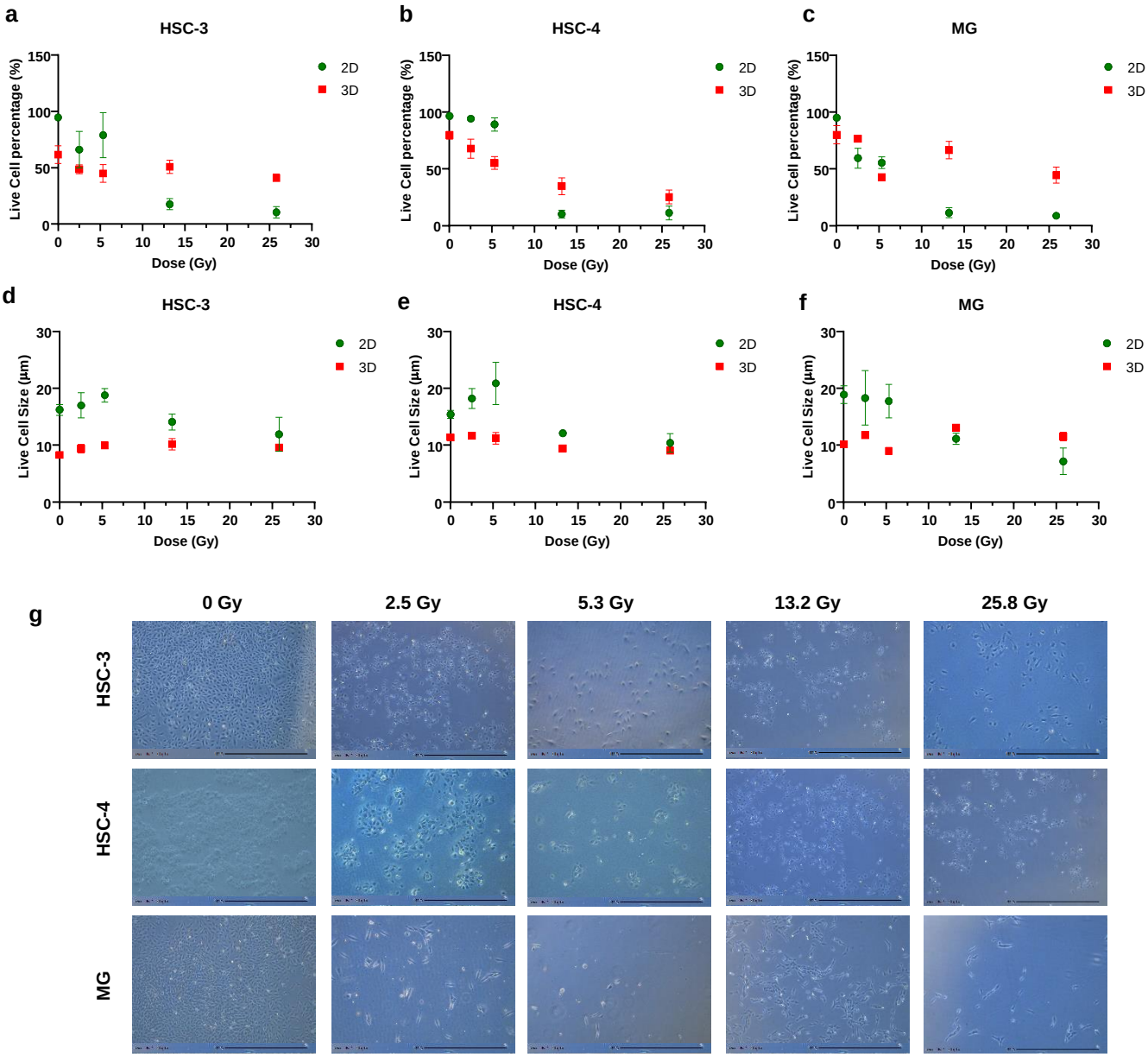
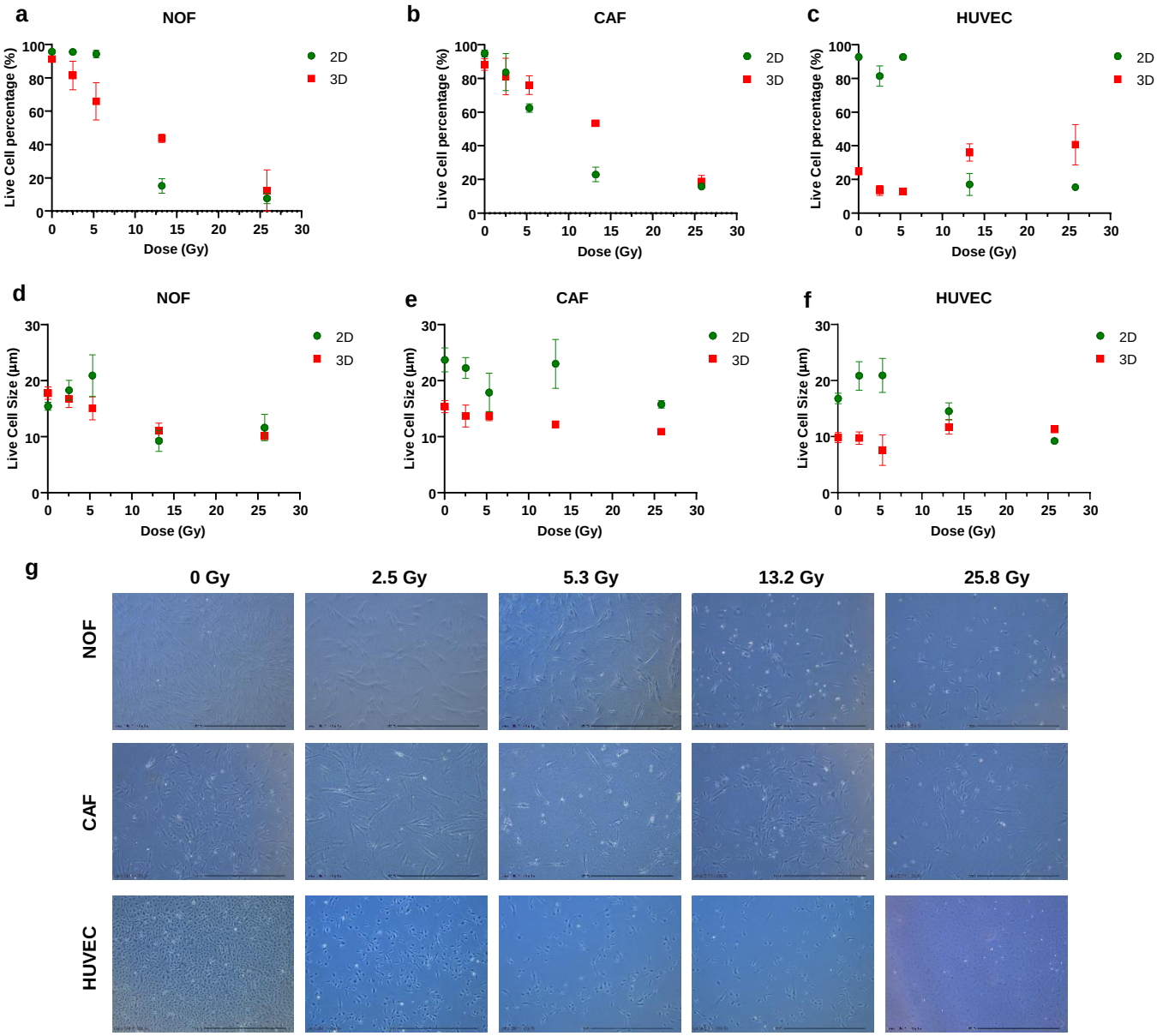


