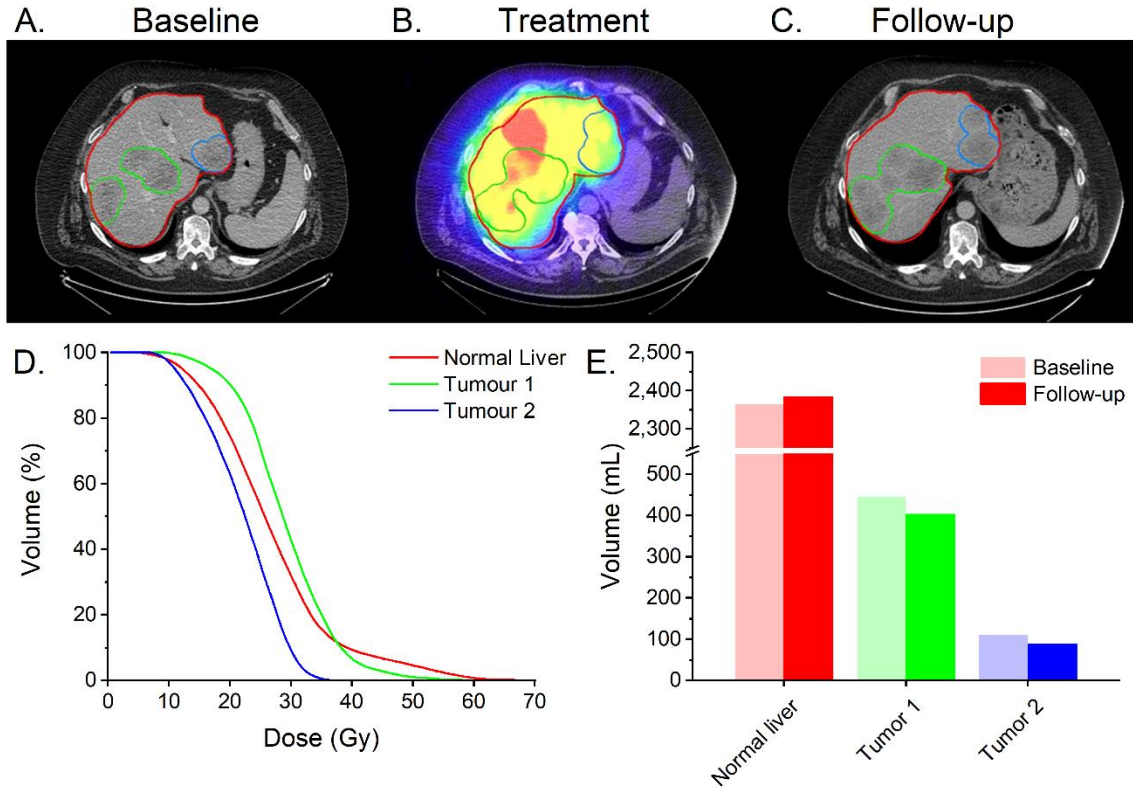


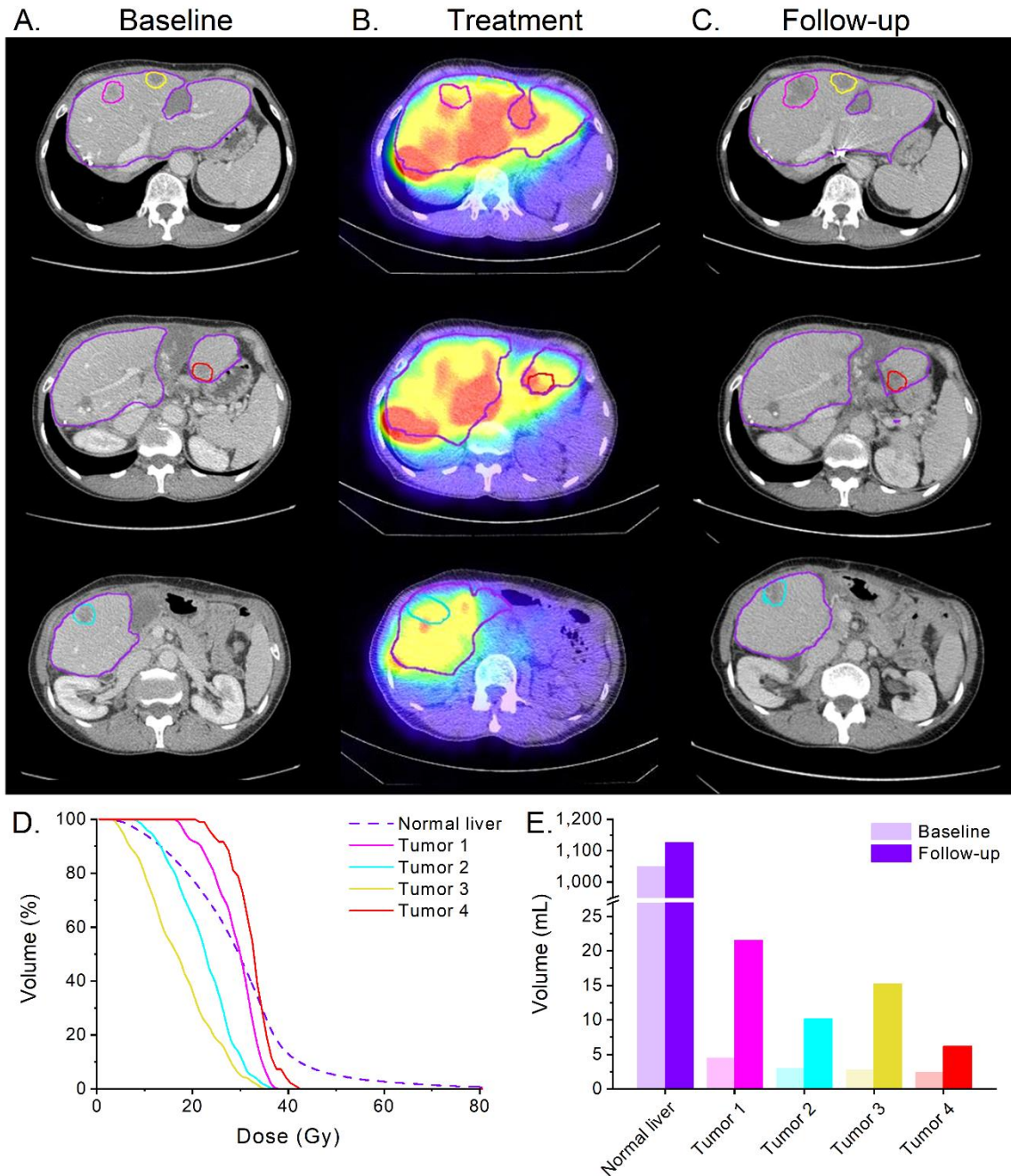
**Supplemental Table 1:** Comparison of  $^{90}\text{Y}$  SIRT radiobiological modelling parameters derived for each cell line using LQM fitted parameters in Table 2. The  $RBE_{max}$  and Lea-Catcheside factor of 6-day exposure  $G_6$  values were extracted from LQM fit parameters of experimental data. The repair half-time  $T_{rep}$  was determined using supplemental equation S4 from Lee *et al.* (16) to correct for the experimental limitations of a 6-day exposure rather than the indefinite exposure which is given for  $^{90}\text{Y}$  SIRT. The indefinite exposure-corrected Lea-Catcheside factor  $G_\infty$  was determined using equation 3. The last column shows the  $(\alpha/\beta)_{90Y}$  for indefinite exposure and is given in Table 2. The range shown within brackets represents the 95% confidence interval of the estimated parameter.

