KINETIC ANALYSIS OF THE MULTI-STEP CYTOCHROME P450 1A2 AND 19A1 ENZYMES

By

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To my mother, the lifelong scholar.

Even though she was always told a college education was inappropriate for her (despite her obvious intelligence, excellent work ethic, and zest for learning), she instilled the importance of schooling in her children and selflessly helped provide the monetary means and emotional support for higher education for her entire family. Persistence and hard work led to earning her own college degree in 1996.

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$(CH_3)_2CH$-O-$PhNO_2$	1-isopropoxy-4-nitrobenzene
$Ph(NC)_2$	1,4-phenylene diisocyanide
1-OH pyrene	1-hydroxypyrene
di-OH pyrene	di-hydroxypyrene
19=O andro	19-aldoandrostenedione
19-OH andro	19-hydroxyandrostenedione
αNF	α-naphthoflavone (5,6-benzoflavone)
andro	androstenedione
CD	circular dichroism
CHAPS	3-[(3-cholamidopropyl)dimethylammonio]-1-propanesulfonate
COSY	correlated spectroscopy
DTT	dithiothreitol
EDTA	ethylenediamine tetraacetic acid
ESI	electrospray ionization
FAD	flavin adenine dinucleotide
FMN	flavin mononucleotide
HMBC	heteronuclear multiple bond coherence
HMQC	heteronuclear multiple quantum coherence
HPLC	high performance liquid chromatography
IPTG	isopropyl-β-D-thiogalactopyranoside

kDa	kilodaltons
LC-MS	liquid chromatography-mass spectrometry
LTQ	linear trap quadrupole
MS	mass spectrometry
NADPH	nicotine adenine dinucleotide phosphate (reduced form)
NMR	nuclear magnetic resonance
OH	hydroxy
P450	cytochrome P450
PCR	polymerase chain reaction
SDS-PAGE	sodium dodecyl sulfate-polyacrylamide gel electrophoresis
TB	Terrific Broth
Tris	tris[hydroxymethyl]aminomethane
t_R	retention time
UPLC	ultra performance liquid chromatography
UV	ultraviolet
v	enzymatic rate, typically in nmol product formed/nmol P450/time