

Tether-free Optogenetic Control of Insulin Secretion by Upconversion Nanoparticles Doped Hydrogel Platform

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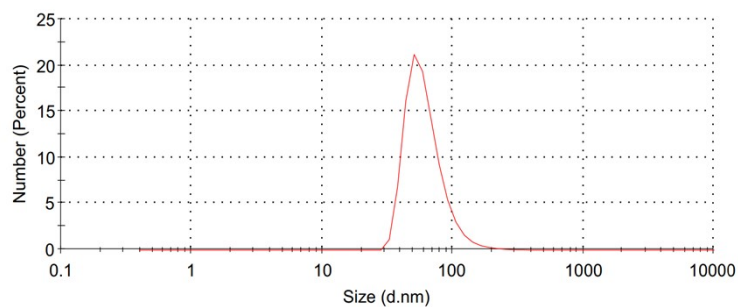


Figure S1. DLS size distribution of the silica coated UCNPs.

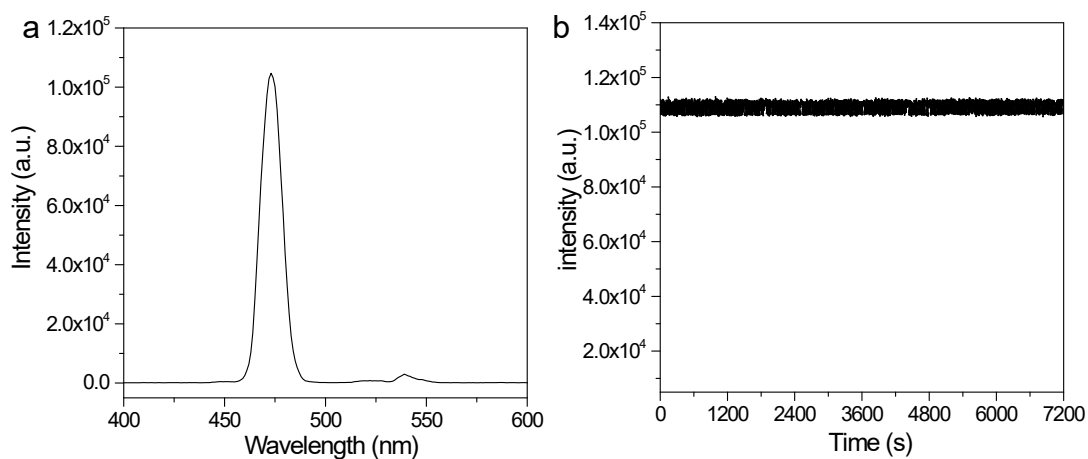


Figure S2. a) Luminescence spectrum of the silica-coated UCNPs. b) The luminescence variations of silica-coated UCNPs when irradiated at a 2.5 W/cm² of 980 nm laser for 2h, and the fluorescence intensity of emission peak at 470 nm was recorded with an interval of 1 s.

