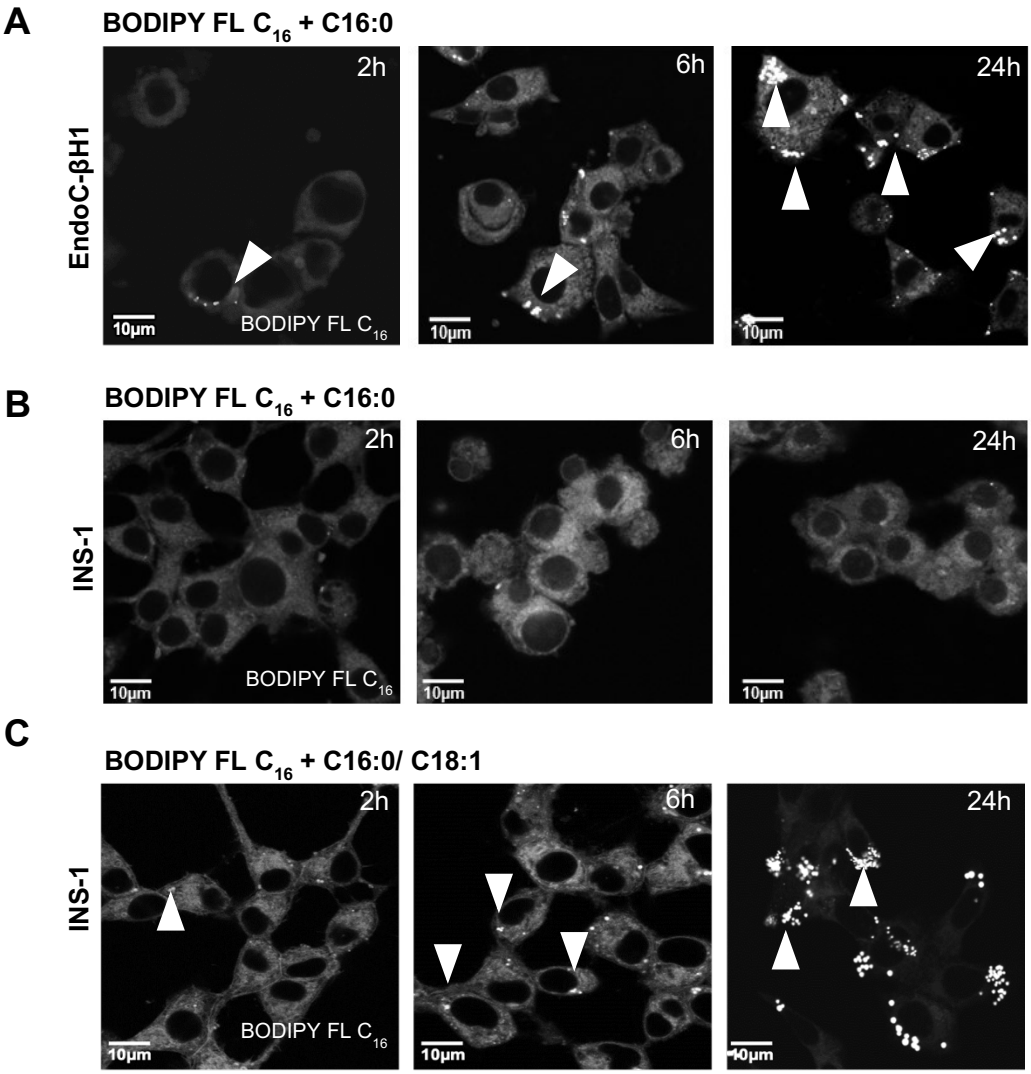
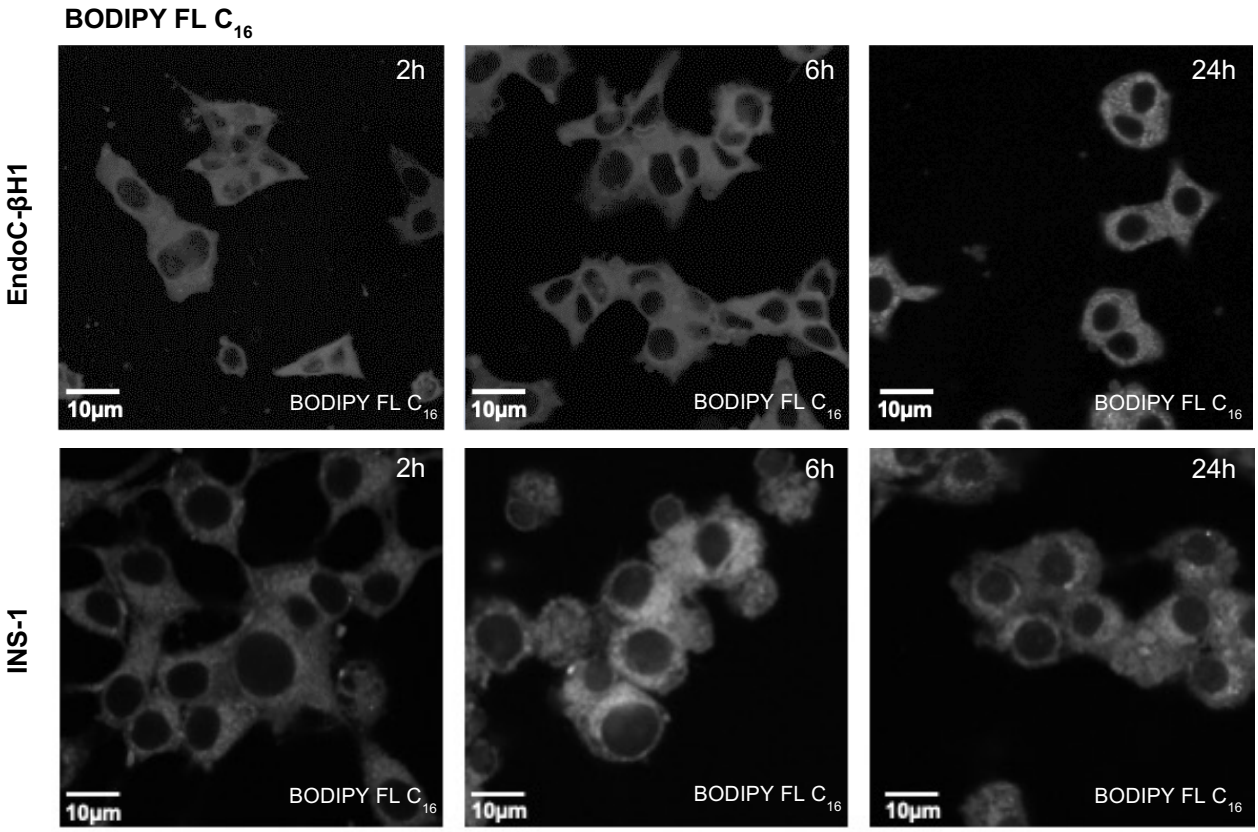
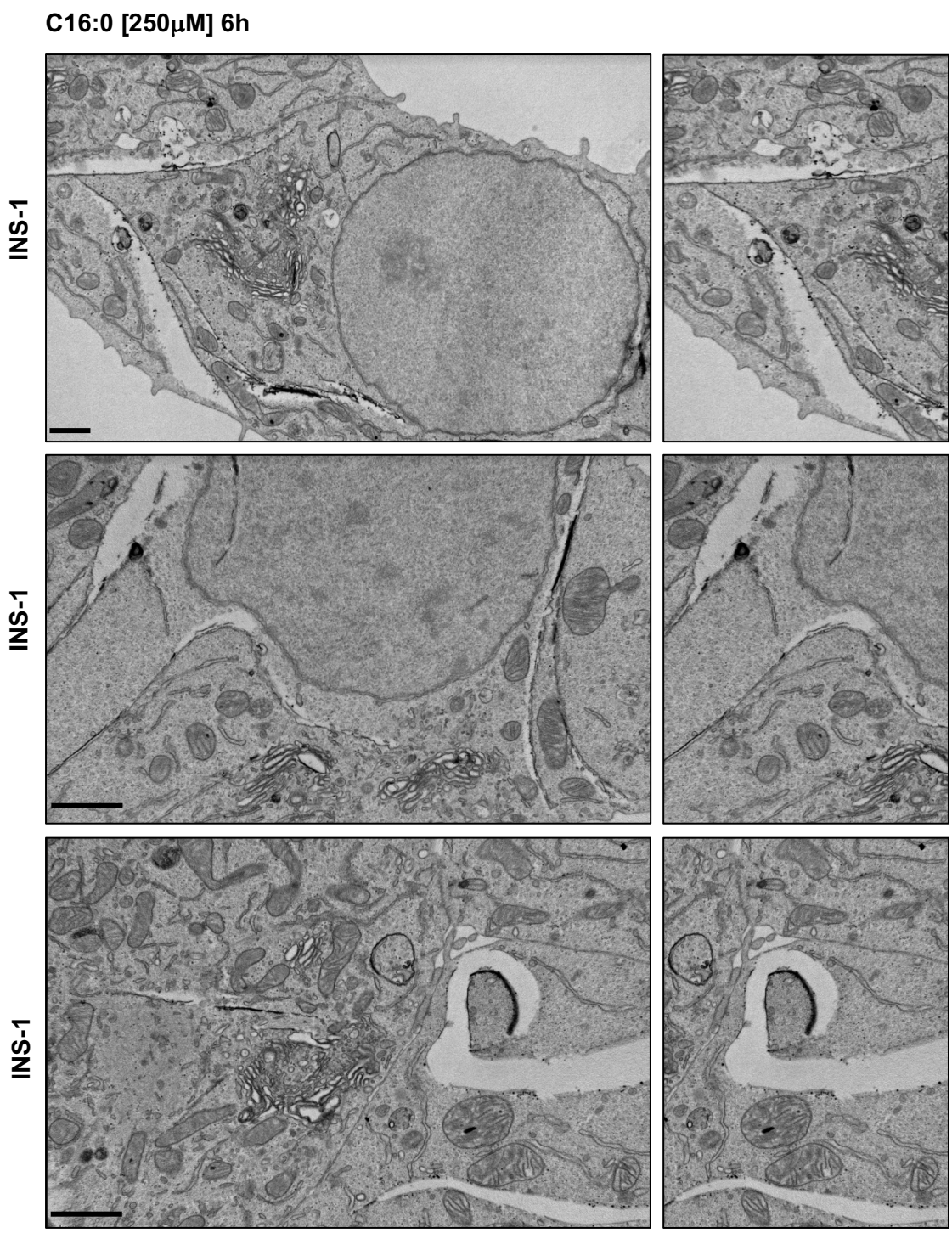
| **Table S1: Antibodies used within this study** | | |
|---|---|---|
| **Primary Antibody** | **Manufacturer, host and clonality** | **Conditions and secondary detection system** |
| **PLIN2** | Progen GP40<br>Guinea pig polyclonal | Immunofluorescent staining (1:100 for 16h at 4℃) using Fluor-conjugated