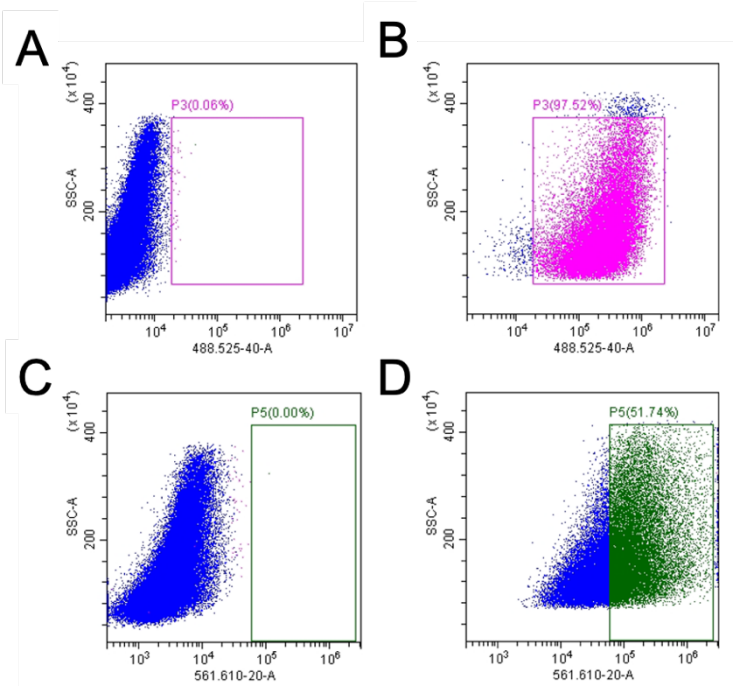
# *Supplementary Material*

## Supplementary Figures




**Supplementary Figure 1: Flow cytometric analysis of channelrhodopsin expression in HL-1 cells.** Transduction of HL-1 cells with the CheRiff-encoding LV or the ChR2(H134R)-encoding AAVV resulted in 97.52% eGFP$^{+}$ (B) and 51.74% mCherry$^{+}$ (D) HL-1 cells, respectively, *versus* 0.06% (A) and 0.00% (C) of positive hits under control conditions.

