'	5'-AGAAGTCGCCCTGGACATCG-3'
PGRP	5'-TATGCGGGGCATGCAGAACT-3'	5'-CCCATCCGCGACCTTCGTAT-3'
βGRP	5'-GCCATGGCGCCTTTTGATGA-3'	5'-TCGTACCACGGCTTGGAGTC-3'
rpL8	5'-AAGCGAGGAACATCAGCC-3'	5'-GGTCTTGCCACCACGAAT-3'
cecropin	5'-CGCTTGTTTCATGGCGTTCG-3'	5'-ACGATGCCGTCTCGGATGTT-3'
gloverin	5'-GGAGACCTCACTGCTGACCA-3'	5'-GTGCTCGTAGCCAGCTTTGC-3'
moricin	5'-CCCTGCCCCTAAGGTTCCTG-3'	5'-CTGTAGACGTCGTGGGCTGT-3'
Imd	5'-AGATCATGACAAACGAGGCAGT-3'	5'-TTGCTGCCAAACTGGACACC-3'

Toll	5’-AGAAGTTGCGGTTCGCGTTG-3’	5’-GTGATGGTGCCTGTGCATCG-3’

```
    1 GAAAAAACCGGTCATACCTTCCCAGGTCGTCATCGCATCAACTGACCGACCACTGAGTTTGCCAGCTCAGTCGCGCCCTACCCACGG
   88 ACTGGGCCGCTTGTGTGTAATCATGATTCAATAAACCAAATACCCTGTGCGGTGCTAACAGTGTTCAAAACTTCCAAAATAATATAA
  175 TTAAAAGGCCGGATCTCAATCGCCTTGAAGTTAATTTTTCTGTGTGTTTTCCTTATCAACATAATGACTCCAAGATTTTATTTCACA
  -19                                                                  M  T  P  R  F  Y  F  T
  262 CTTTTTGTAGTGGGCCCAGCACTATGTGTAGCCCAACAAATCGACCCGAACACCCTGATCAACGTGTTTGGAACCCCCAGCAACTAC
  -11  L  F  V  V  G  P  A  L  C  V  A  Q  Q  I  D  P  N  T  L  I  N  V  F  G  T  P  S  N  Y
  349 GCTGCGTCTGTGAACCCCCATGACCCTGCTGCGAGTGGAGTGCCGTTGGCCCAGGCCCTGCCTGTGAAACCTATTAACGAAACCCTC
   19  A  A  S  V  N  P  H  D  P  A  A  S  G  V  P  L  A  Q  A  L  P  V  K  P  I  N  E  T  L
  436 ACTGATCCCGACTATTGGGATATAGATGAGCTGCCGGCAGCAGCGGTAGCTGACTATGATAAGTTTGACTGGAGTTTGACTAAGAGG
   48  T  D  P  D  Y  W  D  I  D  E  L  P  A  A  A  V  A  D  Y  D  K  F  D  W  S  L  T  K  R
  523 CTATCAGCTTCCTCAGATACCAACTTCCTTCTGTCTCCCCTGGGTCTGAAGCTAGCCCTGGCCATCCTAACGGAAGCCGCGACCGGA
   77  L  S  A  S  S  D  T  N  F  L  L  S  P  L  G  L  K  L  A  L  A  I  L  T  E  A  A  T  G
  610 CTGACCAGGTCAGAGTTGCAGTCGGTGCTGGGTTTTGAAATGGATAGAGTGGCTGTTAGAAGAAAGTTCGCGAACATAGTTAATTCA
  106  L  T  R  S  E  L  Q  S  V  L  G  F  E  M  D  R  V  A  V  R  R  K  F  A  N  I  V  N  S
  697 TTGCAGCACAAATCGCCCCTATACGTCCTTGACTTAGGTAGTAAAATCTATGTGGAGAACATTGCCCACCCTCGTCAGAAGTTTGCA
  135  L  Q  H  K  S  P  L  Y  V  L  D  L  G  S  K  I  Y  V  E  N  I  A  H  P  R  Q  K  F  A
  784 GCAGTTGCCCACGAGTCCTACAAAACGGACCTGACTCCCATCGACTTCCATAACCCTCCTGCAGCCGCCAAAGCCATCAACGATTGG
  164  A  V  A  H  E  S  Y  K  T  D  L  T  P  I  D  F  H  N  P  P  A  A  A  K  A  I  N  D  W
