Table 1
Cell size and oxygen uptake.

Cell	Diameter/volume[a]	Protein mass/cell (pg)	OCR		
			Mean	SE (+/−)	*n*
HL-60 (promyelocytic leukemia)	10.7 μm/0.64 pl[b]	170 (13)[c]	9.9[d,e] (58)[f]	0.8	13
HL-60 (retinoic acid differentiated)	9.8 μm/0.49 pl	180	8.3[d,e] (46)[f]	2.0	11
HL-60 (retinoic acid differentiated; stimulated with PMA)		180	30.5[d,e] (170)[f]	6.1	9
U-937 (histocytic lymphoma)	12.1 μm/0.93 pl	110 (12)[c]	3.7[d,e] (34)[f]	0.3	14
MDA-MB-231 (mammary adenocarcinoma)	14.3 μm/1.53 pl	295 (15)[c]	16.8[d,e] (56)[f]	1.2	13
			53[g,h]	4	16
MCF-7 (mammary adenocarcinoma)	14.8 μm/1.70 pl	404 (29)[c]	32.5[d,e] (81)[f]	5.6	11
			35[g,h]	5	16
MCF-7-p51 (mammary adenocarcinoma; *GPx4* overexpressor)	15.2 μm/1.84 pl	625 (45)[c]	39.9[d,e] (63)[f]	3.9	12
MIA-PaCa-2 (pancreatic carcinoma)	15.7 μm/2.03 pl	730 (70)[c]	30.1[d,e] (41)[f]	5.8	12
			57[g,h]	5	16
PC-3 (prostate adenocarcinoma)	17.5 μm/2.9 pl	724 (85)[c]	45.3[d,e] (63)[f]	9.4	13
			49[g,h]	5	16
			43[g,i]	2	68
BAEC (aortic endothelial cells)	12.1 μm/0.93 pl				

OCR, O_2 consumption rate.

[a] The Z2 Coulter Counter determines particle volume; the diameter was calculated assuming a spherical shape, volume $= 4/3\ \pi r^3$.

[b] We provide cell volume in picoliters to be easily compatible with units to be used in kinetic modeling of cell processes and systems biology. Other units for cell volume that have been used are femtoliters and μm^3. 1 pl = 1000 fl = 1000 μm^3. We find that the typical standard deviation in cell diameter is on the order of 10–15% of the diameter. Because spherical volume is a function of r^3, the standard deviation for the volume distribution will be on the order of 30% of the mean cell volume.

[c] Standard error.

[d] Units are amol s^{-1} $cell^{-1}$.

[e] OCR determined using a Clark electrode (YSI biological oxygen monitor) and BioStat multi-electrode system, at 25 °C.

[f] Units are amol s^{-1} ng-$protein^{-1}$. Note that amol s^{-1} ng-$protein^{-1}$ = pmol s^{-1} mg-$protein^{-1}$. The units of amol s^{-1} ng-$protein^{-1}$ provide a numerical value on an order of magnitude similar to that for the per-cell basis.

[g] Determined with Seahorse Bioscience XF96, at 37 °C.

[h] After being seeded onto the XF96 cell culture plate, cells were allowed to grow for 48 h.

[i] After being seeded onto the XF96 cell culture plate, cells were allowed to grow for 24 h.