Influence of injection technique, drug formulation, and tumor microenvironment on intratumoral immunotherapy delivery and efficacy

Nina Muñoz¹ (NMMunoz@mdanderson.org), Malea Williams¹ (MLWilliams5@mdanderson.org), Katherine Dixon¹ (katherine.dixon@mdanderson.org), Crystal Dupuis¹ (CJDupuis@mdanderson.org), Amanda McWatters¹ (AMcWatters@mdanderson.org), Rony Avritscher¹ (Rony.Avritscher@mdanderson.org), Soraya Zorro Manrique² (SZorro@mdanderson.org), Kevin McHugh² (kevin.mchugh@rice.edu), Ravi Murthy¹ (rmurthy@mdanderson.org), Alda Tam¹ (alda.tam@mdanderson.org), Aung Naing⁴ (anaing@mdanderson.org), Sapna Patel² (SPPatel@mdanderson.org), David Leach⁶ (dgl2@rice.edu), Jeff Hartgerink⁶ (jdh@rice.edu), Simon Young⁷ (simon.young@uth.tmc.edu), Punit Prakash⁸ (prakashp@ksu.edu), Patrick Hwu² (phwu@mdanderson.org), Rahul A. Sheth¹ (rasheth@mdanderson.org)

¹Department of Interventional Radiology, The University of Texas MD Anderson Cancer Center, Houston, TX
²Department of Melanoma Medical Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX
³Department of Bioengineering, Rice University, Houston, TX
⁴Department of Investigational Cancer Therapeutics, The University of Texas MD Anderson Cancer Center, Houston, TX
⁶Department of Chemistry, Rice University, Houston, TX
⁷Department of Oral & Maxillofacial Surgery, University of Texas Health Science Center, Houston, Texas
Supplemental Figures

Supplementary Video 1. Digital subtraction angiography of simultaneous intratumoral injection using multi-side hole needle (left) versus end-hole needle (right).

Supplementary Figure 1. CT scan images from patients undergoing image-guided intratumoral injections of an immunotherapeutic agent that contains iodine and can therefore be visualized on CT. While some patients demonstrate adequate delivery within the target tumor (circumscribed by blue dotted lines) as demonstrated in the bottom row, other tumors demonstrate intravasation and leakage of drug into the adjacent portal vein and hepatic segment (top row, red arrows). Note that the patient in the bottom row had previously undergone injection of a second tumor (yellow asterisk).

Supplementary Figure 2. FACS plots illustrating the expression of CD3, CD8, and CD4 on mouse HCC tumors 48 hours following intratumoral injection of free STING agonist (A, tumors 1 through 3) or MDP-STING agonist (B, tumors 4 through 6). CD3 subsets were gated on CD45+ cells, and the CD4/CD8 subsets were gated on CD3+ cells.