

Amino Sequence: B/Brisbane/60/2008
 DRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTKSHFANLKGTETRGKLCPKCLNCTDL DVALGRPKCTG
 KIP SARVSILHEVRPVTS GCFPI MHDR TKIRQLPNLLRGYE HIRLSTHN VINAENAPGGPYKIGTS GSCP NITNG
 NGFFATMAWAVPKNDKNKTATNPLTIEVPYICTEGEDQITVWGFHSDNETQMAKLYGDSKPQKFTSSANGVT
 THYVSQIGGFNPQTEDGGLPQSGRIVVDYMVQKSGKTGTITYQRGILLPQKVWCASGRSKVIKGS LPLIG EAD
 CLHEKYGGLNKS KPYTGEHAKAIGNCPIWVK TPLKLANGTKYRPPAKLLKERGFFGA IAGFLEGGWEGMIAG
 WHGYTSHGAHGVAVAADLKSTQEAINKITKNLNSLSELEVKNLQRLSGAMDELHNEILELDEKVDDL RADTISS
 QIELAVLLSNEGIINSEDEHLLALERKLKMLGPSAVEIGNGCFETKHKCNQTCLDRIAAGTFDAGEFSLPTFDS
 LNITAASSGR

Amino Sequence: B60-Stem
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTGSANKSKPYTGEHTKTTGNSPIWVCTPLKLANGTK
 YGSAGSATQEAINKITKNLNSLSELEVKNQQRSSGAMDEDHNEILELDEKVDDL RADTIC SQIELAVLLSNEGI
 NSEDEQGTGGGYIPEAPRDGQAYVRKDGEWVLLSTFLHHHHHHHHH

Amino Sequence: B60-Stem-8033
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTGSAKIGTS GSCP NITNGNGFFATMAWAVPKNGSAQ
 MAKLG SALPQSNKSKPYTGEHTKTTGNSPIWVCTPLKLANGTKYGSAGSATQEAINKITKNLNSLSELEVKN
 QQRSSGAMDEDHNEILELDEKVDDL RADTIC SQIELAVLLSNEGIINSEDEQGTGGGYIPEAPRDGQAYVRKD
 EWVLLSTFLHHHHHHHHH

Amino Sequence: B60-Stem-12G6
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTGSAPIKIGTS GSCP NITNGNGFFATMAWAVPKNDGG
 GGS HSDDETQMAKLG GGGSLPQSGGSANKSKPYTGEHTKTTGNSPIWVCTPLKLANGTKYGSAGSATQE
 AINKITKNLNSLSELEVKNQQRSSGAMDEDHNEILELDEKVDDL RADTIC SQIELAVLLSNEGIINSEDEQGTGGGY
 IPEAPRDGQAYVRKDGEWVLLSTFLHHHHHHHHH

Amino Sequence: B60-Stem-SD84
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTGSA RLSTHN VINAENAPGGPYKIGTS GGGGSLNGVTT
 GSANKSKPYTGEHTKTTGNSPIWVCTPLKLANGTKYGSAGSATQEAINKITKNLNSLSELEVKNQQRSSGAM
 DE DHNEILELDEKVDDL RADTIC SQIELAVLLSNEGIINSEDEQGTGGGYIPEAPRDGQAYVRKDGEWVLLSTFL
 HHHHHHHHHH

Amino Sequence: B60-Stem-46B8
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTGSA AKSLN GGGGSLSLPLIGGSANKSKPYTGEHTK
 TTGNSPIWVCTPLKLANGTKYGSAGSATQEAINKITKNLNSLSELEVKNQQRSSGAMDEDHNEILELDEKVDDL
 RADTIC SQIELAVLLSNEGIINSEDEQGTGGGYIPEAPRDGQAYVRKDGEWVLLSTFLHHHHHHHHH

Amino Sequence: B60-Stem-8071
 MDRICTGITSSNSPHVVKATATQGEVNTGVIPLTTTPTKSHFANLKGTETRGKLCPKCLNCTDL DVALGRPKCT
 GKIP SARVSILHEVRPVGSA GSLPLIG EADCLHEKYGGLNKS KPYTGEHTKTTGNSPIWVCTPLKLANGTKY
 GSAGSATQEAINKITKNLNSLSELEVKNQQRSSGAMDEDHNEILELDEKVDDL RADTIC SQIELAVLLSNEGIINSE
 DEQGTGGGYIPEAPRDGQAYVRKDGEWVLLSTFLHHHHHHHHH

Figure S1. Construct design and diagrams of HA stem. Sequences of full length, B60-Stem, B60-Stem-8033(blue), B60-Stem-12G6(yellow), B60-Stem-SD84(purple), B60-Stem-46B8(red) and B60-Stem-8071(yellow).

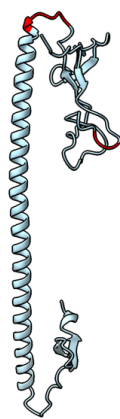


Figure S2. The prediction model of B60-Stem monomer by AlphaFold2. GSA linker was colored red.