goat anti-guinea pig secondary antibody (1:400 for 1h; Invitrogen) |
| **peIF2α** | Cell Signalling Technologies 3398P<br>Rabbit monoclonal | Western blotting (1:1000 for 16h at 4℃) using HRP-linked anti-rabbit secondary antibody (1:5000 for 1h; Agilent Dako) |
| **Total eIF2α** | Cell Signalling Technologies 5324P<br>Rabbit monoclonal | Western blotting (1:1000 for 16h at 4℃) using HRP-linked anti-rabbit secondary antibody (1:5000 for 1h; Agilent Dako) |
| **CHOP (INS-1)** | Santa Cruz sc-575<br>Rabbit polyclonal | Western blotting (1:200 for 16h at 4℃) using HRP-linked anti-rabbit secondary antibody (1:5000 for 1h; Agilent Dako) |
| **CHOP (EndoC-βH1)** | Proteintech Europe 15204-1-AP<br>Rabbit Polyclonal | Western blotting (1:500 for 16h at 4℃) using HRP-linked anti-rabbit secondary antibody (1:5000 for 1h; Agilent Dako) |
| **GAPDH** | Hytest 5G4<br>Mouse monoclonal | Western blotting (1:10,000 for 16h at 4℃) using HRP-linked anti-mouse secondary antibody (1:5000 for 1h; Thermo Fisher Scientific) |



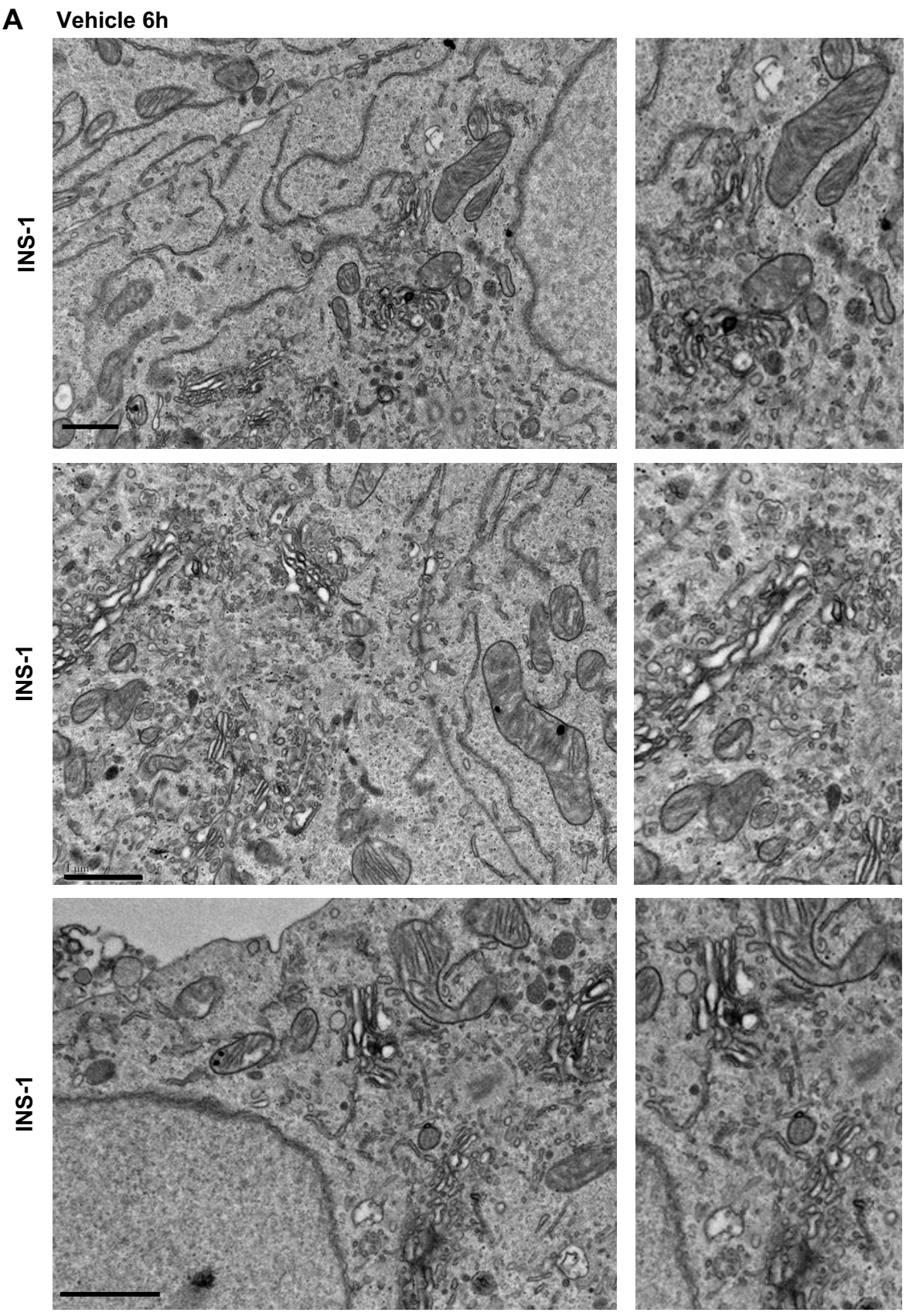

**S2:** Representative images of EndoC-βH1 **(A)** and INS-1 cells **(B)** exposed to C16:0 [500µM] BODIPY FL $C_{16}$ [400nM] alone or in combination with 250µM C18:1 for 2h, 6h or 24h. Scale bars 10µm.