Cell line	$RBE_{max}$ ( $\alpha_{90Y}/\alpha_{EBRT}$ )	$G_6$ ( $\beta_{90Y}/\beta_{EBRT}$ )	$T_{rep}$ (h)	$G_\infty$	$\alpha_{90Y}/G_\infty\beta_{EBRT}$ (Gy)
DLD-1	0.388 [0.221–0.555]	0.0577 [-0.0123–0.1277]	2.51 [-0.67–5.69]	0.0377 [-0.0102–0.0856]	148 [-56.3–353]
HT-29	1.800 [0.198–3.402]	0.0051 [-0.0351–0.0453]	0.21 [-1.48–1.90]	0.0033 [-0.0230–0.0296]	979 [-6911–8861]
Mixed model	0.554 [0.145–0.963]	0.0300 [-0.0117–0.0718]	1.28 [1.27–1.29]	0.0196 [0.0195–0.0198]	226 [-129–582]

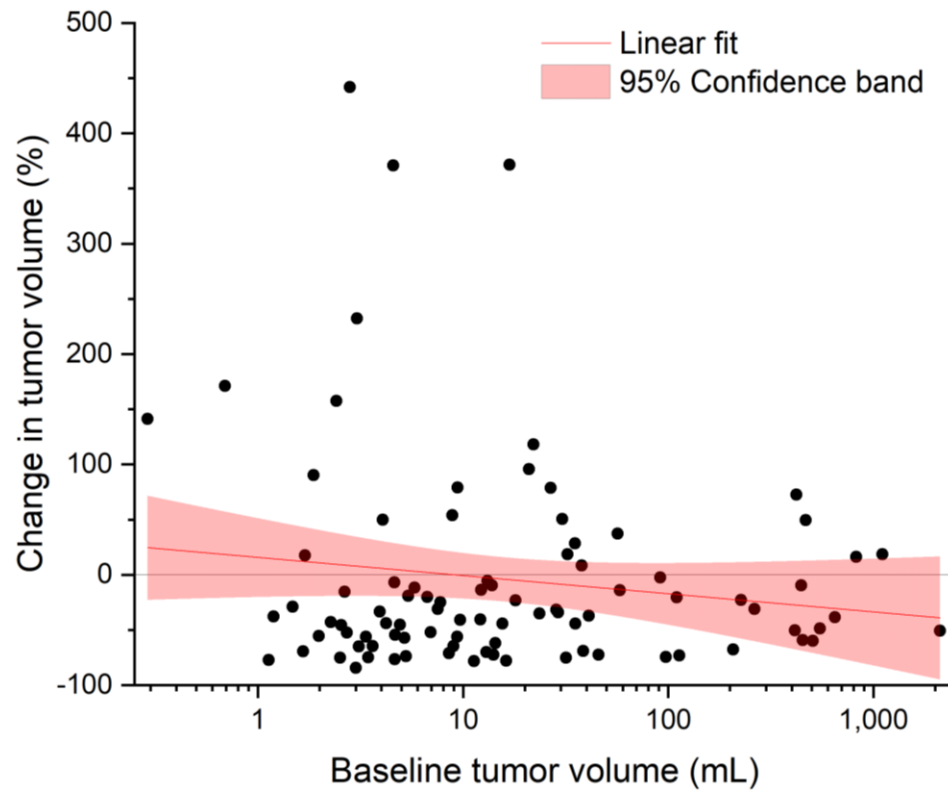
16. Lee BQ, Abbott EM, Able S, et al. Radiosensitivity of colorectal cancer to  $^{90}\text{Y}$  and the radiobiological implications for radioembolisation therapy. *Phys Med Biol.* 2019;64:135018.



