

Mechanistic model of radiotherapy-induced lung fibrosis using coupled 3D Agent-Based and Monte Carlo simulations

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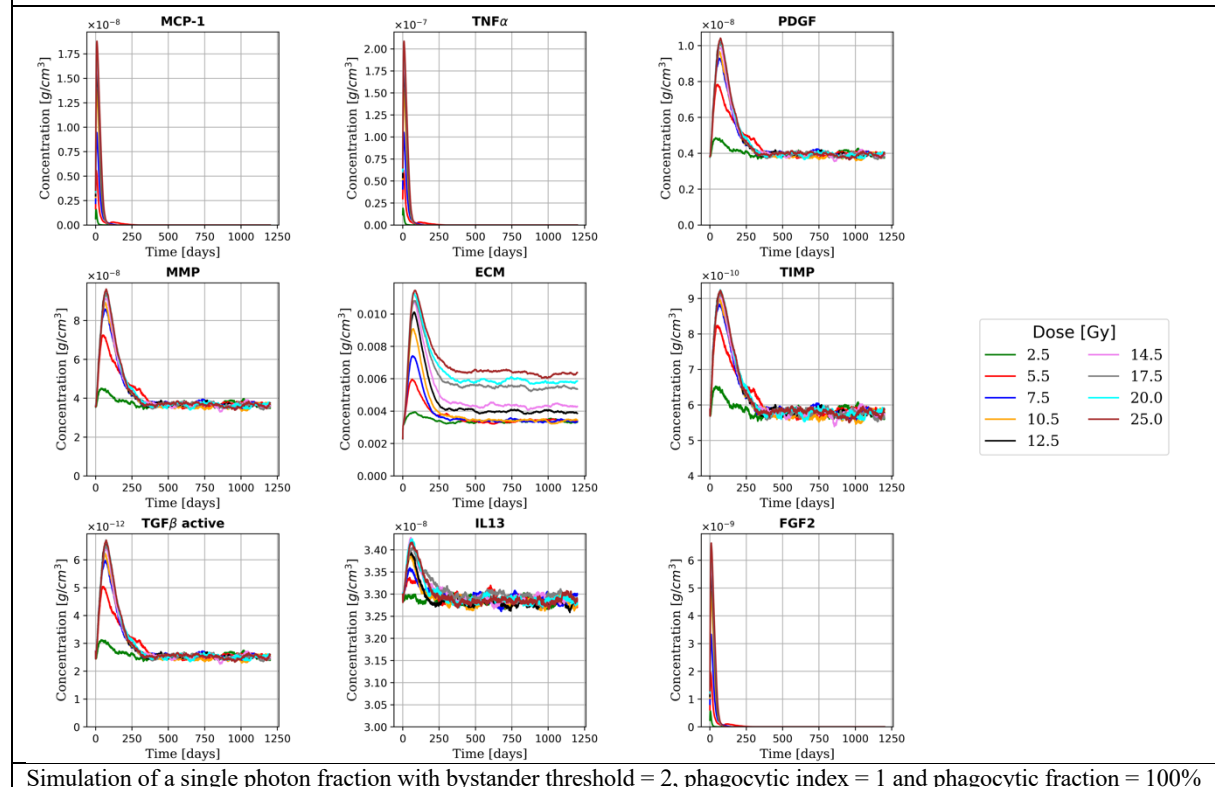
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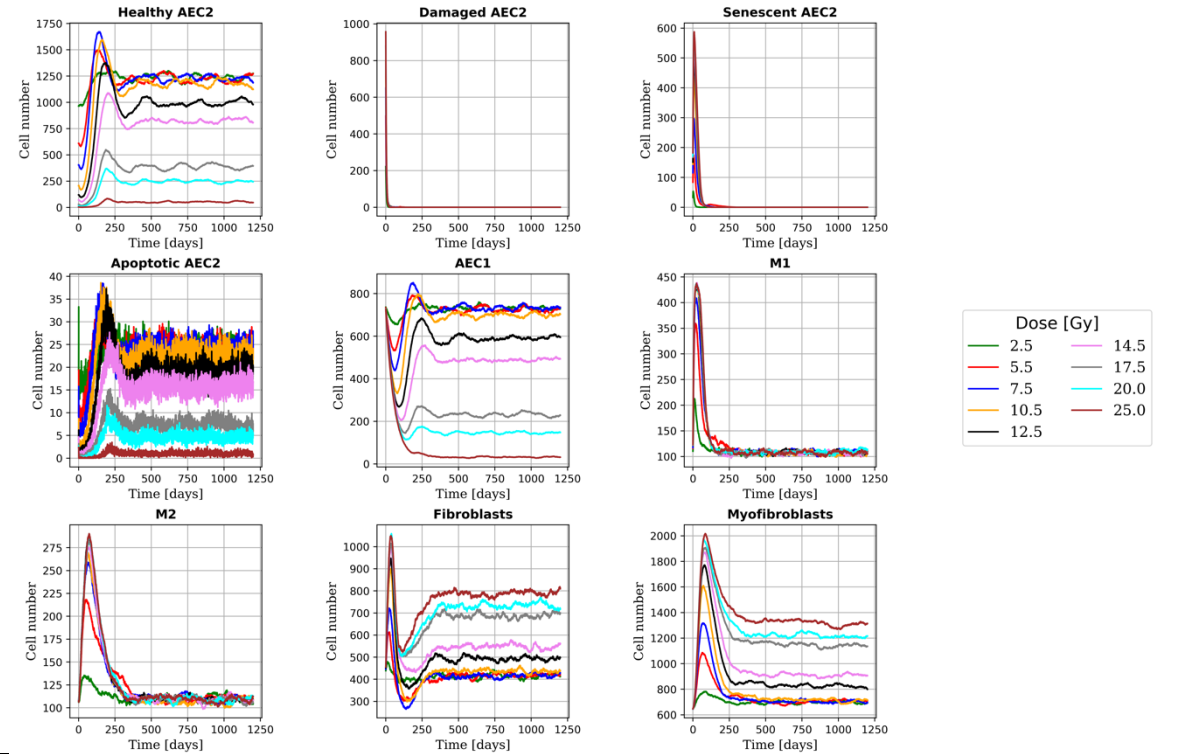
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Supplementary information