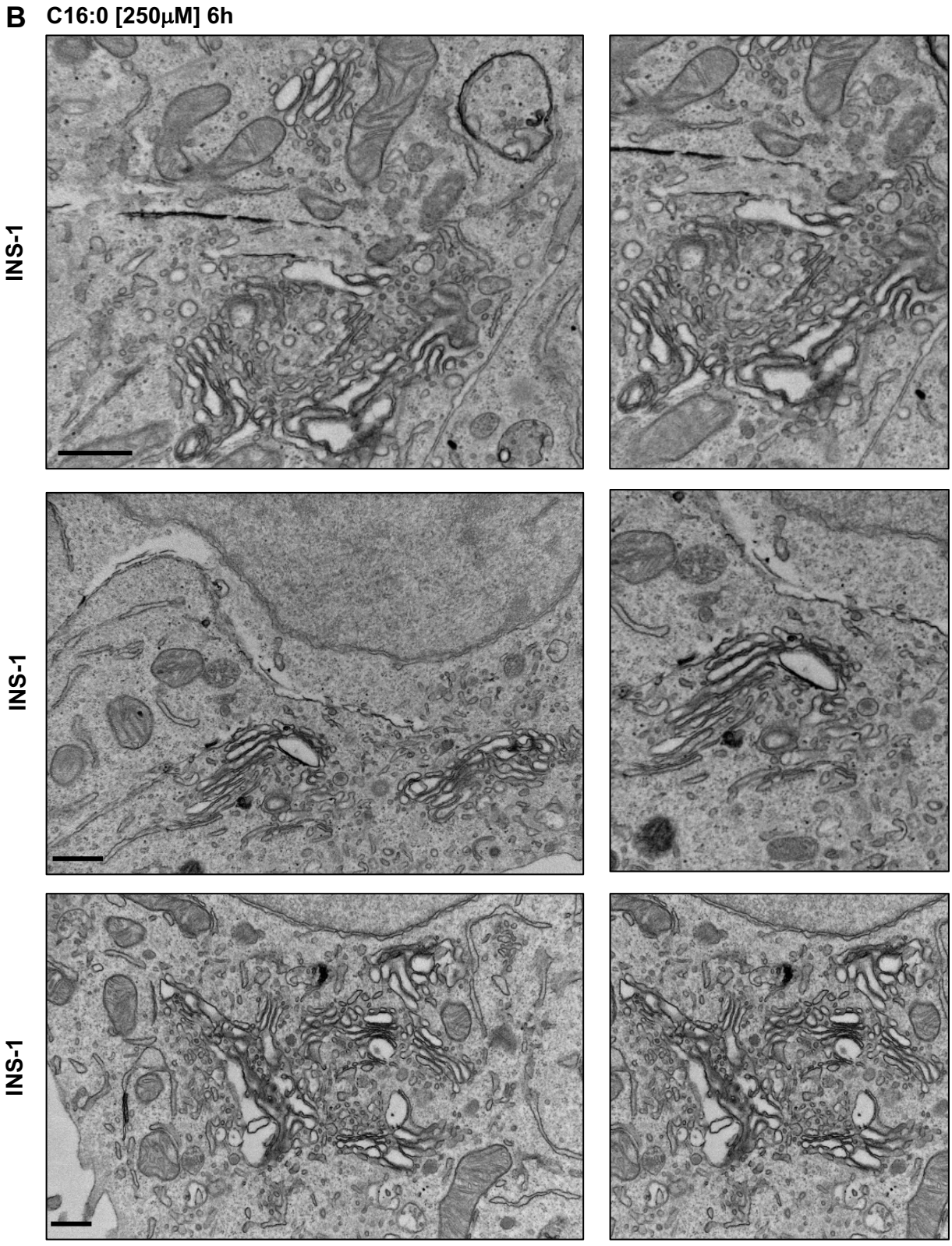



**S3:** Representative images of EndoC-βH1 **(A)** and INS-1 cells **(B)** exposed to the BODIPY FL $C_{16}$ [400nM] tracer only for 2h, 6h or 24h. Scale bars 10µm.

