

Figure S1. Heat map summary showing the effects of IR and p53 on nucleolar type. (A-D) Heat maps summarizing the statistical significance of results obtained comparing individual nucleolar types in HCT116 and U2OS cells. Comparison (A) between 2 Gy of X-rays and the control, (B) between p53-proficient and -deficient status after irradiation with 2 Gy of X-rays, (C) between X-rays and carbon ions in p53-proficient cells and (D) between X-rays and carbon ions in p53-deficient cells. IR, ionizing radiation; NA, not available.

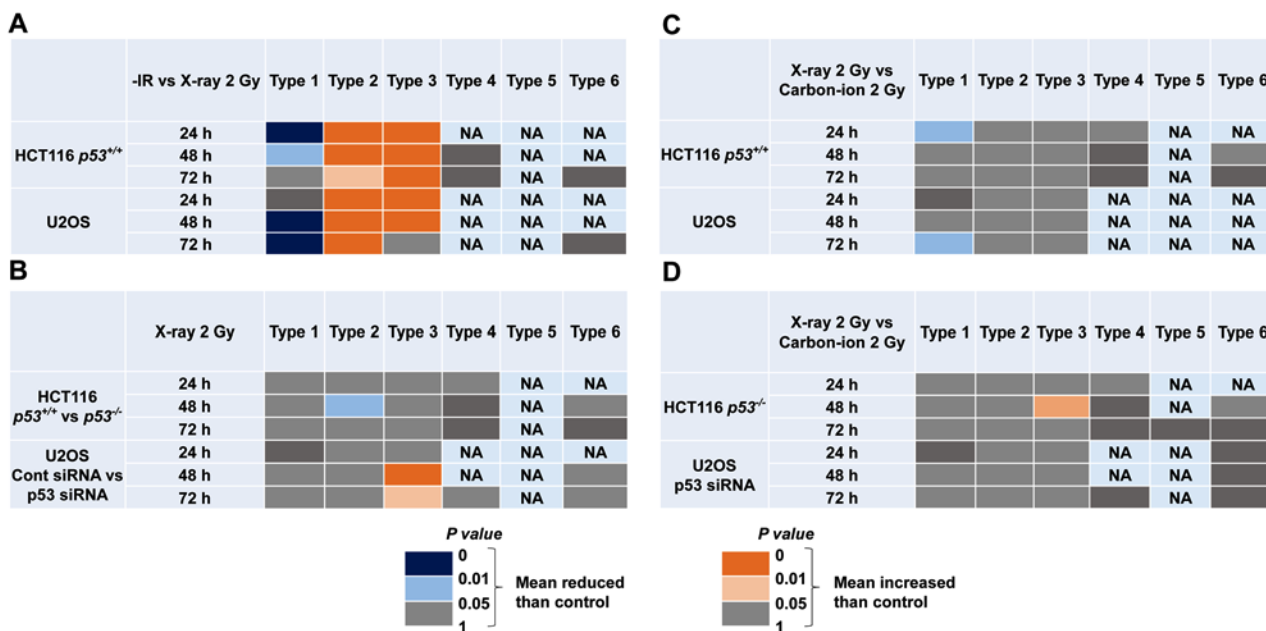


Figure S2. Distribution of individual nucleolar types in p53-proficient and -deficient cells following X-rays. (A-J) The percentage of individual nucleolar types at 24, 48 and 72 h after irradiation with 2 Gy of X-rays was compared between  $p53^{+/+}$  and  $p53^{-/-}$  HCT116 cells (A-E). Similarly, the percentage of individual nucleolar types in control or p53-depleted U2OS cells is shown (F-J). The error bars represent the standard deviation of three independent experiments. \* $P < 0.05$ , \*\* $P < 0.01$ . NS, not significant; IR, ionizing radiation.

