**Supplemental File 1: Measurement of Rapamycin using High Performance Liquid Chromatography-tandem Mass Spectroscopy (HPLC-tandem MS) Assay**

Patient whole blood samples were prepared alongside calibrator samples, made by spiking blank blood samples with rapamycin (Sigma, St. Louis, MO) and serially diluting to achieve concentrations of 0, 1.56, 6.25, 25, 100 ng/ml. 0.10mL of either calibrator or patient whole blood samples were mixed with 10 µL of 0.5 µg/mL ascomycin (Sigma, St. Louis, MO) and 250 µL of a solution containing 0.1% formic acid and 10 mM ammonium formate dissolved in 100% HPLC grade methanol. Supernatants were harvested and injected into the HPLC-tandem MS. The HPLC system consisted of a Shimadzu SIL 20A HT autosampler (Kyoto, Japan), LC-20AD pumps, and an AB Sciex API 3200 tandem mass spectrometer with turbo ion spray (Framingham, MA). The LC analytical column was a Grace Alltima C18 (4.6 x 150 mm, 5 micron) (Alltech, Deerfield, IL) and was maintained at 25°C during the chromatographic runs using a Shimadzu CT-20A column oven. The flow rate of the mobile phase was set to 0.5 ml/min. Mobile phase A contained 10 mM ammonium formate and 0.1% formic acid dissolved in 100% HPLC grade methanol. Mobile phase B contained 10 mM ammonium formate and 0.1% formic acid dissolved in 90% HPLC grade methanol. Rapamycin was eluted with a gradient in which the initial mobile phase was 100% B, then at 0.10 minutes after injection was ramped to 100% mobile phase A until 4 minutes. The concentration of mobile phase was held at 100% A for 1 minute and at 5.1 minutes was switched immediately back to 100% B and ran for 4.9 minutes to equilibrate the column before the next injection. The rapamycin transition was detected in positive mode at 931.6 Da (precursor ion) and the daughter ion was detected at 864.5 Da. The internal standard (ascomycin) transition was detected at 809.6 Da and the daughter ion was detected at 756.6 Da. The ratios of rapamycin peak areas to ascomycin peak area for each unknown sample were compared against a linear regression of the ratios of spiked calibration samples to quantify rapamycin. The concentration of rapamycin was expressed as ng/mL.