Supporting information

Nanoscale visualization of the anti-tumor effect of a plasma-activated Ringer's lactate solution

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Figure S1: Cell shape variation upon exposure to different concentrations of PAL. (a) MCF-7 and (b) MCF-10A were observed by optical microscopy images before and two hours after treatment with diluted 8-256 times.



Figure S2: Raw data from chronoamperometry (a)before and (b) after widening the nanopipettes.



Figure S3: Comparison of approach curves before and after morphological changes due to PAL treatment. Topographic images of (a)MCF-7, and (c)MCF-10A. The scan size is $40 \times 40 \ \mu m^2$. Approach curves on (b)MCF-7, and (d)MCF-10A were extracted from the marking points shown in (a) and (b). There was no difference in the approach curves before and 3 hours after treatment of PAL diluted 32 times.



Figure S4 : Height distribution and coloring of SICM topographic image.

Regarding the coloring of Figure 5 (a), the substrate is shown in green, the edge of the cell in black, and the center of the cell in yellow, making the boundary between the cell edge and the substrate clearly visible.

Processing of SICM topographic Images.

SICM images shown in this paper were processed using Gwyddion (version2.65)¹. First, impulse noise, which is often seen in hopping mode SICM imaging, was removed by a conservative denoise filter. Then, to remove distortions due to thermal drift and hysteresis of piezo stages, the rows were aligned based on substrate region using a matching algorithm. Finally, the tilt of SICM images was corrected with reference to the substrate, and then the lowest height point was adjusted to zero.

1. D. Nečas and P. Klapetek, *Open Phys.*, 2012, **10**, 181-188.