

Supplemental Methods:

Lighting during the experimental protocol: Lighting was provided by ceiling-mounted fluorescent lamps transmitted through ultraviolet-shielding filters (Lexan, GE plastics). On the second and third (baseline) study days the light intensity was approximately 0.23 W/m^2 (~89 lux) at 137 cm from the floor facing the wall with a maximum of 0.48 W/m^2 (~150 lux) at 187 cm from the floor facing the ceiling. On the admission day, throughout the CRs, and on the intervention day (except during the 6.5h LE) the light intensity was approximately 0.0087 W/m^2 (~3.3 lux) at 137 cm from the floor facing the wall with a maximum of 0.048 W/m^2 (~15 lux) at 187 cm from the floor facing the ceiling. During scheduled sleep episodes, all lights were switched off.

Determination of the target illuminance for the light exposure protocol: In our earlier study (Duffy et al. 2007), the illuminance-response data from a series of older adults were fit with a four-parameter logistic model derived from the Michaelis-Menton equation (a non-linear least square analysis, see below) and compared with a model fit to data from young adults (Zeitzer et al. 2000). Among the model estimates for illuminance-response changes in melatonin phase, only the sensitivity term was significantly different between the age groups, and the model for the older subjects predicted an inflection point (i.e. the sensitivity of the system) at ~270 lux.

Light exposure (LE): Throughout the 6.5h LE the participant wore clear UV-excluding glasses (UVEX Ultraspec 2000, UVEX Safety). In alternating 6-min segments throughout the LE the participant was instructed to gaze at a location on the wall where they would receive the target experimental light level. The illuminance (lux) in the average angle of gaze was recorded using an IL 1400 light meter (International Light Technologies).

Constant Routine protocol: Throughout each CR, the participant remained awake, inactive, and in a semi-recumbent posture in bed. A staff member remained in the room to ensure wakefulness and compliance with the protocol. The room lighting remained at the same (dim)

level, room temperature was maintained at ~22 °C, and the participant was provided an identical equicaloric snack each hour.