Tumor models. The MKL-4 tumor cells (a gift of F.G. Kern, Georgetown University, Washington, DC) used in this study were generated by transfecting MCF-7 human breast cancer cells with a plasmid containing FGF_4 as previously described[13,14]. MKL-4 tumor cells were injected into the breast fat pads bilaterally.

Murine breast tumor cells (C127i) transfected with the wild-type hCFTR compared with those transfected with BPV alone were grown in nude mice as previously described[2,22]. Both the C127i and mock-transfected C127i have no detectable CFTR by metabolic labeling and immunoprecipitation. hCFTR-transfected cells have high CFTR protein expression[22]. In separate studies, mock-transfected cells were found to release significantly less ATP than intact hCFTR-transfected cells[2].

ATP determination and statistics. Blood samples were obtained by retro-orbital puncture in heparinized tubes and stored on ice until analysis. Aliquots (10 μl) of blood were introduced into 1.0 ml of luciferin-luciferase suspension (Sigma) and lysed after initial plasma ATP levels were determined. Cells were lysed with somatic cell lysis buffer (Sigma). For these studies, C57BL/6 mice that were wild type, heterozygous for CFTR or homozygous at the CFTR locus were used. Measurement of culture medium ATP concentrations was similar to that used for blood. The *t*-test, chi-square test or Fisher's exact test was used where appropriate.

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ERRATUM

Phase-contrast X-ray computed tomography for observing biological soft tissues

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Two equations were incorrectly printed in the Methods.

Image analysis. The interference patterns cannot be the input data to the CT algorithm as they are. According to the principle of X-ray CT, the CT input data $g(x,y)$ in general must have the form

$$g(x,y) \propto \int f(x,y,z)dz \qquad (1)$$

where the z-direction is parallel to the beam propagation direction. This means that g is a simple projection of a value f that conveys structural information of an object. The CT algorithm determines f from g's obtained from different projection directions. For conventional X-ray CT using absorption contrast, f corresponds to the linear absorption coefficient. Then, g equals the logarithm of the transmittance. For phase-contrast X-ray CT, f should be the refractive index decrement δ from unity, and then g corresponds to the spatial distribution of the X-ray phase shift, or a phase-mapping image Φ. Assuming the image blur due to the beam deflection caused by refraction is negligible, the Φ is written as

$$\Phi(x,y) = \frac{2\pi}{\lambda} \int \delta(x,y,z)dz \qquad (2)$$

where λ is the X-ray wavelength. Thus, the key to achieving phase-contrast X-ray CT is to obtain the phase-mapping image Φ.