  871 GTTGCCAACCTTACCCAGGGAAGGATCACTGACTTAGTACATCAAGATGACCTCGAAAACGTGGTGGTGATGATCCTCAACACACTA
  193  V  A  N  L  T  Q  G  R  I  T  D  L  V  H  Q  D  D  L  E  N  V  V  V  M  I  L  N  T  L
  958 TACTTCAAGGGCAGCTGGCGCCACCAGTTCGCGCCCAACGCTACCAAGCAGGGTCAATTCTACGTCACCCCGAAAATAGCTAAACCA
  222  Y  F  K  G  S  W  R  H  Q  F  A  P  N  A  T  K  Q  G  Q  F  Y  V  T  P  K  I  A  K  P
 1045 GTGTATTTCATGAATGTGAAGGACAAGTTCTACTATGCTGAGTCTGCCAAATTCGACGCTAAGATCCTCAGGATGCCATACATGGGC
  251  V  Y  F  M  N  V  K  D  K  F  Y  Y  A  E  S  A  K  F  D  A  K  I  L  R  M  P  Y  M  G
 1132 TACAAATTTGCAATGTACGTAGTAGTTCCCAACTCATTGACTGGTCTGAACCGAGTATTGGATGGTCTGACGGAGCTCCGCCCCGAA
  280  Y  K  F  A  M  Y  V  V  V  P  N  S  L  T  G  L  N  R  V  L  D  G  L  T  E  L  R  P  E
 1219 ATGGATTTGTTACAAGAGCGCTTCGTCGACGTCACTTTGCCCAGATTCCAGTTCGAATTCTCCTCGCACTTGGACAGCGTGTTGAGA
  309  M  D  L  L  Q  E  R  F  V  D  V  T  L  P  R  F  Q  F  E  F  S  S  H  L  D  S  V  L  R
 1306 GATATGGGTGTCAGACAAGCCTTCGAGGACACTGCGTCGTTCCCTGGCATCGCCAGGGGACAGTCCCTGCAGCAGCGCCTCAGGGTC
  338  D  M  G  V  R  Q  A  F  E  D  T  A  S  F  P  G  I  A  R  G  Q  S  L  Q  Q  R  L  R  V
 1393 TCCAAGGTTCTGCAGCGGTCGGGCATCGAGGTCAACGAGCTCGGAAGTGTGGCCTACTCAGCTACTGAAATATCTCTAGTCAACAAA
  367  S  K  V  L  Q  R  S  G  I  E  V  N  E  L  G  S  V  A  Y  S  A  T  E  I  S  L  V  N  K
 1480 TTCGGCGAGGATGACGATACCGCTGTGGAGGTGATCGCCAACAAGCCCTTCTTCTTCCTGATCCAAGATGAGACGACCAGGCAACTG
  396  F  G  E  D  D  D  T  A  V  E  V  I  A  N  K  P  F  F  F  L  I  Q  D  E  T  T  R  Q  L
 1567 CTGTTCACGGGCAGAGTGGCCGACCCCACCTTGGCCGATGGCACTTTCAAACACTCATAGGTTATTTTAGGGTTAGGGATGCCCTTT
  425  L  F  T  G  R  V  A  D  P  T  L  A  D  G  T  F  K  H  S  *
 1654 TAGTAATCGCCGACTGAAACTTCCTTGATTCTTAAGTTAAAATTTCCCACAGGTCTTGCTTTGGGTAATTTTGTTTTGCAACTGAAC
 1741 TTGATAATGCCCTGAAGTGTATTACTCGTATAATTGTTTTTCTAATAGCTTATGATAATGTGGTCAGCTTTTAAACCCATCTTACGT
 1828 GGCCAGAAGTGCTAGAATATTGTAGATAGGATACAGCTATCGTTTAAGTTTTGGAAAGGTGATTACTGAGAGGGCATAATATTGTTT
 1915 AAGTCATTAGTCTAAGTTCCATGTAAATTATCATGATATGTATGAAATCAGGCACGATATAGAAGTCAATGTTAAGAATATTAGTAG
 2002 GTACATGATGGCTCTCTTTTGATTCGATCTGTGATCTGTTTAACATTTATACGAAGTAAAAATATATCAAAACCAAGGTTATTGAAG
 2089 CATGTGCCATTGATGCCTTTGACTCTACGCTCTTGCATTTTTATAAAAACACATAATAAAATGACATTTTGATCCTAAAAAAAAAAAA
```