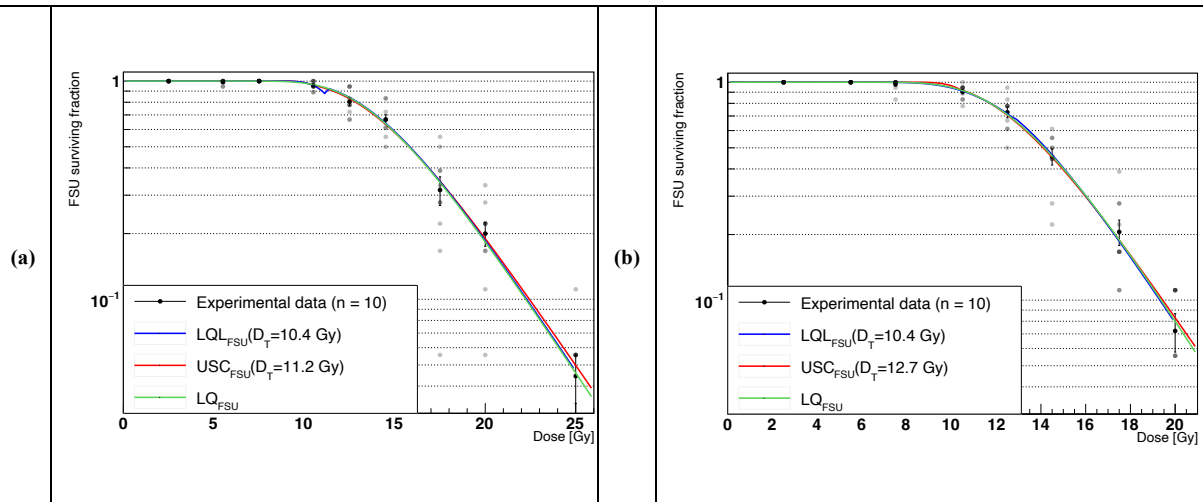
Supplementary Figure 1: Time evolution of the extracellular substances for multiple doses from the Agent-Based - Monte Carlo model.



Supplementary Figure 2: Time evolution of the total number of cells for multiple doses from the Agent-Based - Monte Carlo model.



Supplementary Figure 3: Functional subunits survival for different radiation types and fit curves.



Surviving fraction of the functional subunits survival for photons (panel (a)) and protons (panel (b)) in standard conditions. Both the datasets were fitted using the equation (4) from the main document, where for $1 - P_{kill, cell} = P_{surv, cell}$ three different models were used: the linear-quadratic-linear¹ (blue curve), the universal survival curve² (red curve) and the linear-quadratic (as in the main document, green curve). The three curves are almost identical, therefore no difference in the relative biological effectiveness for functional subunits at 50%, 37% and 10% survival could be observed. The error bars in panels (a) and (b) represent the standard error of the mean for $n = 10$ independent experiments.

Supplementary References

1. Astrahan, M. Some implications of linear-quadratic-linear radiation dose-response with regard to hypofractionation. *Med. Phys.* **35**, 4161–4172 (2008).
2. Park, C., Papiez, L., Zhang, S., Story, M. & Timmerman, R. D. Universal Survival Curve and Single Fraction Equivalent Dose: Useful Tools in Understanding Potency of Ablative Radiotherapy. *Int. J. Radiat. Oncol. Biol. Phys.* **70**, 847–852 (2008).