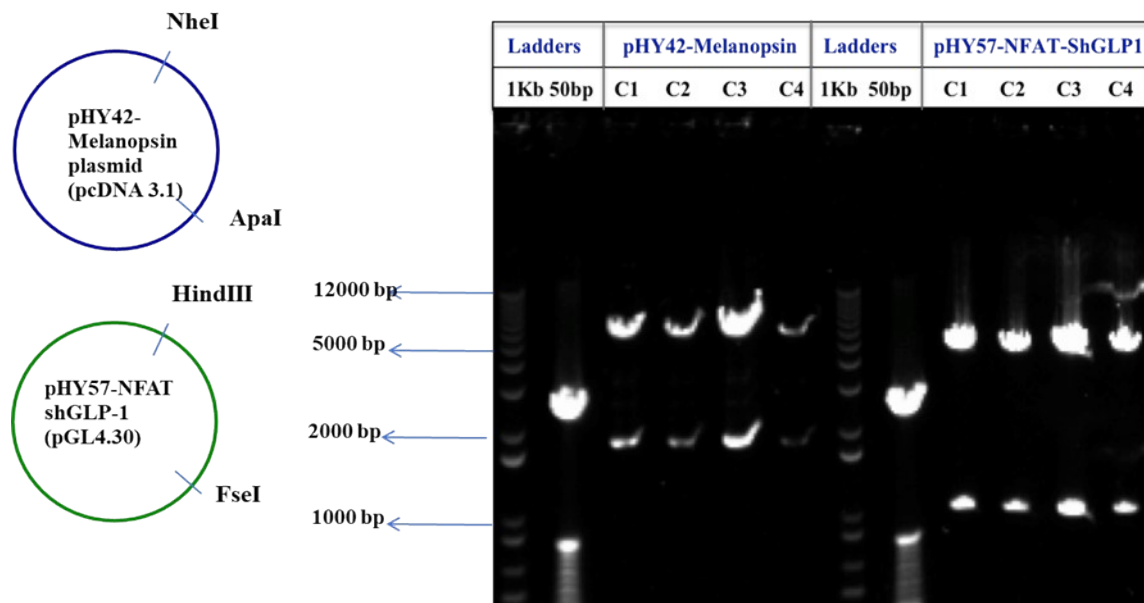


Figure S3. Gel electrophoresis to show DNA fragments after restriction digestion to confirm presence of inserts.

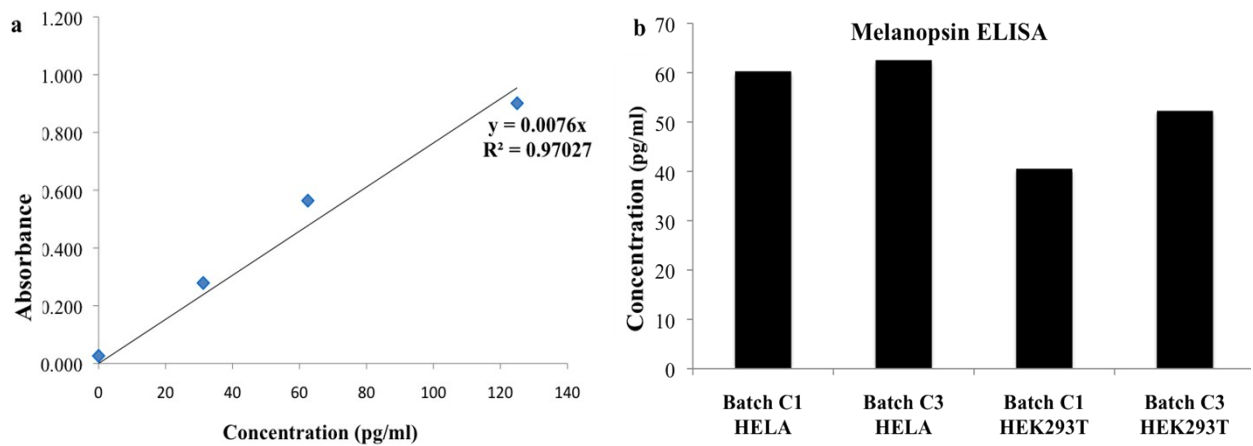


Figure S4. Standard curve for melanopsin (a) and graph showing melanopsin expression due to randomly selected plasmid batches C1 and C3 in HELA and HEK293T cells (b).