Figure S1. Nucleotide and amino acid sequence of *O. furnacalis* serpin-3. The deduced amino acid sequence is shown below the nucleotide sequence of serpin-3 (GenBank™ accession number KF501490). The one-letter code for each amino acid is aligned with the second nucleotide of the corresponding codon. The stop codon is marked with *asterisk* (*). The primers for amplifying *serpin-3* DNA and dsRNA fragment are underlined and double-underlined, respectively.

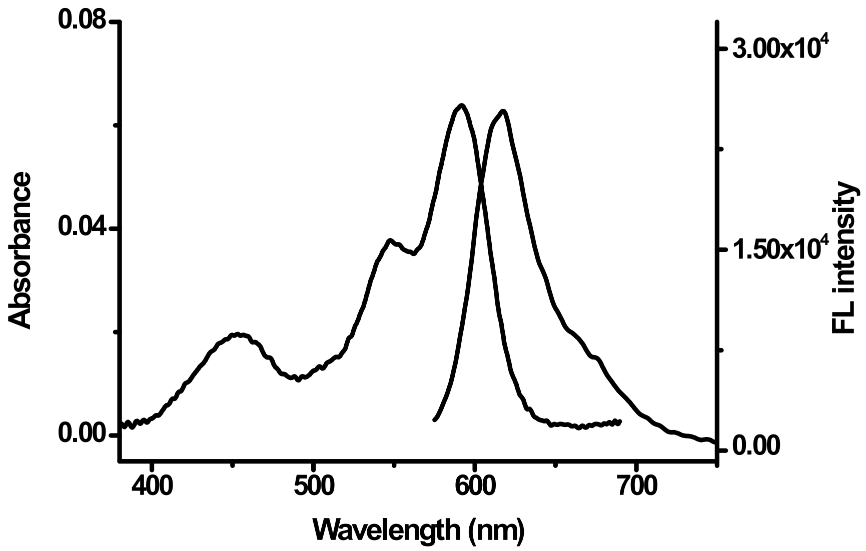

Figure S2. Absorption and emission spectra of G2 in water (concentration: 2×10^{-6} M, λ_{ex} = 545 nm).