**Supplemental Figure 1:** Patient 20 (63 y, 2.74 m<sup>2</sup> BSA): rectal carcinoma with Ras mutation, mediastinal metastasis, and lymphadenopathy. The primary tumor was resected and the patient received one line of prior chemotherapy. (A) Baseline imaging acquired 13 days prior to SIRT confirmed PD. <sup>99m</sup>Tc-MAA, angiography and coil embolisation were performed to achieve 4.7% lung shunt. <sup>90</sup>Y microspheres were administered in a single injection of 1863 MBq. (B) SPECT/CT one day post-SIRT demonstrated suboptimal uptake distribution. (C) CT imaging 74 days following SIRT revealed no response. (D) DVH of absorbed doses to the normal liver was comparable to each of the two tumors. (E) Volumetric response illustrates stable disease.



**Supplemental Figure 2:** Patient 18 (66 y, 1.53 m<sup>2</sup> BSA): rectal cancer. The primary tumor was resected and the patient received two lines of prior chemotherapy. (A) Baseline imaging acquired 13 days prior to SIRT showed PD. <sup>99m</sup>Tc-MAA, angiography and coil embolisation were performed to optimally redirect flow away from lungs to achieve 0% lung shunt. <sup>90</sup>Y microspheres were administered in a single injection of 847 MBq. (B) SPECT/CT one day post-SIRT demonstrated a poor uptake distribution (C) CT imaging 77 days following SIRT revealed a significant increase in tumor volume. (D) DVH of absorbed doses highlight greater doses in normal liver compared to tumor, in particular, tumors 2 and 3. (E) Volumetric response illustrates PD in all tumors.



**Supplemental Figure 3. Relationship between baseline and 3-month follow-up tumor volume.** Linear regression (red line) with 95% CI (red band), shows no significant correlation ( $p=0.19$ ,  $R^2=0.0013$ ) between log baseline tumor volume and percentage change in tumor volume.

