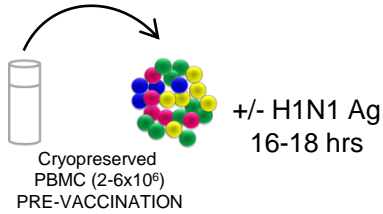
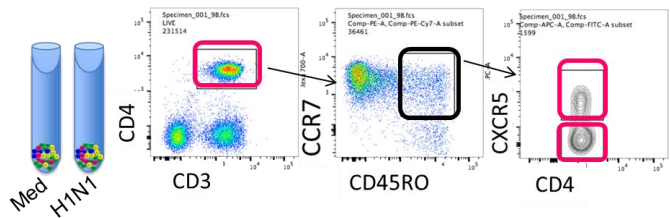
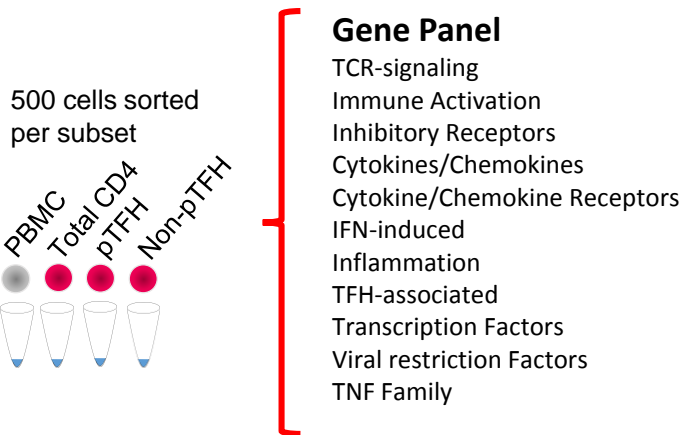
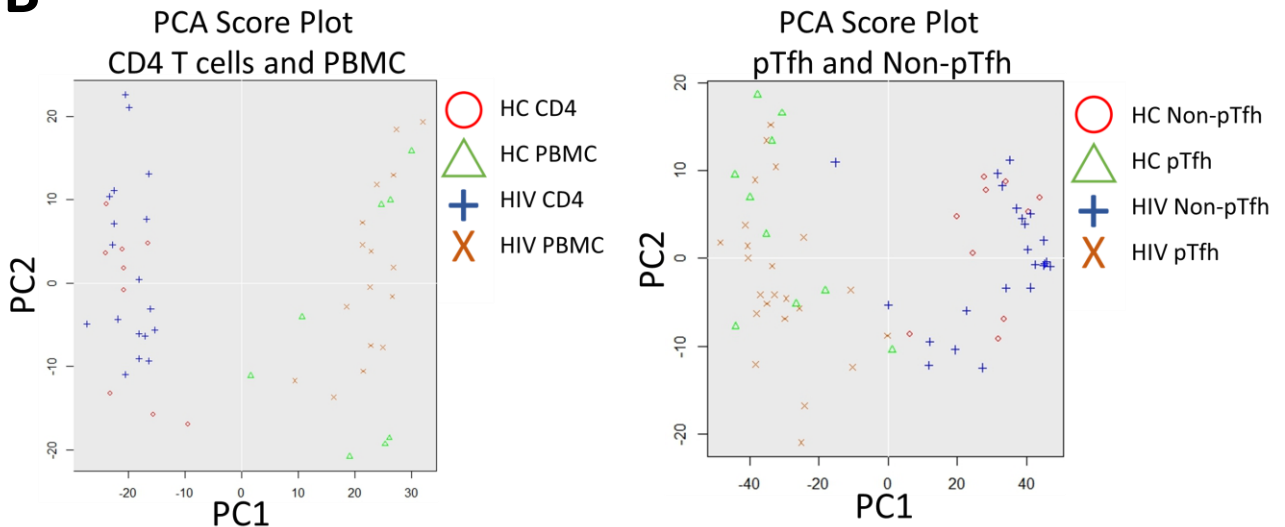