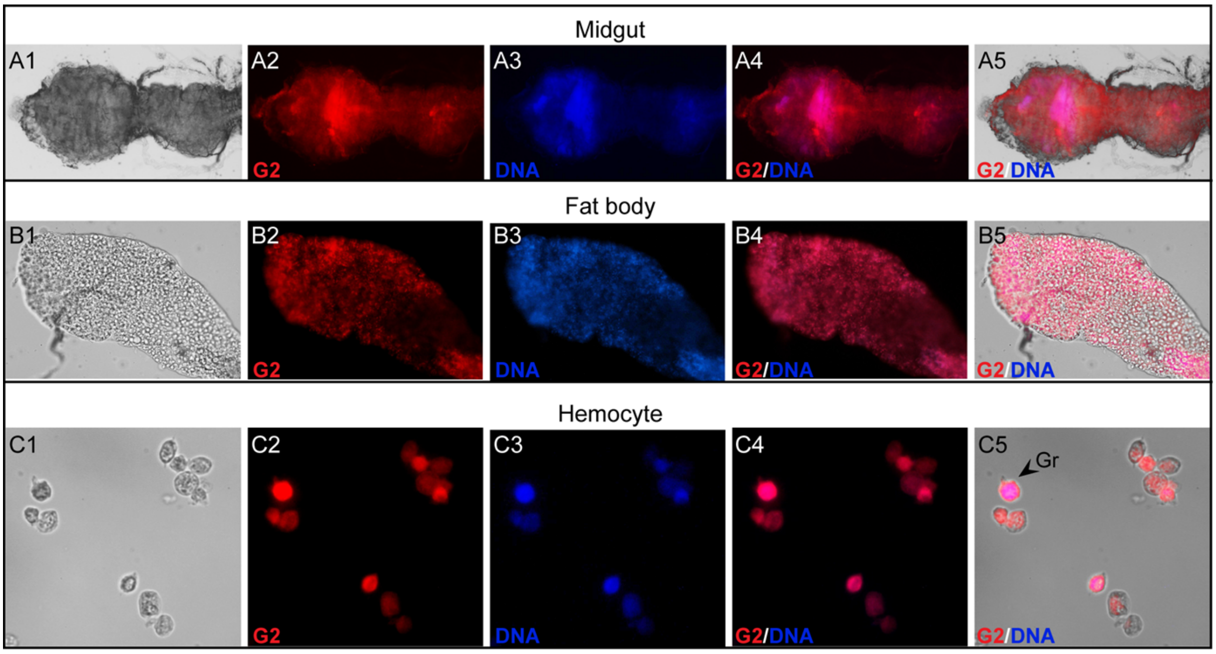

Figure S3. Fluorescence images of G2/DNA complexes (N/P= 2:1) after 8 h incubation with *O. furnacalis* midgut (A1-A5), fat body (B1-B5), and hemocyte (C1-C5). A1, B1 and C1: separated channels for tissues or cells only. A2, B2, and C2: separated channels for G2 (red). A3, B3, and C3: separated channels for DNA labeled by CXR Reference Dye (blue). A4, B4, and C4: merged images from the second and third one on the left. A5, B5, and C5: merged images from the three ones on the left. Gr: granulocyte

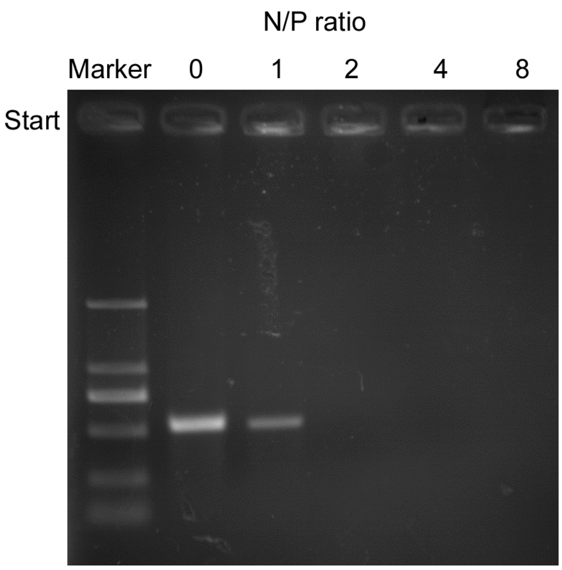

Figure S4. Agarose gel electrophoresis of G2/DNA complexes at various N/P ratios.

Table S2. Particle sizes of G2 before and after it forms a complex with DNA at N/P = 8:1.

	Average size(nm)
G2	1.8±0.3
DNA	1318.3±3.2
G2/DNA	136.5±3.4

Table S3. The zeta-potentials of G2 before and after it form complexes with DNA at N/P = 8:1.

	Zeta potential (mV)
G2	13.3±0.8
DNA	-24.2±0.5
G2/DNA	11.6±1.2