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Reply: Potential Use of Radiolabeled Antibodies for Imaging and Treatment of COVID-19

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REPLY: We are happy to respond to the four concerns raised by Dr. Ekaterina Dadachova in her letter to editor, commenting on our *Brief Communication* “Oncology-Inspired Treatment Options for COVID-19”.

Regarding the first two points, we would like to emphasize that these experiments were performed during the height of the devastating first COVID-19 peak in NYC, when very little was known about the etiology, transmission and possible treatments for this virus. Without the ability of using animal models, we nevertheless recognized that the uncertainty, the general dearth of knowledge, and the rapidly evolving situation at that time merited publication of our data as a *Brief Communication* to provoke thought and discussion on a potential approach to treating this disease.

Regarding the third point: the suggested references, including some interesting papers authored by Dr. Ekaterina Dadachova, were not appropriate for this *Brief Communication*, since they do not address Auger therapy. Future publication of the ongoing studies may warrant citation of this work.

Lastly, the critical advantage of Auger therapy, as described in our *Brief Communication*, is that Auger electron cascades are highly localized, providing potential advantages over other forms of ionizing radiation when it comes to destroying virions. The letter’s final point references the ‘18 kilogray of radiation’ required for sterilization of bone grafts from HIV virions (1); this figure of course applies to uniform external gamma irradiation. In the case of an Auger-emitting radionuclide bound to a virion, the *locally* absorbed energy must be considered; this may exceed *megagray* levels in small volumes near the decay site (2,3).

References

1. Grieb TA, Forng R-Y, Stafford RE, et al. Effective use of optimized, high-dose (50 kGy) gamma irradiation for pathogen inactivation of human bone allografts. *Biomaterials*. 2005;26:2033-2042.
2. Sastry KSR. Biological effects of the Auger emitter iodine-125: A review. Report No. 1 of AAPM Nuclear Medicine Task Group No. 6. *Medical Physics*. 1992;19:1361-1370.
3. Humm JL, Howell RW, Rao DV. Dosimetry of Auger-electron-emitting radionuclides: report no. 3 of AAPM Nuclear Medicine Task Group No. 6. *Med Phys*. 1994;21:1901-1915.