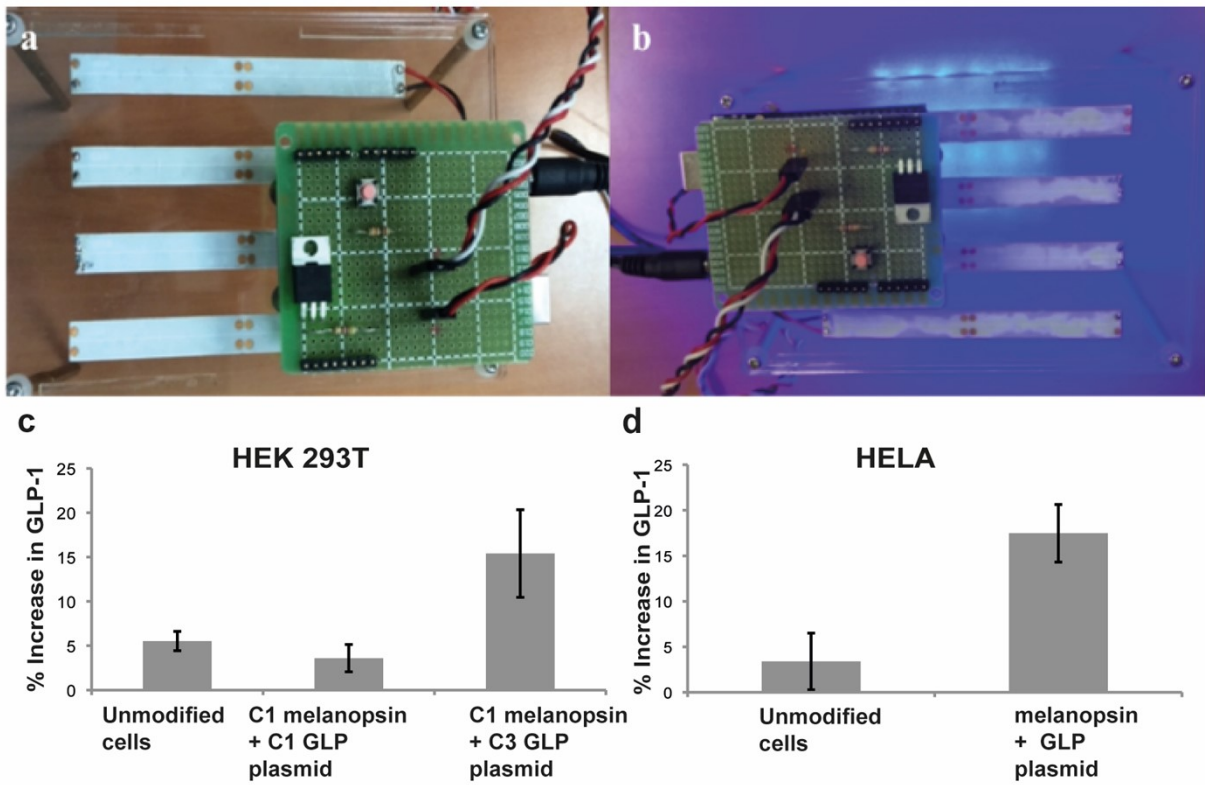


Figure S5. Customized blue LED array to deliver light pulses, off mode (a) and on mode (b). Graphs showing increasing in GLP-1 production in HEK293T and HELA cells, (c) and (d) relative to GLP-1 produced in the absence of light.

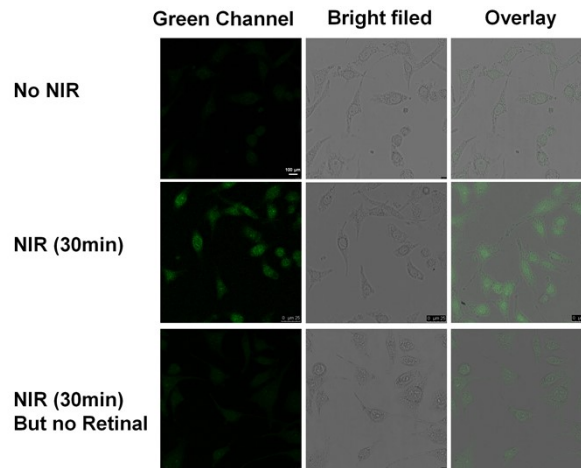


Figure S6. Fluorescent images of HEK293T cells to indicated the influx of calcium ions under different conditions.

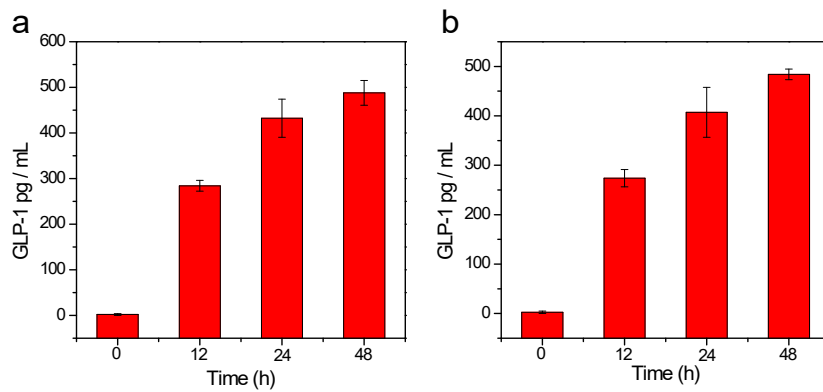


Figure S7. GLP-1 generation amount during different time incubations after the hydrogel was illuminated with NIR light (980 nm, 2.5W/cm²) exposure for 2 h. a) Freshly-prepared hydrogel. b) After the hydrogel was stored for two weeks.