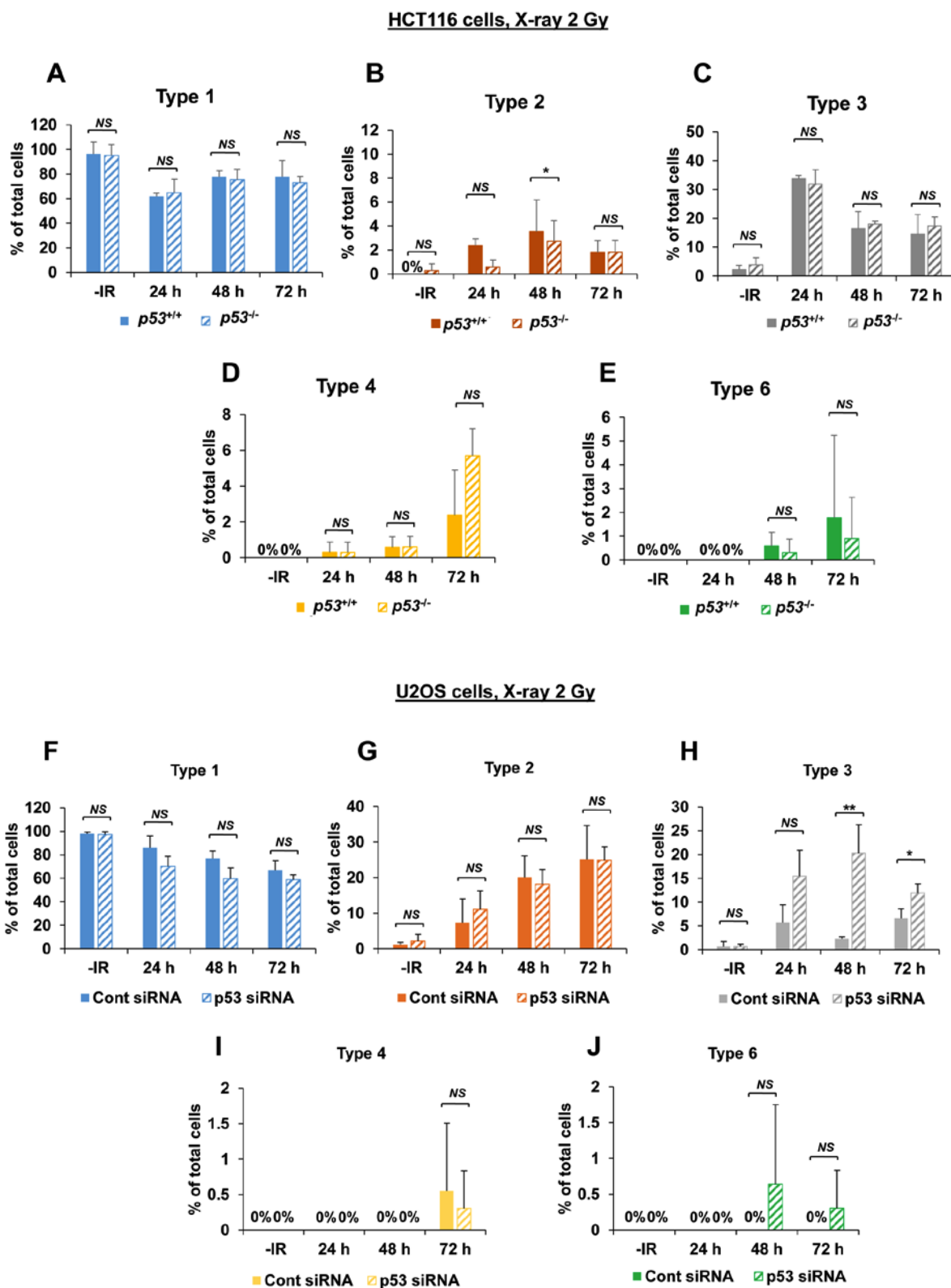


Figure S3. Distribution of individual nucleolar types following X-rays and carbon ions in p53-proficient cells. (A-H) Percentage of individual nucleolar types at 24, 48 and 72 h after irradiation with 2 Gy of X-rays or 2 Gy of carbon-ions in (A-E) HCT116 *p53*<sup>+/+</sup> and (F-H) U2OS cells. Error bars represent the standard deviation of three independent experiments. \*P<0.05, \*\*P<0.01. NS, not significant; IR, ionizing radiation.