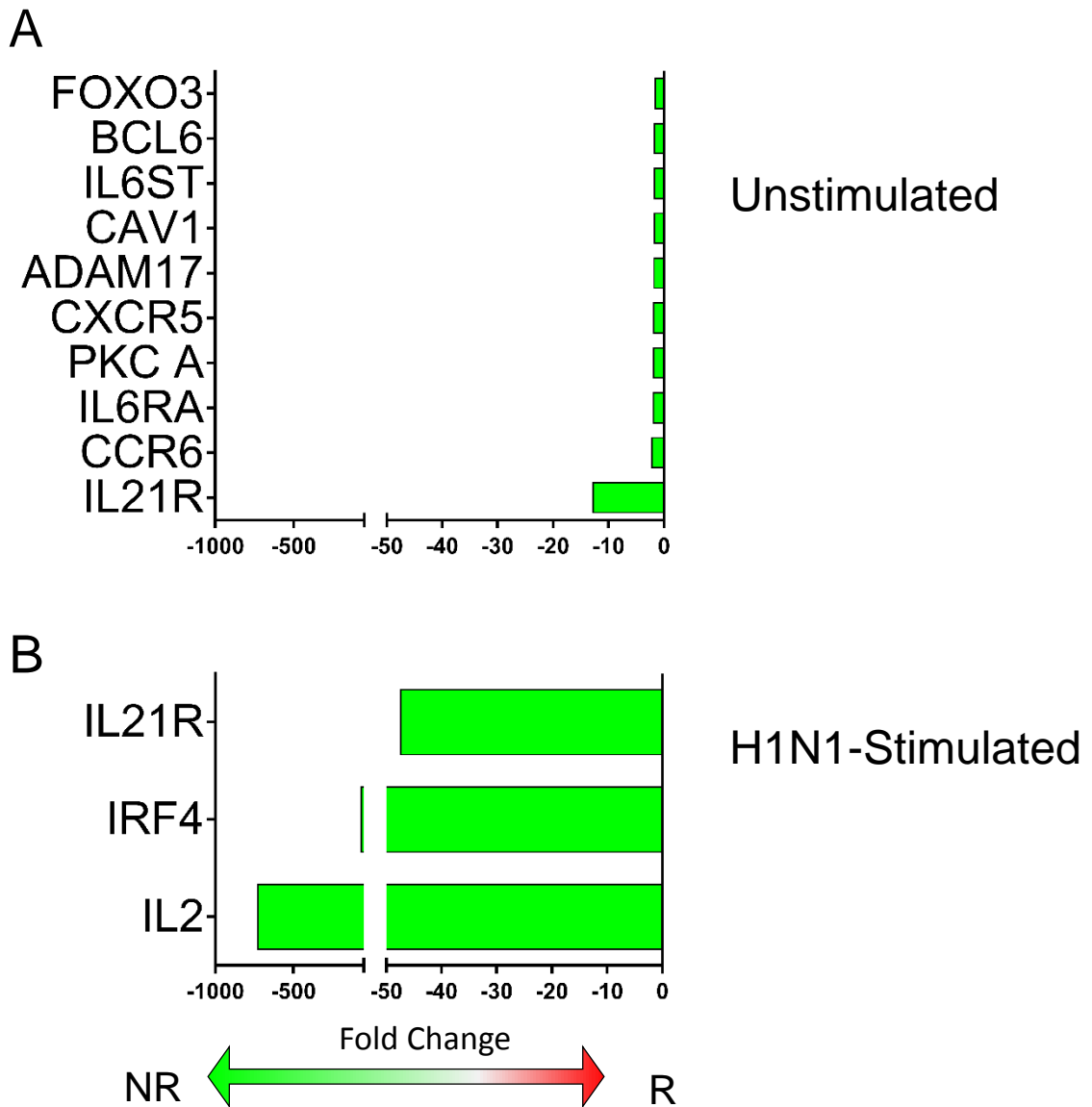
Supplemental Figure 1. Serological and Immunological Assessment of Response to Influenza Vaccine Strains. **A)** Serum titer fold changes, and **B)** Memory B cell ELISpot data from 5 day stimulation cultures, are shown in box and whisker plots for HIV+ responders (R) and non-responders (NR) as previously defined for response to H1N1. Statistical significance was determined by student's T test, *** denotes p value<0.001.