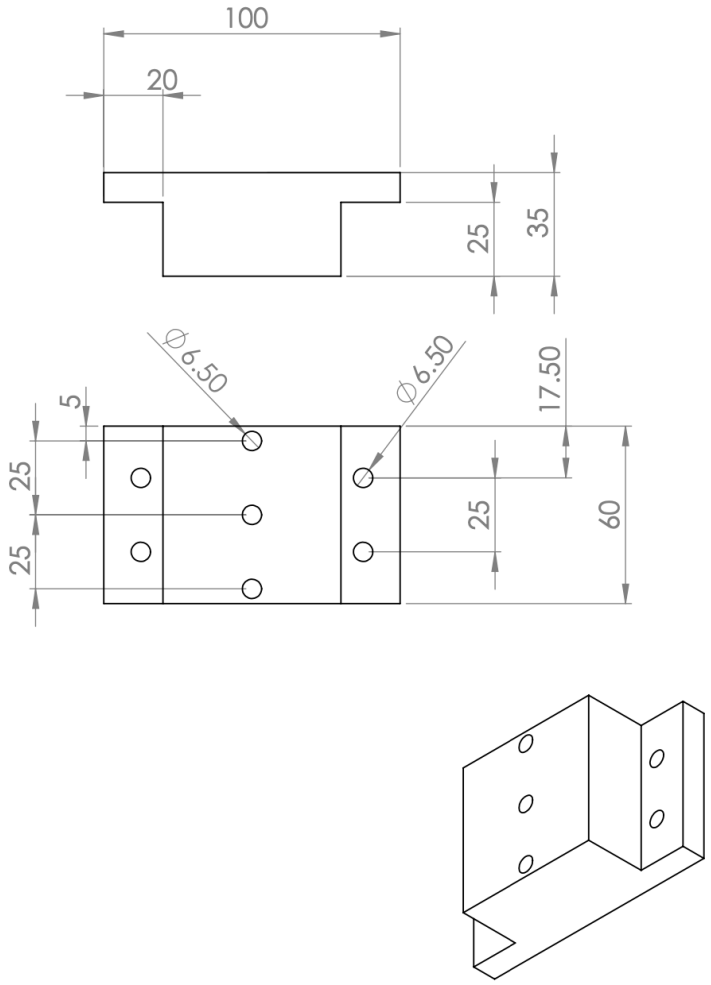



**Figure S2: Camera holder technical drawing.**

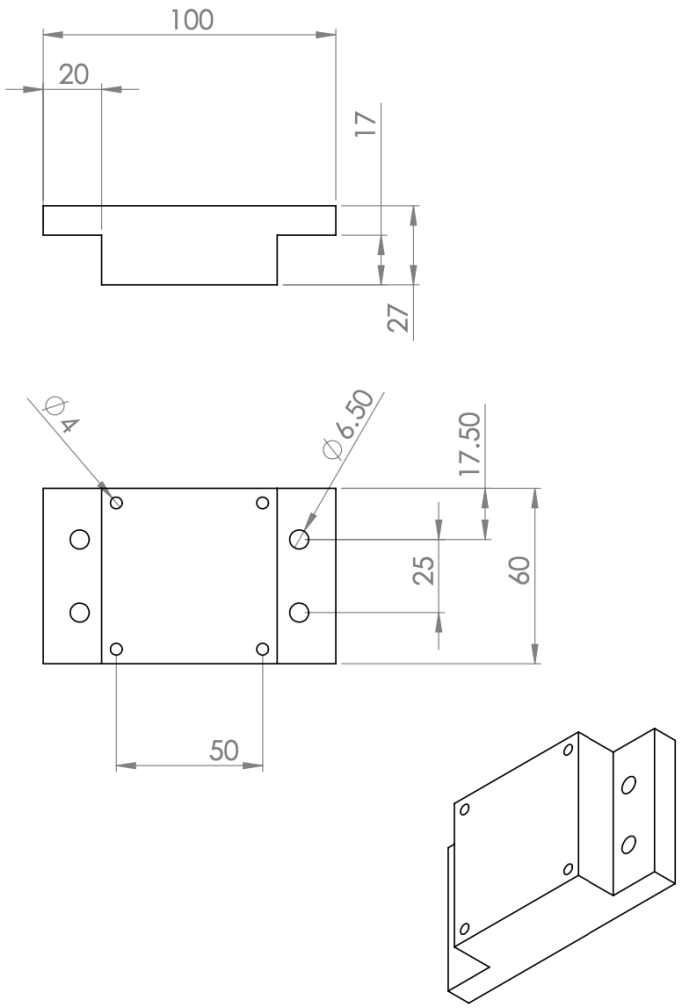



**Figure S3: Cube holder technical drawing.**

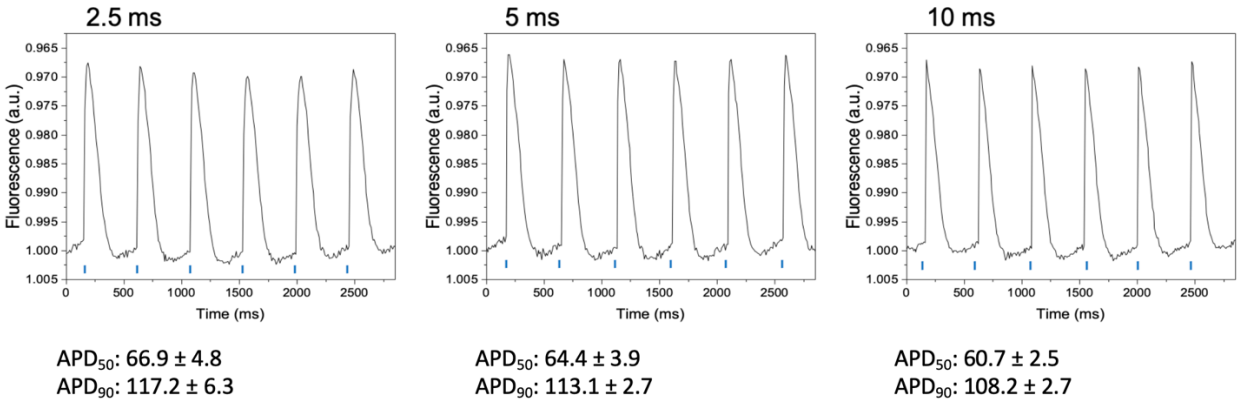



**Figure S4: Optical recording of optogenetically induced APs in channelrhodopsin-expressing HL-1 cells using short blue light pulses.** Representative traces of APs elicited by applying a blue light pulse of 2.5, 5 or 10 ms. In this proof of principle experiment, the blue light intensity was raised by removing the divergence lens after the LED matrices. This allows stimulating the central portion of the multi-well plate (approximately four wells) with a blue light intensity of the order of 2 mW/mm$^2$. Red light intensity was set at the same value used in the experiment described in the main text. $APD_{50}$ and $APD_{90}$ are reported for each pulse length on the average of four wells.