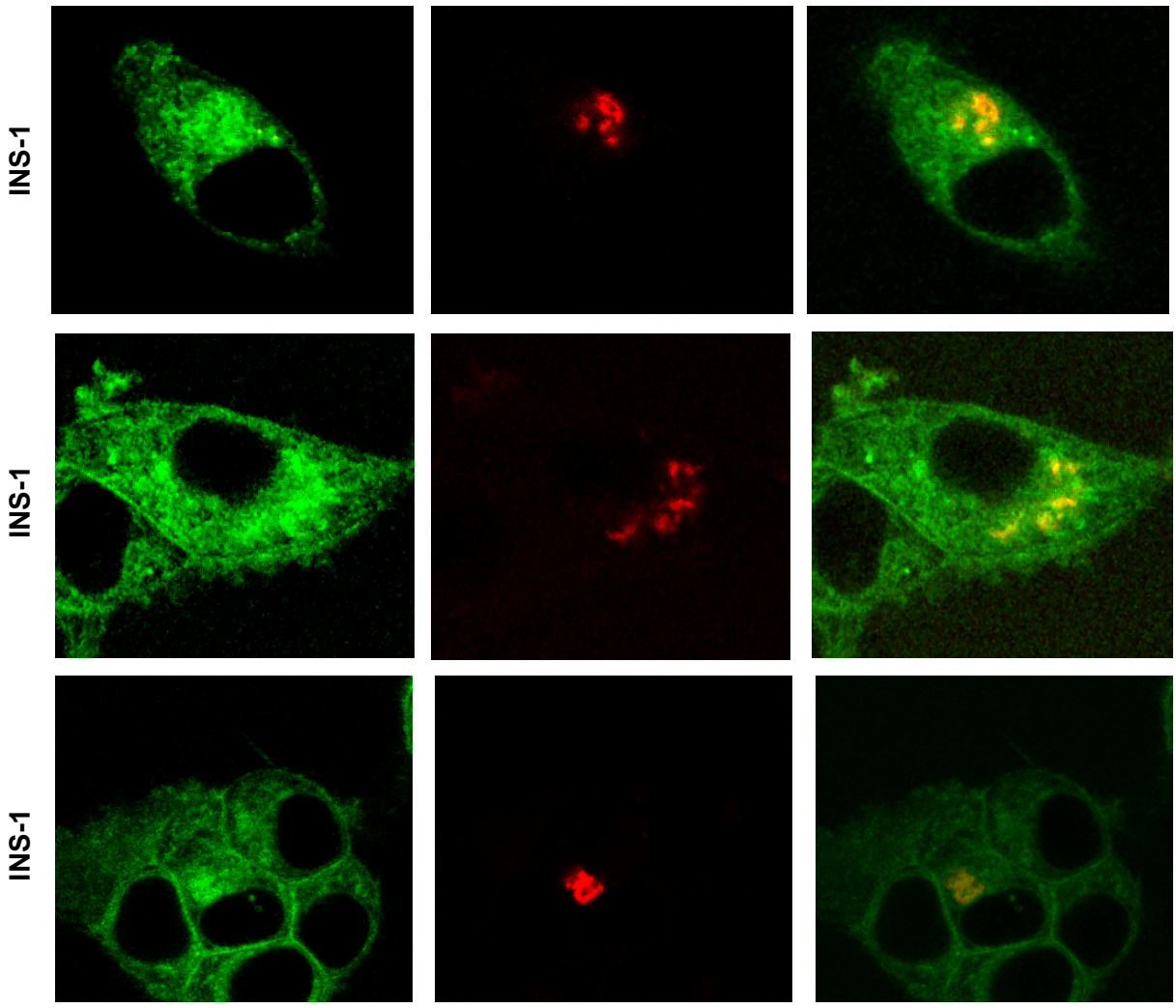



**S4:** The effect of C16:0 on intracellular membrane morphology in INS-1 cells**.** INS-1 cells were treated for 6hrs with 250μM C16:0. INS-1 cells were then fixed in an osmium tetroxide fixative before being imaged with TEM. Scale bar represents 1μm.

