# Supporting Information

## Yang et al. 10.1073/pnas.1307473110

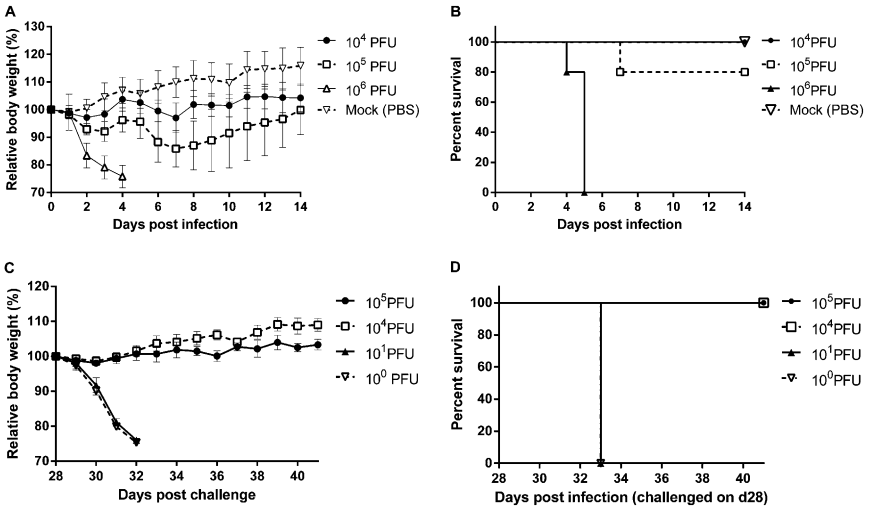


**Fig. S1.** $LD_{50}$ and median protective dose ($PD_{50}$) values of neuraminidase (NA) with minimal gene expression variant ($NA^{Min}$) in mice. (*A* and *B*) Groups of five male BALB/c mice were infected intranasally with different doses of $NA^{Min}$. Relative body weight (*A*) and survival rate (*B*) were monitored for 14 d. The calculated $LD_{50}$ was $2.4 \times 10^5$ plaque-forming units (PFU). (*C* and *D*) Groups of five male mice were vaccinated intranasally with different doses of $NA^{Min}$ variant. At 28 d p.i., mice were challenged with $10^5$ PFU of WT influenza A/PR/8/34 (PR8), and their relative body weight (*C*) and survival rate (*D*) were monitored for 14 d. Error bars represent SD.

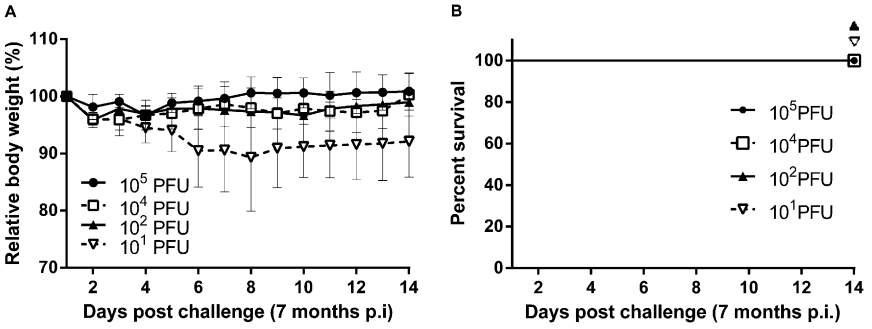


**Fig. S2.** Long-term protection of NA and hemagglutinase (HA) with minimal gene expression $(NA+HA)^{Min}$-vaccinated mice. Groups of five BALB/c mice (5-6 wk old) were intranasally vaccinated with $(NA+HA)^{Min}$ at different doses. After 7 mo, the mice were challenged with $10^5$ PFU of WT PR8, and body weight (*A*) and survival rate (*B*) were monitored for 14 d. Error bars represent SD.