

Supplementary Videos

Video S1. UV/cold shock induces nuclear gas generation and bubble formation in COS7 fibroblasts. COS7 cells were transiently overexpressed with ECFP. Cyan fluorescent protein (CFP) mainly localizes in the nucleus. These cells were exposed to UV irradiation (480 mJoule/cm²) and subsequently cold shock at 4°C for 5 min. Time-lapse microscopy was carried out at room temperature for 2 hr. ECFP release from the nucleus to the generated bubble is shown. Release of exosomal particles to the extracellular space is also observed. (adapted from reference #20 with permission).

Video S2. UV alone is sufficient in inducing bubbling. Mv1Lu cells were exposed to UV irradiation (480 mJoule/cm²) and then subjected to time-lapse microscopy at room temperature. A bubble formation is shown. Cyan fluorescent protein (CFP) mainly localizes in the nucleus. Three circular areas in the nucleus appear to be nucleoli.

Video S3. UV alone induces bubbling of SCC15 cells. SCC15 cells were exposed to UV irradiation (480 mJoule/cm²) and then subjected to time-lapse microscopy at room temperature. Few cells started exhibiting 1 or 2 bubbles plus small blebs, and then all gases appeared to be sucked into a largest bubble. Bubble formation started in 40 min. Exosomal particles are shown in the bubble (see the second cell from the top).

Video S4. UV/cold enhances bubbling of SCC15 cells. SCC15 cells were exposed to UV irradiation (480 mJoule/cm²)/cold shock (5 min at 4°C), and then subjected to time-lapse microscopy at room temperature. Bubble formation started in less than 30 min.

Video S5. UV/cold shock induces BCD and exosome release in COS7 cells overexpressing the WW domain of WWOX. COS7 cells, expressing EGFP-WW domain, were exposed to UV irradiation at 480 mJoule/cm² and then incubated at 4°C for 5 minutes. Time-lapse microscopy was then carried out at room temperature. Bubble formation from the nucleus is shown. When transiently overexpressed, the WW domain localizes in the nucleus due to the presence of nuclear localization signal⁴²⁻⁴⁴. Nuclear EGFP-WW domain is shown to leak into the gas bubble. Formation of intracellular exosomal particles, along with their subsequent release to the extracellular space, is shown. Note the released exosomal particles are varied in sizes (adapted from reference #20 with permission).

Video S6. UV/cold shock induces BCD and exosome release in COS7 cells overexpressing a dominant negative WW domain. COS7 cells, expressing a dominant negative EGFP-WW domain (EGFP-dnWW), were exposed to UV irradiation at 480 mJoule/cm² and then incubated at 4°C for 5 minutes. Time-lapse microscopy was then carried out at room temperature. Transiently overexpressed EGFP-dnWW localized in the nucleus⁴²⁻⁴⁴. The protein did not relocate into the gas

bubble. Release of exosomal particles with varied sizes to the extracellular space is shown.

Video S7. UV/cold shock induces BCD in COS7 cells overexpressing Golgi-targeting ECFP. COS7 cells were transiently overexpressed with Golgi-targeting ECFP. After culturing for 24 hr, these cells were exposed to UV irradiation (480 mJoule/cm²) and cold shock at 4°C for 5 min, and then imaged by time-lapse microscopy at room temperature for 2 hr. The ECFP protein was largely retained in the Golgi complex during bubbling. Release of exosomes of various sizes from the cells to the extracellular space is shown (adapted from reference #20 with permission).