

Wiens and Owen Supplementary Data. Nucleotide and amino acid sequence of p57NH2 transposon mutants. The nine-nucleotide transposon insertion-site duplication is marked by underline. The nineteen novel amino acids created after transposon excision and ligation are listed in bold. The original flanking amino acids are numbered as per wildtype p57.

**P57NH<sub>2</sub>.G<sup>51</sup>**

51  
 Q G G Y C L L Y T S C G R K M C T R D R G G Y S  
 CAG GGT GGT TAC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGG GGT GGT TAT TCT 52

**P57NH<sub>2</sub>.S<sup>66</sup>**

66  
 T S S A C L L Y T S C G R K M C T R D S S S A A  
 ACC TCC AGC GCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC TCC AGC GCC GCA 67

**P57NH<sub>2</sub>.A<sup>73</sup>**

73  
 P V A A C L L Y T S C G R K M C T R D R V A A G  
 CCA GTT GCA GCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGA GTT GCA GCT GGT 74

**P57NH<sub>2</sub>.Y<sup>78</sup>**

78  
 G S Y S C L L Y T S C G R K M C T R D S S Y S S  
 GGC TCT TAT AGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC TCT TAT AGT TCT 75

**P57NH<sub>2</sub>.V<sup>94</sup>**

94  
 D L V A V S C T H L A A A R C V Q E T D L V V P  
 GAT CTT GTT GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GAT CTT GTT GTT CCC 95

**P57NH<sub>2</sub>.K<sup>107</sup>**

107  
 E Q K L S L V H I L R P Q D V Y K R Q E Q K G S  
 GAG CAA AAA CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GAG CAA AAA GGA AGC 108

**P57NH<sub>2</sub>.F<sup>111</sup>**

111  
 S S F A V S C T H L A A A R C V Q E T G S F V Y  
 AGC TCC TTT GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGC TCC TTT GTT TAT 112

**P57NH<sub>2</sub>.N<sup>138</sup>a**

138  
 N D N A C L L Y T S C G R K M C T R D S D N A P  
 AAC GAT AAT GCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC GAT AAT GCG CCA 139

**P57NH<sub>2</sub>.N<sup>138</sup>b**

138  
 N D N A C L L Y T S C G R K M C T R D S D N A P  
 AAC GAT AAT GCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC GAT AAT GCG CCA 139

**P57NH<sub>2</sub>.A<sup>139</sup>**

139  
 D N A P V S C T H L A A A R C V Q E T D N A P S  
 GAT AAT GCG CCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GAT AAT GCG CCA TCC 140

**P57NH<sub>2</sub>.M<sup>143</sup>**

143  
 S P M L S L V H I L R P Q D V Y K R Q S P M G C  
 TCC CCA ATG CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG TCC CCA ATG GGA TGT 144

**P57NH<sub>2</sub>G<sup>146</sup>a**

146 147  
 G C G P V S C T H L A A A R C V Q E T G C G P A  
 GGA TGT GGC CCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGA TGT GGC CCG GCA

**P57NH<sub>2</sub>G<sup>146</sup>b**

146 147  
 G C G P V S C T H L A A A R C V Q E T G C G P A  
 GGA TGT GGC CCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGA TGT GGC CCG GCA

**P57NH<sub>2</sub>K<sup>150</sup>a**

150 151  
 A N K P C L L Y T S C G R K M C T R D R N K P V  
 GCA AAT AAA CCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGA AAT AAA CCT GTT

**P57NH<sub>2</sub>K<sup>150</sup>b**

150 150  
 A N K P C L L Y T S C G R K M C T R D R N K P V  
 GCA AAT AAA CCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGA AAT AAA CCT GTT

**P57NH<sub>2</sub>K<sup>150</sup>c**

150 150  
 A N K P C L L Y T S C G R K M C T R D R N K P V  
 GCA AAT AAA CCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGA AAT AAA CCT GTT

**P57NH<sub>2</sub>P<sup>158</sup>**

158 159  
 L Q P I C L L Y T S C G R K M C T R D L Q P P A  
CTT CAG CCT CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG CTT CAG CCT CCG GCG

**P57NH<sub>2</sub>P<sup>159</sup>**

159 160  
 Q P P A C L L Y T S C G R K M C T R D R P P A G  
 CAG CCT CCG GCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGG CCT CCG GCG GGT

**P57NH<sub>2</sub>A<sup>160</sup>**

160 161  
 P P A A V S C T H L A A A R C V Q E T A P A G P  
 CCT CCG GCG GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GCT CCG GCG GGT CCT

**P57NH<sub>2</sub>L<sup>163</sup>**

163 164  
 G P L L S L V H I L R P Q D V Y K R Q G P L G G  
GGT CCT CTT CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GGT CCT CTT GGC GGC

**P57NH<sub>2</sub>G<sup>164</sup>a**

164 165  
 P L G G C L L Y T S C G R K M C T R D S L G G G  
CCT CTT GGC GGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGT CTT GGC GGC GGT

**P57NH<sub>2</sub>G<sup>164</sup>b**

164 165  
 P L G G C L L Y T S C G R K M C T R D S L G G G  
CCT CTT GGC GGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGT CTT GGC GGC GGT

**P57NH<sub>2</sub>G<sup>166</sup>**

166 167  
 G G G T C L L Y T S C G R K M C T R D S G G T V  
GGC GGC GGT ACC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC GGC GGT ACT GTG

