**Supplementary Fig 1: Tumor volume determination by high resolution computed tomography (HRCT) scan**.

Representative images of a lung tumor six weeks after adenocarcinoma cell injection in one rat. Scrolling through the stack of images, the apex and the base of the tumor were identified. Using Image J, a region of interest (ROI; white outline) was drawn around the border of the tumor in each image where the tumor was identified. Image J software was calibrated based on pixel size (0.10 x 0.10 mm). The sum of the areas from the ROI for each image was multiplied by the slice thickness (0.4 mm) and then summed over all the ROIs to calculate tumor volume. (Note: only five representative images are shown from approximately 50 total images per rat that was used to illustrate how the tumor volume was calculated).

HRCT scanner settings:

 Collimator: Ultra High Resolution (16 x 0.3mm)

 Kernel: V80μ Very Sharp

 Effective mAs: 450

 Pitch value: 0.85

 kV: 120

 Direction: Craniocaudal

 Slice: 0.4 x 0.2 mm

 Rotation time: 1 second

 Lung window: Width-1600 Level-500

 Field of View: 50 mm

 Reconstructions: Iterative

**Supplementary Fig 2: Quantification of tumor perfusion by contrast enhanced CT imaging.**

After the baseline scans were acquired (far left images top and bottom), repeated total thoracic scans were acquired while intravenous (IV) contrast medium (0.25% Visipaque 320 mgl/ml) was injected into the femoral vein. Approximately 50 images covering the thorax from apex to base were repeatedly acquired every 0.1 seconds during the contrast infusion over a total 9-second time interval. From the repeatedly acquired thoracic scans, we selected 3 sets of HRCT chest scans: 1) at baseline (prior to IV contrast, Figure S2 far left top and bottom), 2) on the first pass of the IV contrast through the right heart and into the pulmonary circulation (Figure S2 middle top), and 3) after the IV contrast passed through the right heart, the pulmonary circulation, the left heart, and into the systemic circulation (Figure S2 far right top).

On the three HRCT thoracic image sets, a Region of Interest (ROI) was drawn around the lung tumor perimeter on every scan where the tumor could be identified (Figure S2 bottom left, middle and right). To determine perfusion to the tumor, the mean intensity (HU) of the tumor was measured during IV contrast infusion. On each of the three thoracic images sets, the mean intensity of the tumor ROI was calculated on each slice. The overall mean HU intensity for the tumor for each rat at each time point was then averaged over all the scans in that HRCT image set.

Any increase in tumor intensity during the first pass of the IV contrast through the right heart and the pulmonary circulation, but not yet in the left heart was considered due to the pulmonary circulation alone (S2 middle top). Any increase in tumor intensity after the IV contrast passed through the right heart, the pulmonary circulation, and the left heart, was considered due to the pulmonary and the systemic (bronchial) circulations (S2 right top). In order to determine the contribution of the bronchial circulation alone, we subtracted the tumor intensity after contrast passed through the right heart, the pulmonary circulation, and the left heart (S2 right top) from the tumor intensity after the IV contrast passed through the right heart and the pulmonary circulation (S2 middle top).

To normalize the values and account for any differences in the rate or quantity of IV contrast delivered between animals or in the same animal on different days, the measured pixel intensities in the tumor were divided by the maximum intensity detected in the initial bolus of IV contrast in the IVC of the rat.

HRCT scanner settings:

 Collimator: 128 x 0.6mm

 Kernel: H70h Very Sharp

 Effective mAs: 350

 kV: 120

 Scan time: 6 sec + 2 sec delay

 Slice: 0.6 x 0.4mm

 Time increment: 0.05 sec

 Lung window: Width-1600 Level-500

 Field of View: 50 mm

Reconstructions: Standard filtered back projection