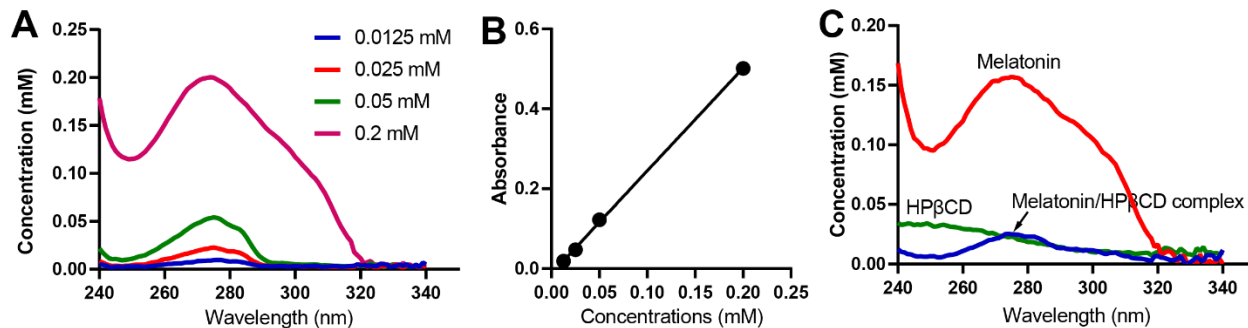
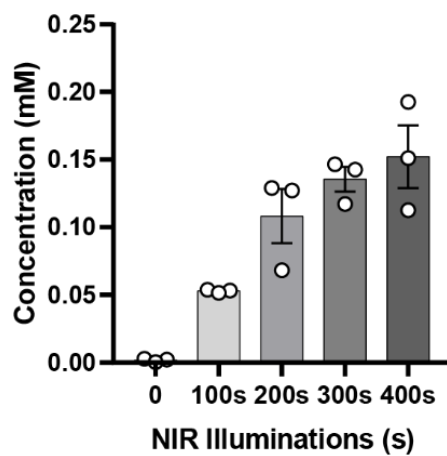


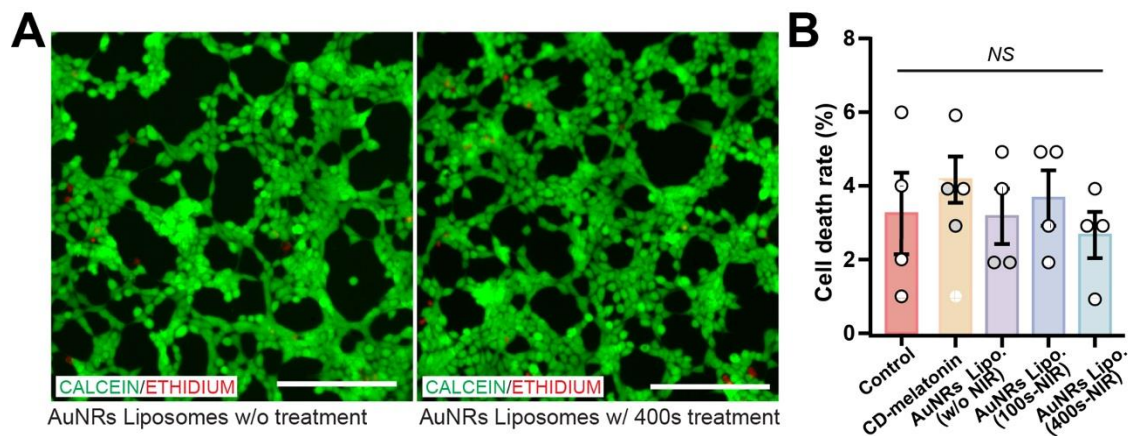
## Supplementary Information



**Supplementary Figure 1:** (A) Absorption spectra of melatonin at different concentrations. (B) Absorbance trend at 278 nm over time. (C) UV-vis absorption spectra of (green) HPβCD, (blue) melatonin/HPβCD complex after encapsulation, and (red) melatonin before the encapsulation.



**Supplementary Figure 2:** NIR-triggered release of melatonin from liposomes with a series of illumination times ranging from 100 seconds to 400 seconds at 11.2 mW. Data are represented as means  $\pm$  S.D. ( $n = 3$  independent samples).



**Supplementary Figure 3:** (A) Representative fluorescent microscopy images and cell death quantification (B) assess the cytotoxicity impact of liposomes on HEK293 cells, under conditions of AuNRs liposome in the presence or absence of NIR illuminations (11.2 mW, 400 seconds). Live cells are identified by Calcein-AM green staining, whereas dead cells are marked with red ethidium homodimer-1 staining. Data are represented as means  $\pm$  SEM ( $n = 4$  independent samples). NS = no significant difference.