

Supplementary Figure 1

(A) Promoter activity of IL-6 under various conditions in MLE12. Each drug was used as described in MATERIALS AND METHODS. (B) IL-6 promoter activity after disruption of CREB and NF κ B binding lesion in MLE12. All values represent mean \pm SEM. **P<0.01, ***P<0.001, ****P<0.0001 versus absence of TNF α and forskolin. # P<0.05, ###P<0.001, #####P<0.0001. (each n=6) by one-way ANOVA with multiple comparison test.

Supplementary Figure 2

(A) Survival rates and (B) body weight change of the *Glp1r*^{+/+} mice and *Glp1r*^{-/-} mice after influenza virus infection (*Glp1r*^{+/+} n=15, *Glp1r*^{-/-} n=10). (C) Cytokines and chemokines gene expression in the lung of *Glp1r*^{+/+} mice and *Glp1r*^{-/-} mice 2 days after influenza virus infection. (each n=5) (D) NP protein gene expression in the lung of *Glp1r*^{+/+} mice and *Glp1r*^{-/-} mice after influenza virus infection. (each n=5) All values represent mean \pm SEM. *P<0.05, **P<0.01, NS: not statistically significant by non-paired t-test (B, C, D) and Log-Lank test (A).

Supplementary Figure 3

The effect of sympathetic block on the survival of the influenza infected mice with liraglutide. NS: not statistically significant by Log-Lank test .

Supplementary Figure 4

(A) Pathway analysis based on the gene expression in the lung 1 day after influenza

administration. (B) Interferons gene expression after influenza virus infection. All values represent mean \pm SEM. (NI: n=3 the other: n=5~6) *P<0.05 by non-paired t-test (B).

Supplementary Figure 5

(A) *Mx1* mRNA transcripts in the lung after influenza infection with or without iraglutide (from the left n=6: 6: 6: 6: 6: 5: 5). (B) Correlation between *NP* and *Mx1* gene expression after influenza virus infection (day1,2,3,7). *Mx1/NP* gene expression ratio after influenza virus infection (from the left n=6: 6: 6: 6: 6: 5: 5: 5). *P<0.05, **P<0.01, ***P<0.001 by one-way ANOVA with multiple comparison test (A) and Mann Whitney test (C).