Supplemental Figures

Supplemental Figure 1 – PCB Absorption Spectrum Matches Expected. (a) Resulting absorption spectrum measured via spectrophotometer. (b) Reported spectrum from literature. Adapted with permission from Soring Nature, Nature Protocols, “Control of gene expression using a red- and far-red light-responsive bi-stable toggle switch,” Konrad Muller, Matias D. Zurbriggen, Wilfried Weber, 2014
Supplemental Figure 2 – Comparison of Transfection Methods to Optimize Transgene Expression and Cell Health. (a) Transfection efficiency of HeLa cells under two methods outlined in Table 1 using plasmid pITR-VEGF-P2A-EGFP (Table 2). Under Method A, seeding density does not have a significant effect on transfection efficiency. Seeding density does have an effect on transfection efficiency on Method A as more cells yields lower efficiency. (b) The geometric mean of fluorescence of all EGFP+ cells in arbitrary units. Both methods result in an inverse relationship between seeding density and geometric mean. (c) Representative histograms of flow cytometry data collected for each method and each seeding density.
Supplemental Figure 3 - Optimization of Technical Transduction Skills. Transduction with WT and VNP-PIF6 delivering pITR-EGFP (Table 2) (a) For each virus, we observe the trend in transduction index as we increase MOI. Fold changes re close to reasonable for each increase in MOI. (b) A scatter plot of the same data as a function of MOI shows good linear fits for each virus, suggesting appropriate technique.
Supplemental Figure 4 – PCB Plays a Significant and Unknown Role in Transduction Index. Transduced with WT and VNP-PIF6 packaging pITR-EGFP (Table 2) at MOI = 2000 (a) TI as a function of different concentrations of PCB in DMSO and just PCB to elucidate which component increases the TI. From these data, addition of PCB but not DMSO increases TI. (b) TI is dependent upon the concentration of added PCB at a constant MOI.
Supplemental Figure 5 – Impact of Light Program Length on System Performance. From these data, the longer applied light program does not improve system performance. Data following 5hr incubation is consistently lower than the 2hr incubation, but we hypothesize this is due to experimental variation. The trends remain identical between the conditions. Viruses packaging pITR-EGFP (Table 2). MOI = 2000. R = 25 µmol/m²s. FR = 10 µmol/m²s. Striped bars under light condition for 1 hour, solid bars under light condition for 5 hours.
Supplemental Figure 6 – HeLa-BmCT Cells Amenable to PEI Transfections.
(a) Transfection efficiency of HeLa-BmCTs using Method A (Table 1) with PEI and pTP003 (Table 2). (b) A representative histogram of unmodified cells with the blue line representing the manually set fluorescent gate. (c) A representative histogram of transfected cells.
Supplemental Figure 7 – Scaffold Thickness Impacts Transmitted Light. As gelatin scaffolds increase in the thickness, the amount of light transmitted (as read on a plate reader) decreases, suggesting attenuation and absorbance of light.