The cytochrome P450 family enzymes are xenobiotic metabolizing enzymes located in the liver, small intestine, and large intestine. These enzymes are mainly comprised of a polypeptide chain and heme cofactor. Once the heme binds with oxygen, cytochrome P450 utilizes nicotinamide adenine dinucleotide phosphate (NADPH) as an H+ energy source for oxidation of buprenorphine via the NADPH-cytochrome P450 oxidoreductase. Therefore, NADPH acts as the energy source for studying the drug interactions of Buprenorphine and Proton-Pump Inhibitors. Our objective was to study the time-dependent inhibition that Cimetidine and Rabeprazole, both proton pump inhibitors, have on the metabolism of buprenorphine via the cytochrome P450 enzymes.