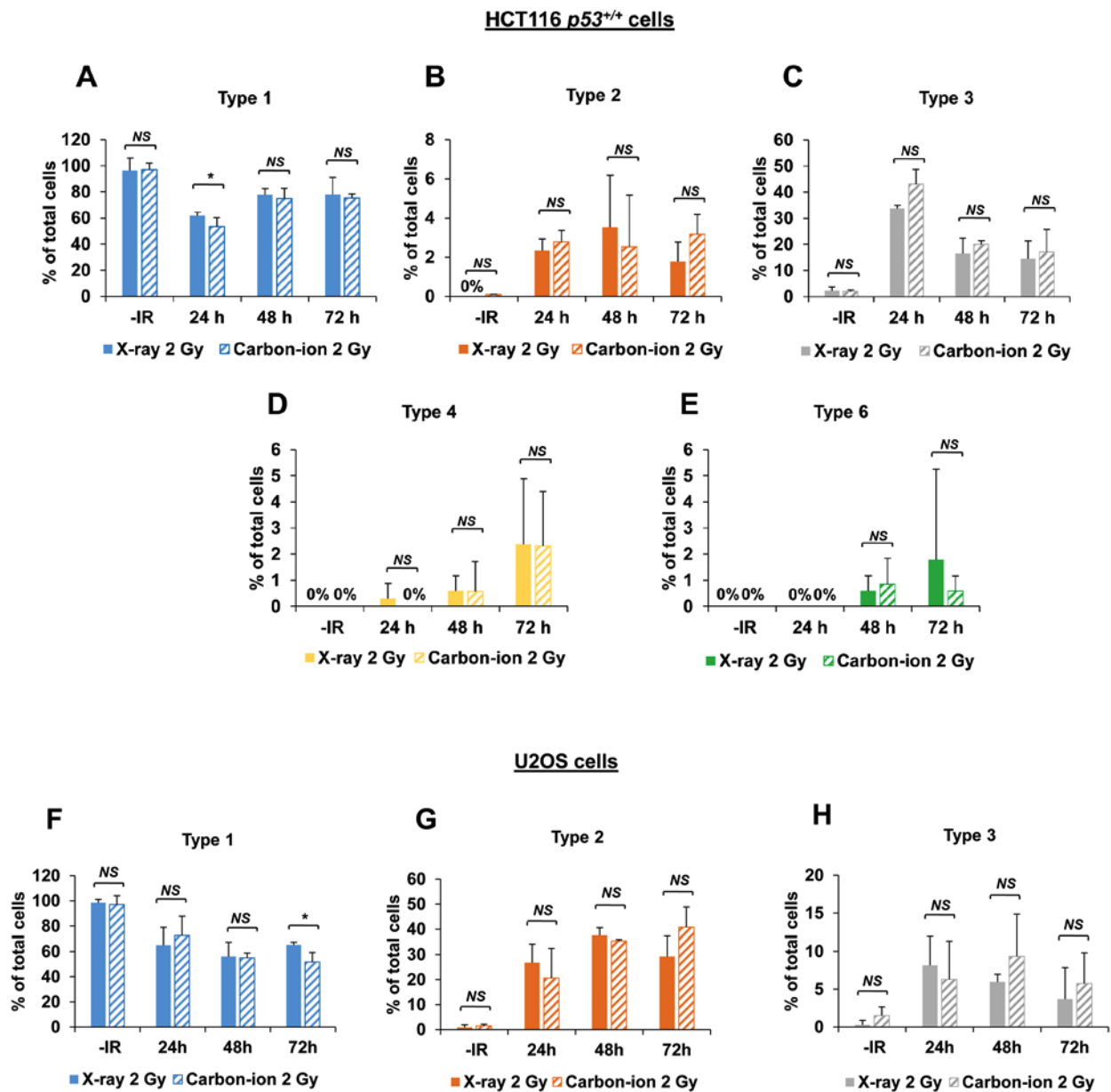


Figure S4. Distribution of individual nucleolar types following X-rays and carbon ions in p53-deficient cells. (A-K) The percentage of individual nucleolar types in the total set of evaluated (A-F) HCT116 *p53*<sup>-/-</sup> and (G-K) p53-depleted U2OS cells after 2 Gy of X-rays or 2 Gy of carbon ions was examined. The error bars represent the standard deviation of three independent experiments. \*P<0.05. NS, not significant; IR, ionizing radiation.

