

Supplementary Table 1 B[a]P Radical cation mutants			
Sample #	Codon	Mutation	AA Change
RC-1	151	CCC>GCC	Pro>Ala
RC-2	242	TGC>TCC	Cys>Ser
RC-3	180	GAG>CAG	Glu>Gln
RC-4	196	CGA>GGA	Arg>Gly
RC-5	285	GAG>TAG	Glu>Stop
RC-6	297	CAC>GAC	His>Asp
RC-7	232	ATC>AGC	Ile>Ser
RC-8	280	AGA>ACA	Arg>Thr
RC-9	265	CTG>CAG	Leu>Gln
RC-10	251	ATC>ACC	Ile>Thr
RC-11	152	CCC>CCG	Pro>Pro
RC-12	232	ATC>AGC	Ile>Ser
RC-13	152	CCG>CTG	Pro>Leu
RC-14	152	CCG>CTG	Pro>Leu
RC-15	278	CCT>TCT	Pro>Ser
RC-16	177	CCC>ACC	Pro>Thr
RC-17	152	CCG>CTG	Pro>Leu
RC-18	251	ATC>GTC	Ile>Val
RC-19	144	CAG>CCG	Gln>Pro
RC-20	281	GAC>TAC	Asp>Tyr
RC-21	243	ATG>ATC	Met>Ile
RC-22	278	CCT>TCT	Pro>Ser
RC-23	309	GAC>CAC	Asp>His
RC-24	280	AGA>ATA	Arg>Ile
RC-25	178	CAC>AAC	His>Asn
RC-26	161	GCC>GAC	Ala>Asp
RC-27	142	CCT>ACT	Pro>Thr
RC-28	256	ACA>ACC	Thr>Thr
RC-29	154	GGC>TGC	Gly>Cys
RC-30	177	CCC>CAC	Pro>His
RC-31	155	ACC>AAC	Thr>Asn
RC-32	154	GGC>TGC	Gly>Cys
RC-33	234	TAC>GAC	Tyr>Asp
RC-34	159	GCC>CCC	Ala>Pro
RC-35	351	AAG>GAG	Lys>Glu

Supplementary Table 2 B[a]P 1,6 Dione mutants			
Sample #	Codon	Mutation	AA Change
1,6-1	288	AAT>GAU	Asn> Asp
1,6-4	264	CTA>TTA	leu> Leu
1,6-7	238	TGT>CGT	Cys> Arg
1,6-8	315	TCT>TTT	Ser> Phe
1,6-9	196	CGA>CCA	Arg> Pro
1,6-10	238	TGT>CGT	Cys> Arg
1,6-11	177	CCC>CTC	Pro> leu
1,6-18	153	CCC>CAC	Pro>His
1,6-18	154	GGC>AGC	Gly>Ser
1,6-20	196	CGA>CCA	Arg> Pro
1,6-21	68	GAG>TAG	Glu> STOP
1,6-22	68	GAG>TAG	Glu> STOP
1,6-23	142	CCT>ACT	Pro> Thr
1,6- 29	283	CGC>CAC	Arg> His
1,6-33	127	TCC>CCC	Ser> Pro
1,6-37	220	TAT>TGT	Tyr> Cys
1,6-57	291	AAG>AAT	Lys>Asn
1,6-60	126	TAC>CAC	Tyr> His
1,6-61	312	ACC>TCC	Thr> Ser
1,6-63	291	AAG>AAT	Lys>Asn
1,6-65	267	CGG>CAG	Arg> Gln
1,6-71	117	GGG>GTG	Gly> Gly
1,6-81	281	GAC>AAC	Asp> Asn
1,6-82	161	GCC>TCC	Ala> Ser
1,6-83	168	CAC>CAT	His> His
1,6-83	175	CGC>CAC	Arg> His
1,6-85	257	CTG>CAG	Leu> Gln
1,6-86	198	GAA>TAA	Glu> STOP
1,6-87	236	TAC>TAA	Tyr> STOP
1,6-89	236	TAC>TAA	TYR> STOP
1,6-90	198	GAA>TAA	Glu> STOP
1,6-91	276	GCC>GAC	Ala> Asp
1,6-91	296	CAC>CAA	His> Gln
1,6-94	248	CGG>CAG	Arg> Gln

Supplementary Table 3 B[a]P 3,6 dione mutants			
Sample #	Codon	Mutation	AA Change
3,6-2	TAC>AAC	163	Trp>STOP
3,6-6	ATG>ATA	246	Met>Ile
3,6-12	GCC>GTC	276	Ala>Val
3,6-13	CCC>CTC	151	Pro>Leu
3,6-14	GGG>GAG	302	Gly>Glu
3,6-15	CGG>CAG	267	Arg>Gln
3,6-16	CCC>TCC	151	Pro>Ser
3,6-17	AGC>ATC	303	Ser>Ile
3,6-19	CGC>CAC	181	Arg>His
3,6-20	CTG>CCG	145	Leu>Pro
3,6-25	TCT>CCT	121	Ser>Pro
3,6-35	CGC>CAC	158	Arg>His
3,6-39	CGC>CTC	158	Arg>Leu
3,6-40	TGC>TGA	141	Cys>STOP
3,6-46	GCC>GTC	276	Ala>Val
3,6-49	AAG>AAT	139	Lys> Asn
3,6-51	TGC>TGA	176	Cys>STOP
3,6-55	TGC>TGA	176	Cys>STOP
3,6-67	TGG>TAG	146	Trp>STOP
3,6-68	CGC>CGA	156	Arg>Arg
3,6-68	TGG>TAG	146	Trp>STOP
3,6-69	CCT>CUT	223	Pro>Leu
3,6-69	CGC>CAC	181	Arg>His
3,6-72	GAT>CAT	148	Asp>His
3,6-72	TCC>TCA	149	Ser>Ser
3,6-73	CGC>CAC	181	Arg>His
3,6-74	CGT>GGT	273	Arg>Gly
3,6-74	CGC>CAC	181	Arg>His
3,6-76	CGT>AGT	273	Arg>Ser
3,6-79	CCC>ACC	219	Pro>Thr
3,6-79	AAG>AAT	291	Lys> Asn

Supplementary Figure 1