Supplementary Figure 1. Morphological and viability characterization of cancer cell lines in 2D and 3D cultures.

(a–c) Live Cell Percentage. Percentage of live cells for HSC-3 **(a)**, HSC-4 **(b)**, and MG **(c)** comparing 2D monolayer (green circles) and 3D matrix-based models (red circles) . Data are expressed as percentage relative to 0 Gy controls across the dose range (0–25.8 Gy) . Error bars represent mean ±SD.

(d–f) Live Cell Size. Analysis of cell dimensions (µm) for HSC-3 **(d)**, HSC-4 **(e)**, and MG **(f)** in 2D (green circles) and 3D cultures (red circles) following neutron irradiation. Error bars represent mean ±SD.

(g) 2D Representative Morphology. Representative bright-field microscopy images of HSC3, HSC4, and MG 2D monolayers at indicated neutron doses (0, 2.5, 5.3, 13.2, and 25.8 Gy) .



Supplementary Figure 2. Morphological and viability characterization of stromal cell lines in 2D and 3D cultures. (a–c) Live Cell Percentage. Percentage of live cells for (**a**)NOF, (**b**) CAF and HUVEC (**c**) comparing 2D monolayer (green circles) and 3D matrix-based models (red circles) . Data are expressed as percentage relative to 0 Gy controls across the dose range (0–25.8 Gy). Error bars represent mean ±SD.

(d–f) Live Cell Size. Analysis of cell dimensions (µm) for , NOF (**d**), CAF (**e**), and HUVEC (**f**) in 2D (green circles) and 3D cultures (red circles) . Error bars represent mean ±SD.

(g) 2D Representative Morphology. Representative bright-field microscopy images of NHDF, NOF, CAF, and HUVEC 2D monolayers at neutron doses of 0, 2.5, 5.3, 13.2, and 25.8 Gy .