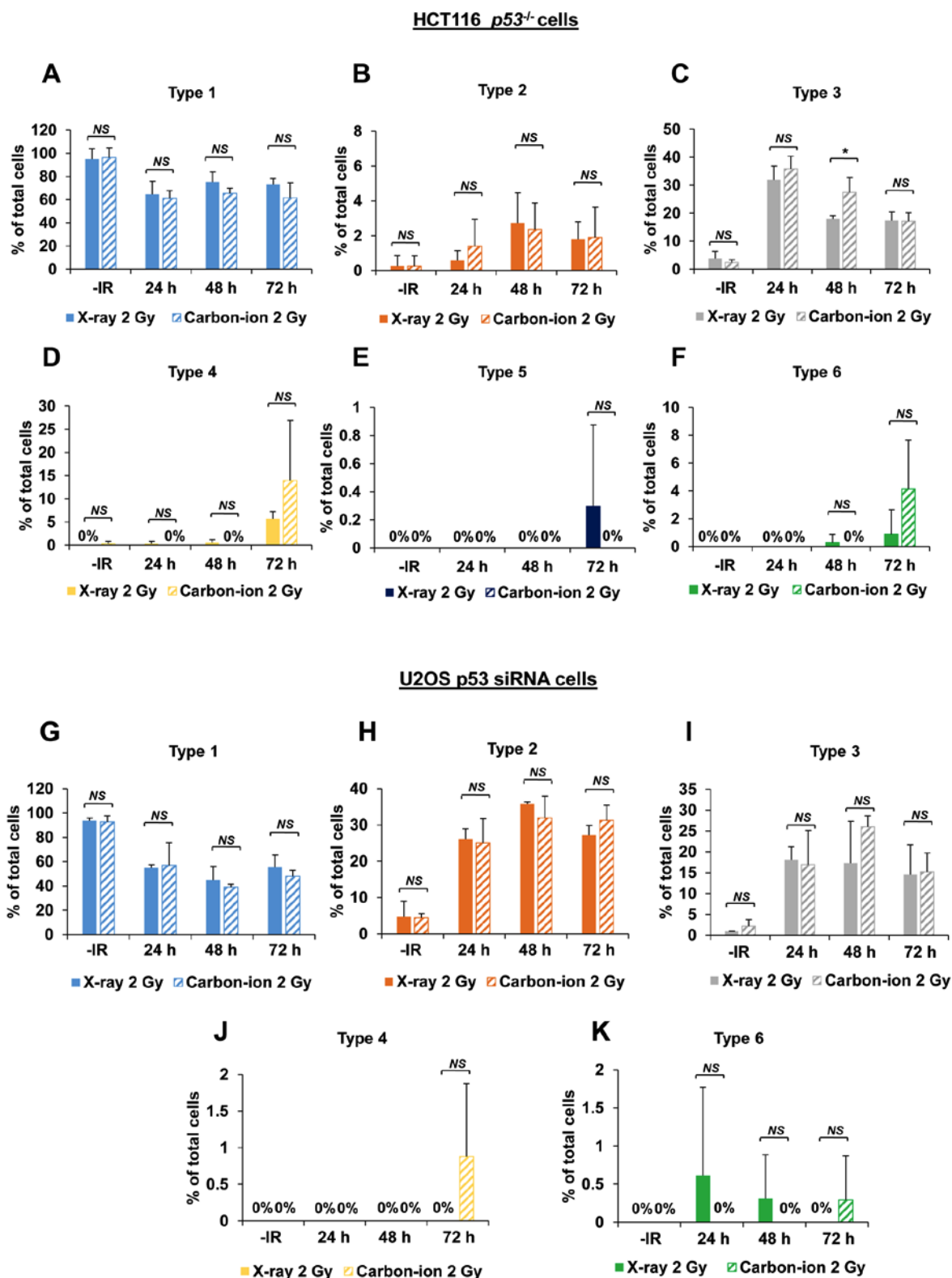
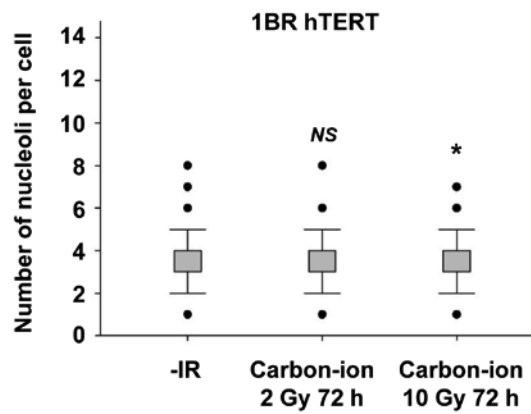


Figure S5. Carbon ion irradiation does not increase the number of nucleoli in normal human fibroblasts. Distribution of the number of nucleoli per cell in 1BR hTERT cells at 72 h following irradiation with 2 or 10 Gy of carbon ions. The statistical significance was examined by comparison with non-irradiated cells, using Bonferroni's correction. \* $P < 0.025$ . NS, not significant; IR, ionizing radiation.



	-IR	Carbon-ion 2 Gy 72 h	Carbon-ion 10 Gy 72 h
Mean	3.68	3.54	3.38
Median	4	3	3