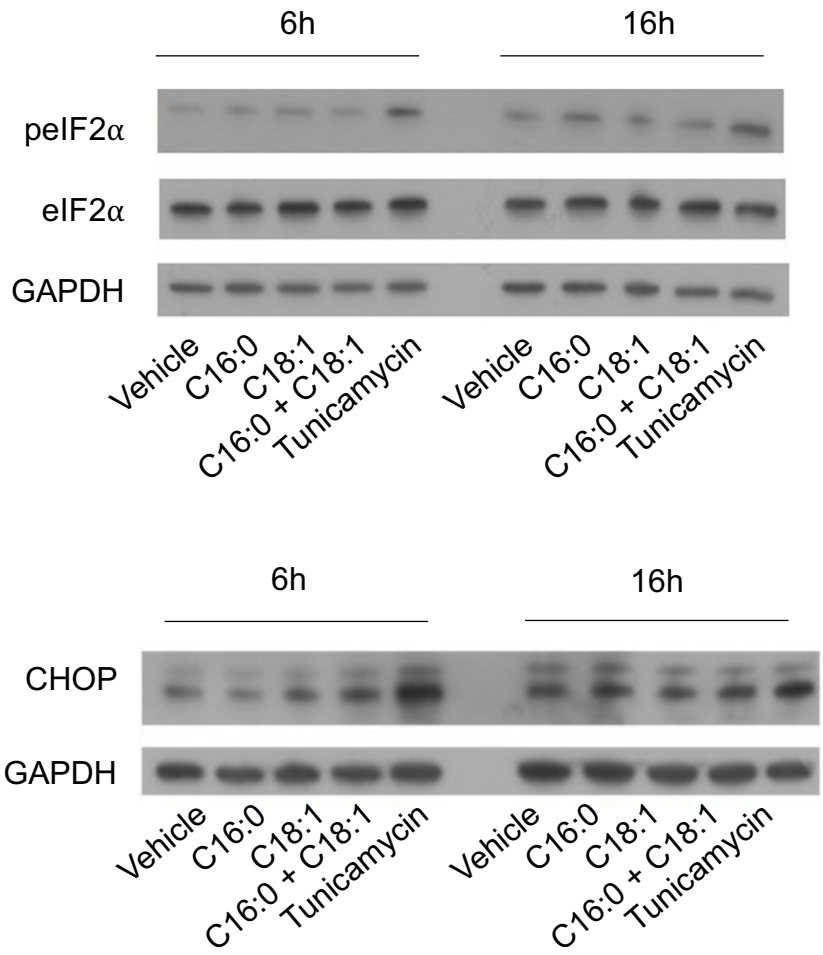

A
Vehicle 6h
INS-1
INS-1
INS-1



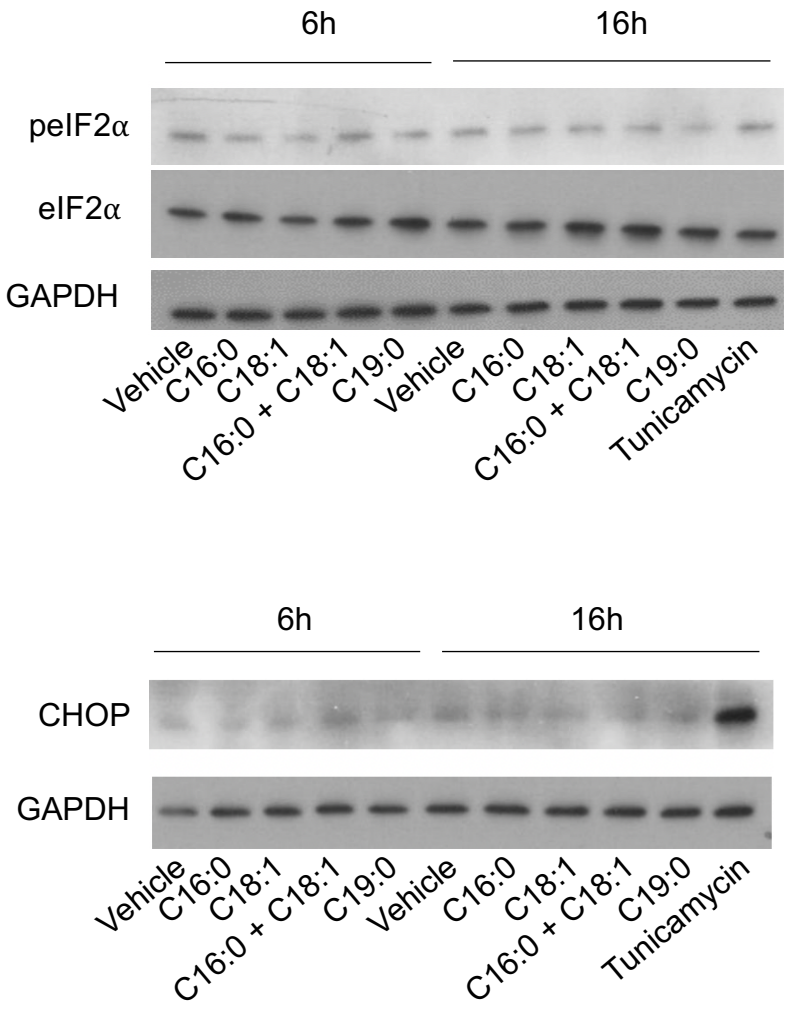

**S5:** The effect of C16:0 on Golgi morphology in INS-1 cells. INS-1 cells were treated for 6hrs with either vehicle control (**A**) or 250μM C16:0 (**B**). INS-1 cells were then fixed in an osmium tetroxide fixative before being imaged with TEM. Scale bar represents 1μm.




**S6:** Confocal fluorescent images of INS-1 cells where the Golgi apparatus was stained with CellLight Golgi-RFP and the cells exposed to BODIPY FL $C_{16}$ with 250µM C16:0 for 24h.




**S7:** Sample blots to show that LC-FFA do not activate ER stress in rodent INS-1 cells. INS-1 cells were treated with either 250µM C16:0, 250µM C18:1, 250µM 16:0 + 250µM C18:1, or 5µg/ml Tunicamycin for 6h or 16h. Total eIF2α, peIF2α, CHOP and GAPDH levels were analysed by Western blotting.




**S8:** Sample blots to show that LC-FFA do not activate ER stress in human EndoC-βH1 cells. EndoC-βH1 cells were treated with either 250µM C16:0, 250µM C18:1, 250µM C19:0, 250µM C16:0 + 250µM C18:1, or 5 µg/ml Tunicamycin for 6h or 18h. Total eIF2α, peIF2α, CHOP and GAPDH levels were analysed by Western blotting.