Figures 3 and 4

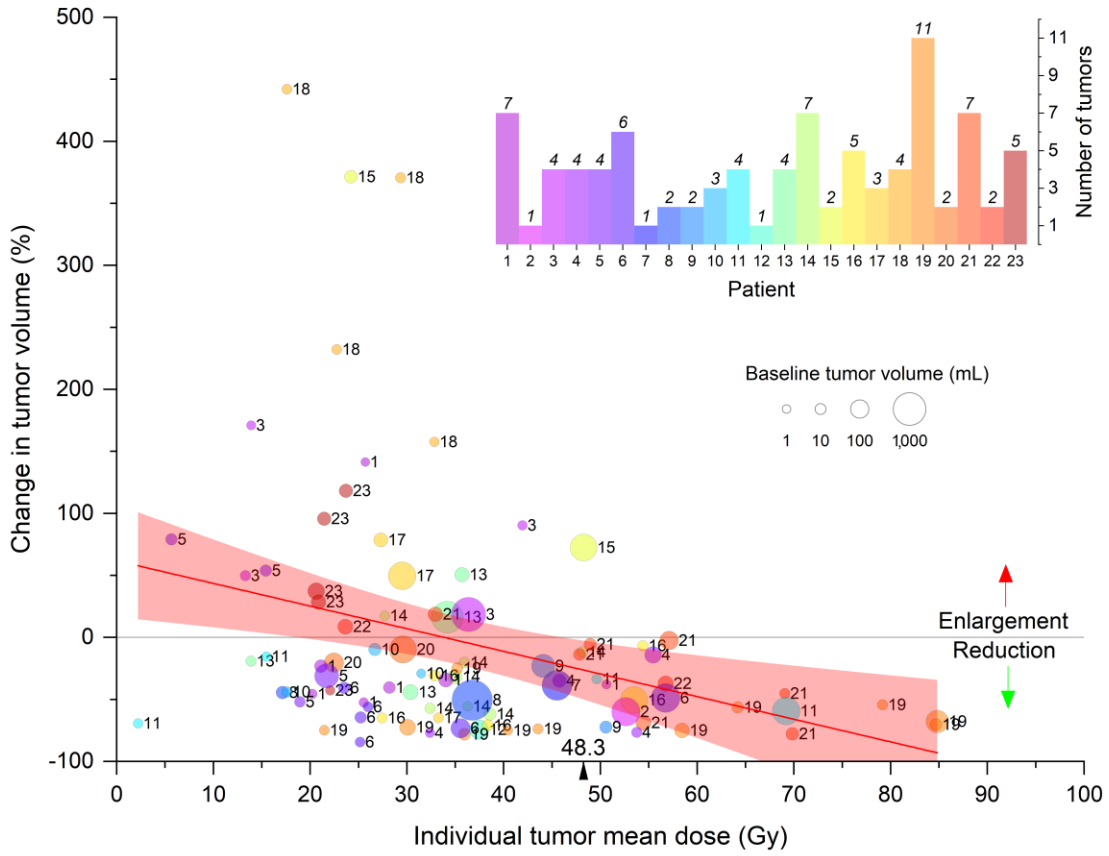


FIGURE 3.

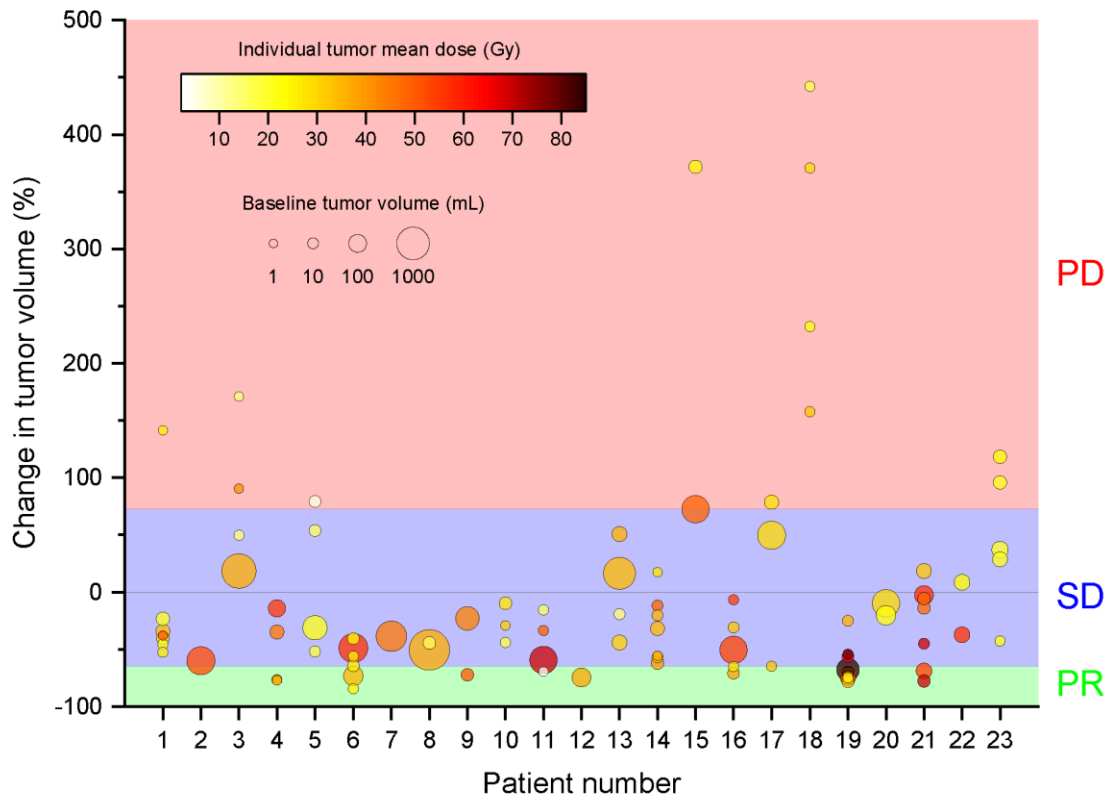


FIGURE 4.