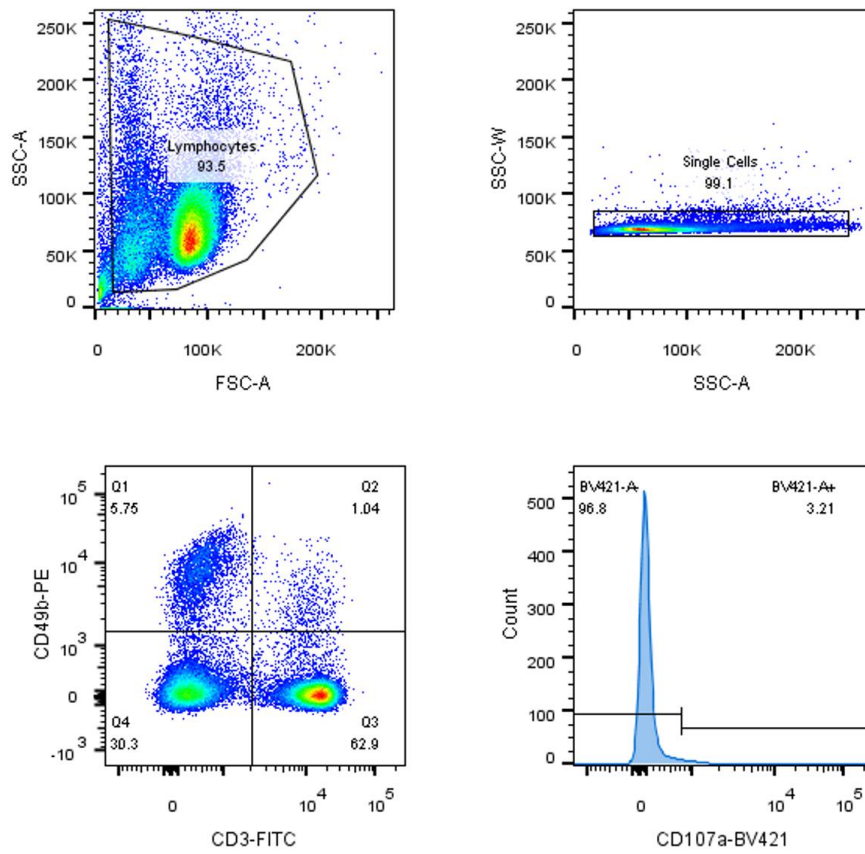


Figure S3. The gating strategy of NK cell activation by FACS. (A) PBMCs isolated from NC group mice, and the cells were stained with anti-mouse antibody FITC-antiCD3, PE-antiCD49b and BV421-antiCD107a.

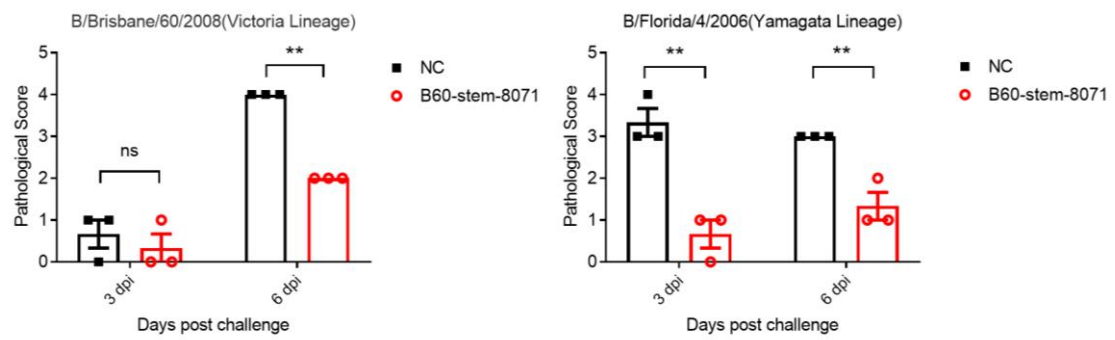


Figure S4. Histological scoring is shown as mean \pm SEM ($n = 3$ mice) with asterisks representing significant differences Significance (* $p < 0.05$, ** $p < 0.01$).

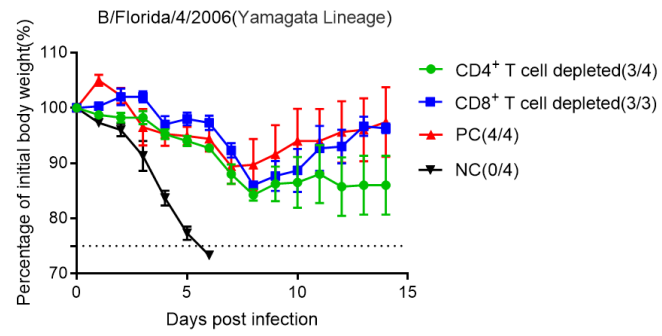


Figure S5. Body weight loss of mice vaccinated with B60-stem-8071 were treated with anti-CD4⁺ (in green) or anti-CD8⁺ T cells antibodies (in blue) after intranasal infection with B/Florida/4/2006.