**Supplemental Figure Legends**

**Supplementary Figure S1: Avocatin B is the most active avocado lipid analogue. (A)** TEX cells were treated with increasing concentrations of avocado lipid analogues. Avocatin B imparted the greatest reducing in TEX cell viability. Data are presented as mean percentage of live cells (MTS assay) ± SD from representative experiments. Experiments were performed three times in triplicate.

**Supplementary Figure S2: Kinetics of avocatin B-induced death.** TEX cells were treated with 10µM avocatin B and **(A)** apoptotic cells (ANN+/PI-), **(B)** cell viability (ANN-/PI- and MTS) and **(C)** forward scatter/side scatter (FS/SS) were measured. (A-B) Data are presented as mean percentage of apoptotic or live cells ± SD and (C) raw FS/SS plots shown. All experiments were performed three times in triplicate.

**Supplementary Figure S3: Cell cycle analysis of avocatin B treated TEX cells. (A)** TEX cells were incubated with avocatin B (10µM) over a 48 hour time course and cell cycle analysis was performed by propidium iodide staining and flow cytometry. Data are presented as percentage of cells per cell cycle phase ± SD from representative experiments. **(B)** Avocatin B’s effect on cell cycle was compared to that of cells treated with nocodazole. All experiments were performed three times in triplicate. \*\*\*; p<0.001.

**Supplementary Figure S4: Avocatin B increases DCFH-DA and DHE.** TEX cells were treated with 10µM avocatin B and DCFH-DA and DHE were measured at increasing time points by flow cytometry. Raw data showing the shift in DCFH-DA or DHE are shown.

**Supplementary Figure S5: Avocatin B’s activity is neutralized by co-incubation with PEG-SOD.**  The effects of avocatin B (10µM) in the absence and presence of PEG-SOD (25µL/mL) were tested for **(A)** changes in DCFH-DA levels and **(B)** clonogenic growth of AML cells. Data are presented as **(A)** percent cells expressing DCFH-DA and **(B)** percent clonogenic growth, as described in the methods section. All experiments were performed three times in triplicate. \*\*p<0.01; \*\*\*; p<0.001.

**Supplementary Figure S6: Jurkat T cells cultured in ethidium bromide medium have reduced mitochondria with decreased function. (A)** Jurkat T cells were cultured in ethidium bromide media for 60 days and mitochondria were detected by nonyl acridine orange (NAO) staining, which binds to the mitochondria specific lipid, cardiolipin. (Left panel) Jurkat T cells demonstrate positive NAO staining whereas (right panel) Jurkat-Rho(0) cells demonstrate a drastic reduction in NAO staining (~87%). **(B)** Oxygen consumption rate (OCR) was measured in these cells following treatment with oligomycin and CCCP to detect changes in mitochondrial respiration.

**Supplementary Figure S7: Avocatin B is absent in mitochondria and cytosolic fractions of vehicle control treated TEX cells. (A)** Mitochondrial and cytosolic fractions of TEX cells treated with vehicle control for 1 hour were subjected to LC-MS, as described in the methods section. Data presented as fluorescent intensity. All experiments were performed three times in triplicate.

**Supplementary Figure S8: Avocatin B calibration curves and estimated concentraiton in cytosolic and mitochondrial fractions. (A)** (Left panel) Calibration curves of avocatin B determined by liquid chromatography- high resolution mass spectrometry analysis (LC-MS) following the addition of increasing concentrations of avocatin B to the LC-MS injection matrix. **(B)** Concentrations of avocatin B were determined in mitochondrial and cytosolic fractions of TEX cells treated with avocatin B (10µM) for 1 hour using the calibration curve as determined by LC-MS. Data are presented as fluorescent intensity. All experiments were performed three times in triplicate.

**Supplementary Figure S9: Avocatin B decreases levels of NADH and NADPH and increases ROS in OCI-AML2 cells.** NADH, NADPH and ROS were measured in avocatin B treated OCI-AML2 cells, as outlined in the methods section. Data are presented as (Left) percent NADH or (middle) percent NADPH or (right) percent of cells with increased ROS compared to vehicle control treated cells ± SD. All experiments were performed three times in triplicate, representative figures are shown. \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.