

Multidrug-Resistant Genotypes of *Plasmodium falciparum*, Myanmar

Technical Appendix

Table. Primers used to amplify drug resistance–related genes in *Plasmodium falciparum* isolates, northeastern Myanmar, 2007–2009*

Target gene	Primer name	Sequences (5' → 3')	SNPs	Size of PCR product, bp	Reference
<i>Pfcr</i>	Outer-PFCF	CCGTTAATAATAAATACAGGC		1,600	(1)
	Outer-PFCR	CTTTAAAAATGGAAGGGTGT			
	Inner-pf72	TGTGCTCATGTGTTTAAACTTAT	72–76	552	
	Inner-pr72	AAAATAGTATACTTACCTATATCT			
	Inner-pf220	CTTATACAATTATCTCGGAGCAG	220	178	
	Inner-pr220	ATAATAAAAAACAAAGTTTAAAGTGT			
<i>Pfmdr1</i>	19F	AGAGAAAAAAGATGGTAACCTCAG	86, 184	590	(2)
	606R	ACCACAAACATAAATTAACGG			
	2902F	GCGGAGTTTTGCATTTAGTTCAGATGATG	1034–1246	960	
	3867R	AGCAGCAAACCTTACTAACACGTTTAAACATC			
<i>Pfdhfr</i>	Outer F	TTTATATTTTCTCCTTTTTAT	16, 51, 59, 108, 164	665	(3)
	Outer R	TTACTAGTATATACA TCGCTAACAG			
	Inner F	ATGATGGAACAAGCTGCGCAC		646	
	Inner R	TTACTAGTATATACATCGCTAACA			
<i>Pfdhps</i>	Outer F	GGTATTTTTGTTGACCTAAACG		727	
	Outer R	TCCAATTGTGTGATTTGCCAC			
	Inner F1	GGTATTTTTGTTGAACCTAAACG	436, 437	319	
	Inner R1	CTGGATTATTTGTACAAGCAC			
	Inner F2	GAATGTGTTGATAATGATTTAG	540, 581, 613	472	
	Inner R2	TCCAATTGTGTGATTTGCCAC			
<i>Pfnhe1</i>	3802F	TTATTAATGAATATAAAGA	Ms4760	520	(4)
	4322R	TTTTTTATCATTACTAAAGA			

*SNP, single nucleotide polymorphisms; *Pfcr*, *Plasmodium falciparum* chloroquine resistance transporter; *Pfmdr1*, *P. falciparum* multidrug resistance 1; *Pfdhfr*, *P. falciparum* dihydrofolate reductase; *Pfdhps*, *P. falciparum* dihydropyrimidine synthase; *Pfnhe1*, *P. falciparum* Na⁺/H⁺ exchanger.

References

- Mittra P, Vinayak S, Chandawat H, Das MK, Singh N, Biswas S, et al. Progressive increase in point mutations associated with chloroquine resistance in *Plasmodium falciparum* isolates from India. *J Infect Dis.* 2006;193:1304–12. [PubMed DOI: 10.1086/502979](https://pubmed.ncbi.nlm.nih.gov/10.1086/502979/)
- Basco LK, Ringwald P. Molecular epidemiology of malaria in Cameroon. X. Evaluation of PFMDR1 mutations as genetic markers for resistance to amino alcohols and artemisinin derivatives. *Am J Trop Med Hyg.* 2002;66:667–71. [PubMed](https://pubmed.ncbi.nlm.nih.gov/)
- Gebre-Woldearegai T, Hailu A, Grobusch MP, Kun JF. Molecular surveillance of mutations in dihydrofolate reductase and dihydropyrimidine synthase genes of *Plasmodium falciparum* in Ethiopia. *Am J Trop Med Hyg.* 2005;73:1131–4. [PubMed](https://pubmed.ncbi.nlm.nih.gov/)

4. Ferdig MT, Cooper RA, Mu J, Deng B, Joy DA, Su XZ, et al. Dissecting the loci of low-level quinine resistance in malaria parasites. *Mol Microbiol.* 2004;52:985–97. [PubMed DOI: 10.1111/j.1365-2958.2004.04035.x](#)