**P57NH<sub>2</sub>T<sup>167</sup>a**

167 168  
 G G T A V S C T H L A A A R C V Q E T G G T V V  
GGC GGT ACT GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGC GGT ACT GTG GTG

**P57NH<sub>2</sub>.T<sup>167b</sup>**

167 168  
G G T A V S C T H L A A A R C V Q E T G G T V V  
GGC GGT ACT GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGC GGT ACT GTG GTG

**P57NH<sub>2</sub>.V<sup>169</sup>**

169 170  
T V V L S L V H I L R P Q D V Y K R Q T V V K V  
ACT GTG GTG CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG ACT GTG GTG AAG GTG

**P57NH<sub>2</sub>.K<sup>170</sup>**

170 171  
V V K A V S C T H L A A A R C V Q E T V V K V D  
GTG GTG AAG GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GTG GTG AAG GTG GAT

**P57NH<sub>2</sub>.G<sup>173</sup>**

173 174  
V D G S C L L Y T S C G R K M C T R D R D G S N  
GTG GAT GGC AGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGG GAT GGC AGC AAC

**P57NH<sub>2</sub>.N<sup>175</sup>**

175 176  
G S N L S L V H I L R P Q D V Y K R Q G S N L F  
GGC AGC AAC CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GGC AGC AAC CTA TTC

**P57NH<sub>2</sub>.N<sup>175</sup>**

175 176  
G S N P V S C T H L A A A R C V Q E T G S N L F  
GGC AGC AAC CCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGC AGC AAC CTA TTC

**P57NH<sub>2</sub>.L<sup>176</sup>**

176 177  
S N L F C L L Y T S C G R K M C T R D S N L F G  
AGC AAC CTA TTC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC AAC CTA TTC GGC

**P57NH<sub>2</sub>.F<sup>177</sup>**

177 178  
N L F L S L V H I L R P Q D V Y K R Q N L F G A  
AAC CTA TTC CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG AAC CTA TTC GGC GCA

**P57NH<sub>2</sub>.F<sup>177a</sup>**

177 178  
N L F G C L L Y T S C G R K M C T R D S L F G A  
AAC CTA TTC GGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC CTA TTC GGC GCA

**P57NH<sub>2</sub>.F<sup>177b</sup>**

177 178  
N L F G C L L Y T S C G R K M C T R D S L F G A  
AAC CTA TTC GGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGC CTA TTC GGC GCA

**P57NH<sub>2</sub>.G<sup>178</sup>**

178 179  
L F G L S L V H I L R P Q D V Y K R Q L F G A S  
CTA TTC GGC CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG CTA TTC GGC GCA TCG

**P57NH<sub>2</sub>.G<sup>178</sup>**

178 179  
L F G A C L L Y T S C G R K M C T R D R F G A S  
CTA TTC GGC GGC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGA TTC GGC GCA TCG

**P57NH<sub>2</sub>.S<sup>180</sup>**

180 181  
G A S P V S C T H L A A A R C V Q E T G A S Q V  
GGC GCA TCG CCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GGC GCA TCG CAA GTC

**P57NH<sub>2</sub>.Q<sup>181</sup>**

181 182  
 A S Q A V S C T H L A A A R C V Q E T A S Q V S  
 GCA TCG CAA GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GCA TCG CAA GTC TCC

**P57NH<sub>2</sub>.F<sup>184</sup>**

184 185  
 V S F A S L V H I L R P Q D V Y K R Q V S F G D  
 GTC TCC TTT CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GTC TCC TTT GGA GAC

**P57NH<sub>2</sub>.G<sup>185</sup>**

185 186  
 S F G A V S C T H L A A A R C V Q E T A F G D K  
 TCC TTT GGA GCT GTC TCT TGT ACA CAT CTT GCG GCC GCA AGA TGT GTA CAA GAG ACA GCC TTT GGA GAC AAA

**P57NH<sub>2</sub>.A<sup>193</sup>**

193 194  
 D I A L S L V H I L R P Q D V Y K R Q D I A V A  
 GAC ATT GCC CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GAC ATT GCC GTC GCT

**P57NH<sub>2</sub>.G<sup>198</sup>**

198 199  
 Q D G N C L L Y T S C G R K M C T R D R D G N S  
 CAG GAT GGT AAC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGG GAT GGT AAC TCG

**P57NH<sub>2</sub>.N<sup>199</sup>**

199 200  
 D G N S C L L Y T S C G R K M C T R D S G N S L  
 GAT GGT AAC TCC TGT CTC TTG TAC ACA TCT TGC GGC CGC AAG ATG TGT ACA AGA GAC AGT GGT AAC TCG TTG

**P57NH<sub>2</sub>.D<sup>209</sup>**

209 210  
 A V D L S L V H I L R P Q D V Y K R Q A V D A A  
 GCA GTA GAT CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG GCA GTA GAT GCC GCT

**P57NH<sub>2</sub>.Y<sup>233</sup>**

233 234  
 F H Y L S L V H I L R P Q D V Y K R Q F H Y F G  
 TTC CAC TAC CTG TCT CTT GTA CAC ATC TTG CCG CCG CAA GAT GTG TAC AAG AGA CAG TTC CAC TAC TTC GGA