**Table S1. Primers used in this study**

|  |  |  |
| --- | --- | --- |
| Primers | Sequences (5’-3’) | Purpose |
| VgR-QF | AAACGCCTAATGGACCTAAATGC | *q-*PCR primers for *L. striatellus* vitellogenin receptor |
| VgR-QR | CGAGTAGACAATACCCAGATACGAGTG |
| ef2-QF | GTCTCCACGGATGGGCTTT | *q-*PCR primers for *L. striatellus* elongation factor 2 |
| ef2-QR | ATCTTGAATTTCTCGGCATACATTT |
| pc3-QF | GATGCGTTGTCTTACCTGACTGC | *q-*PCR primers for RSV capsid protein pc3 |
| pc3-QR | CACTATCCCATACCTCGACACCA |
| VgR-si-F | TAATACGACTCACTATAGGAGAGGGACAAGAGTCCATTGTTAGA | Amplify *VgR* for RNA silence |
| VgR-si-R | TAATACGACTCACTATAGGTAGGAGACAGAGGTCGCTACAGG |
| gfp-si-F | TAATACGACTCACTATAGGATGGTAGATCTGACTAGTAA | Amplify *gfp* for RNA silence |
| gfp-si-R | TAATACGACTCACTATAGGCTAGTCATCTGCACCTTCTG |

**Experimental procedures**

**Viruses, *Laodelphax striatellus* and host plants**

RSV-free and RSV-infected *L*. *striatellus* individuals used in this study were originally captured in Jiangsu Province, China, and were maintained in our laboratory. All plants used for *L*. *striatellus* rearing were grown inside a growth incubator at 25℃ under a 16-h light/8-h dark photo period.

**RT-qPCR**

For quantitative analysis of *VgR* expression in *L. striatellus* tissues, RNA was extracted from the tissues of individual insect. Reverse transcriptional PCR and SYBR-Green-based qPCR were performed according to the protocols provided by the manufacturer. Primer pair used to amplify VgR was VgR-QF / VgR-QR (Table S1). Viral RNA copies were measured by RT-qPCR using primer pair pc3-QF / pc3-QR (Table S1), which were designed and synthesized according to the nucleocapsid protein (Pc3 or CP) gene sequence (DQ333944). *L. striatellus* elongation factor 2 (ef2) was amplified as an internal control for the loading of cDNA isolated from different samples. Primers used for *ef2* amplification were ef2-QF / ef2-QR (Table S1). Water was used as a negative control.

**Confocal Microscopy**

To detect VgR localization, *L. striatellus* 48 h posteclosion was dissected and ovary tissues were placed in PBS on silylated glass slides (Sigma cat. no. S4651; St. Louis, MO, USA) and allowed to dry. Tissues were then fixed in 4% paraformaldehyde at room temperature for 1 h. The slides were rinsed twice with PBS and then incubated in PBST/FBS (PBS containing 2% Tween 20 and 2% fetal bovine serum) for 2 h. The slides were then incubated with mouse anti-VgR polyclonal antibody (1:500 dilution in PBST/FBS) for 1 h and then Alexa Fluor 488-labeled goat anti-mouse antibody (1:200 dilution in PBST/FBS) for 1 h. The slides were rinsed three times with PBST at room temperature for 3 min. The samples were examined using a Leica TCS SP8 confocal microscope. For co-localization between VgR and RSV, mouse anti-VgR polyclonal antibody (1:500 dilution) was probed with Alexa Fluor 594-labeled goat anti-mouse antibody (1:200 dilution), while rabbit anti-RSV polyclonal antibody (1:1000 dilution) was probed with Alexa Fluor 488-labeled goat anti-rabbit antibody (1:200 dilution).

**RNA interference**

DNA fragments specific to the *VgR* coding sequence was PCR amplified with primer pair VgR-si-F / VgR-si-R (Table S1). *Ds*RNA was synthesized using a commercial kit (Ambion) and purified by phenol:chloroform extraction and isopropanol precipitation. The 5th instar nymphs that 24 h before eclosion were injected with *ds*RNA. For each insect, 36.8 nl of *ds*RNA at 1 ng/nl was delivered into the insect hemocoel for gene silencing. GFP *ds*RNA, which was used as a negative control, was synthesized and microinjected following the same protocol. The insects were cultured in new chambers with healthy rice seedlings until emergence of adults. Females were transferred to a new chamber for an additional 48 h of culture. Then insects were dissected and the ovaries were collected. Both RT-qPCR and confocal microscopy were performed according to the protocols described above to determine the influence of VgR knockdown to RSV infection. To determine the influence of *VgR*-deficience on insect spawning, individual *VgR*-deficient RSV-infected *L. striatellus* female was continued to co-culture with a RSV-infected male for 14 days.

**Immunoelectron microscopy**

*L. striatellus* female 48 h posteclosion was dissected and ovaries were fixed for 2 h in 2% (v/v) paraformaldehyde and 0.2% (w/v) osmium tetroxide in PBS. Samples were then rinsed three times in PBS for 5 minand were placed in 2.3M sucrose solution for overnight permeation. Ultra sections of 60 nm thickness were cut using a cryostat (Leica) and placed on a nickel mesh. The side carrying the ultrathin section was rinsed twice in ddH2O, blocked with 3% goat serum for 30 min, incubated with mouse anti-VgR (1:500 dilution) and rabbit anti-RSV antibodies (1:1000 dilution)) for 2 h, rinsed three times with PBS three times for 5 min, incubated with 10-nm gold-conjugated goat anti-mouse IgG (1:200 dilution) and 6-nm gold-conjugated goat anti-rabbit IgG (1:200 dilution) for 1 h, rinsed three times with PBS for 5 min, rinsed six times with ddH2O for 1 min, stained in 5% neutral uranyl acetate (w/v in ddH2O water) for 5 min, and rinsed with ddH2O. The sections were observed with a transmission electron microscope (JEM-1400).