SUPPLEMENTARY MATERIAL

Supplementary Figure 1

Supplementary Tables 1, 2

Supplementary Movies 1-9

Supplementary Figure 1. Moran's I detects departures from spatial randomness within a figure. To calculate local Moran's I for each pixel (A), a disc-shaped spatial range (B) is chosen and the variance of the values within area B is compared to the variance of the values in the entire image; high I values indicate that the values within area B are spatially associated within the image. In this figure local Moran's I for pixel A and region C would be expected to be lower, and show less spatial autocorrelation, than pixel D and region E because region E contains more homogenous pO_2 values. Global Moran's I averages of all the local Moran's I values and normalizes them to the variance in the image. As values of global Moran's I approach 1, they indicate increased spatial correlation for the entire figure; that is, there is more similarity in pO_2 with an examined disc-shaped region than would be expected from the distribution of pO_2 of the entire image. Several sizes (1, 4, 8, 12, 20, 40, and 100 pixel radius) of disc-shaped regions were examined in the Moran's I analysis.

Supplementary Table 1. Significance table for global Moran's I. Between and within tumor types, Moran's I is examined for disk-shaped spatial ranges of radii 1, 4, 8, 12, 20, 40, and 100. Significance is indicated with a "Y" if $p<0.05$ (multiple comparison of means).

Supplementary Table 2. Significance table for global Moran's I of difference images. Between and within tumor types, Moran's I is examined for disk-shaped spatial ranges of radii 1, 4, 8, 12, 20, 40, and 100. Significance is indicated with a "Y" if $p<0.05$ (multiple comparison of means).

Supplementary Movie 1-3. Representative movies of PLI data for 1) 9L; 2) FSA; and 3) R3230. Each movie chronicles pO_2 measurements for a 60 min interval. Each captured image is a single time point, with 2.5 min elapsing between images. For pO_2 color bar, see Figure 1.

Supplementary Movie 4-6. Exploratory analysis of change in pO_2 for 4) 9L; 5) FSA; and 6) R3230; same representative examples as those in movie supplement 1-3. These images were generated by subtracting pO_2 values at subsequent time points, labeling pixels which increased more than 1 mm Hg red, pixels with changed less than 1 mm Hg yellow, and pixels which decreased more than 1 mm Hg blue.

Supplementary Movie 7-9. Exploratory analysis of change in pO_2 for 7) 9L; 8) FSA; and 9) R3230; same representative examples as those in movie supplement 1-3. These images were generated by subtracting pO_2 values at subsequent time points, labeling pixels which increased more than 5 mm Hg red, pixels with changed less than 5 mm Hg yellow, and pixels which decreased more than 5 mm Hg blue.