Supplemental Table 1. Gene Panel for Fluidigm BioMark Experiment

GENE NAME	GENE FAMILY	TAQMAN ASSAY ID	GENE NAME	GENE FAMILY	TAQMAN ASSAY ID
CXCR3	Chemokine Receptors	Hs00171041_m1	TGIF1	Other	Hs00820148_g1
CXCR4	Chemokine Receptors	Hs00607978_s1	CAMK4	TCR-signaling	Hs00174318_m1
CCR2	Chemokines	Hs00356601_m1	CAV1	TCR-signaling	Hs00971716_m1
CCR6	Chemokines	Hs00171121_m1	CD3D	TCR-signaling	Hs00174158_m1
CCR7	Chemokines	Hs00171054_m1	CD4	TCR-signaling	Hs00181217_m1
IL21R	Cytokine Receptors	Hs00222310_m1	DUSP4	TCR-signaling	Hs01027785_m1
IL2RA	Cytokine Receptors	Hs00166229_m1	DUSP6	TCR-signaling	Hs04329643_s1
IL6RA	Cytokine Receptors	Hs00169842_m1	FYN	TCR-signaling	Hs00941600_m1
IL6ST	Cytokine Receptors	Hs00174360_m1	MAPK3	TCR-signaling	Hs00533968_m1
IL7R	Cytokine Receptors	Hs00233682_m1	NFATC1	TCR-signaling	Hs00542678_m1
IFNG	Cytokines	Hs00174143_m1	NFKB1	TCR-signaling	Hs00765730_m1
IL10	Cytokines	Hs00961622_m1	PRKCA	TCR-signaling	Hs01041915_m1
IL12Rb2	Cytokines	Hs01548202_m1	PLCG	TCR-signaling	Hs01008225_m1
IL1B	Cytokines	Hs01555410_m1	SYK	TCR-signaling	Hs00374292_m1
IL2	Cytokines	Hs00174114_m1	ZAP70	TCR-signaling	Rh02837378_m1
IL6	Cytokines	Hs00985639_m1	BCL6	TFH-associated	Hs00277037_m1
FOXO3	IFN-induced	Hs00921424_m1	CD40L	TFH-associated	Hs00163934_m1
IFIT2	IFN-induced	Hs00533665_m1	CXCR5	TFH-associated	Hs00173527_m1
IFNAR2	IFN-induced	Hs01022060_m1	ICOS	TFH-associated	Hs00359999_m1
MX1	IFN-induced	Hs00895608_m1	ID2	TFH-associated	Rh02796147_m1
OAS1	IFN-induced	Hs00973637_m1	ID3	TFH-associated	Hs00171409_m1
CD38	Immune Activation	Hs01120071_m1	IL21	TFH-associated	Hs00222327_m1
CD69	Immune Activation	Hs00934033_m1	IRF4	TFH-associated	Hs01056533_m1
CD74	Immune Activation	Hs00959498_g1	MAF	TFH-associated	Hs00193519_m1
PIK3C2B	Immune Activation	Hs00898518_m1	PDCD1	TFH-associated	Hs00169472_m1
SOCS1	Immune Activation	Hs00705164_s1	PRDM1	TFH-associated	Hs00153357_m1
ABCB1	Inflammation	Hs00184500_m1	SELL	TFH-associated	Hs00174151_m1
ADAM17	Inflammation	Hs01041915_m1	LIGHT	TNF Family	Hs00998604_m1
CCR5	Inflammation	Hs00152917_m1	TNF	TNF Family	Hs00174128_m1
CXCL10	Inflammation	Hs00171042_m1	TNFRSF4	TNF Family	Hs00533968_m1
CYBB	Inflammation	Hs00166163_m1	TNFSF13	TNF Family	Hs00182565_m1
FAS	Inflammation	Hs00531110_m1	BATF	Transcription Factors	Hs00232390_m1
ICAM1	Inflammation	Hs00164932_m1	EOMES	Transcription Factors	Hs00172872_m1
ITCH	Inflammation	Hs00395201_m1	FOXP3	Transcription Factors	Hs00203958_m1
NOD2	Inflammation	Hs01550762_g1	GATA3	Transcription Factors	Hs00231122_m1
PTEN	Inflammation	Hs02621230_s1	RORA	Transcription Factors	Hs00536545_m1
CTLA4	Inhibitory Receptors	Hs00175480_m1	RORC	Transcription Factors	Hs01076112_m1
HAVCR2	Inhibitory Receptors	Hs00958623_m1	RUNX3	Transcription Factors	Hs00231709_m1
KLRG1	Inhibitory Receptors	Rh00929962_m1	STAT1	Transcription Factors	Hs01013996_m1
LAG3	Inhibitory Receptors	Hs00158563_m1	STAT3	Transcription Factors	Hs01047580_m1
LILRB1	Inhibitory Receptors	Hs01848117_s1	STAT4	Transcription Factors	Rh02896026_m1
PDL1	Inhibitory Receptors	Hs00228839_m1	STAT5A	Transcription Factors	Rh02844611_m1
TIGIT	Inhibitory Receptors	Hs00545087_m1	TBX21	Transcription Factors	Hs00894392_m1
CD2	Other	Hs00233515_m1	TFAM	Transcription Factors	Hs00273372_s1
DOCK8	Other	Hs00298892_m1	APOBEC3G	Viral restriction Factors	Hs00222415_m1
MTOR	Other	Hs00234508_m1	BST2	Viral restriction Factors	Hs00171632_m1
PTX3	Other	Hs00173615_m1	PRF1	Viral restriction Factors	Hs00169473_m1
TGIF1	Other	Hs00820148_g1	SAMHD1	Viral restriction Factors	Hs00210019_m1
CAMK4	TCR-signaling	Hs00174318_m1	TRIM5	Viral restriction Factors	Hs01552559_m1

AIn vitro StimulationFACS SortingFluidigm BioMark on Cell Subsets**B**

Supplemental Figure 2. Fluidigm BioMark Experiment. A) Experimental Design Schematic: In vitro Stimulation, FACS Sorting, and Fluidigm. Principle Component Analysis on Subsets analyzed by Fluidigm. B) PCA comparing CD4 T cells and PBMC from HIV+ and HIV-uninfected participants (left) and pTfh and non-pTfh from HIV+ and HIV-uninfected participants (right). PCA plots were generated from Fluidigm data using SingulaR package in R.



Supplemental Figure 3. Differential gene expression analysis in PBMC from pre-vaccination samples isolated from HIV+ Responders (R) and Non-Responders (NR) before (**A**) and after H1N1 stimulation (**B**). Bars show the fold difference in expression between R and NR groups (ANOVA, p -value <0.05 , Fold Change >1.5).