

Plasmodium falciparum *pfhrp2* and *pfhrp3* Gene Deletions and Relatedness to Other Global Isolates, Djibouti, 2019–2020

Appendix

Appendix Table 1. Source of NMS data from previous studies

Country	Year(s)	Samples with NMS data used in current study (n)	Reference
Angola	2019	32	(1)
Costa Rica	2019	14	(2)
Eritrea	2019	173	(3)
Eritrea	2016	14	(4)
Ethiopia	2018	20	(5)
Guyana	2010	27	(6)
Haiti	2016	86	(7)
Indian Subcontinent†	2013–2016	11	(8)
Malaysia*	2008–2014	27	(9)
Peru	2010–2012	18	(10)
Rwanda	2018	42	(11)
Sudan	2010–2018	37	(12)
Suriname	2013–2014	43	(13)
Uganda	2018	25	(14)

*NMS, neutral microsatellite.

†Inclusive of India and Pakistan. Did not include complete 7 NMS panel, so used only in supplementary analysis.

Appendix Table 2. Jost's D and Hendrick G_{st} relatedness of Djibouti *P. falciparum* by *pfhrp2* and *pfhrp3* genotype*

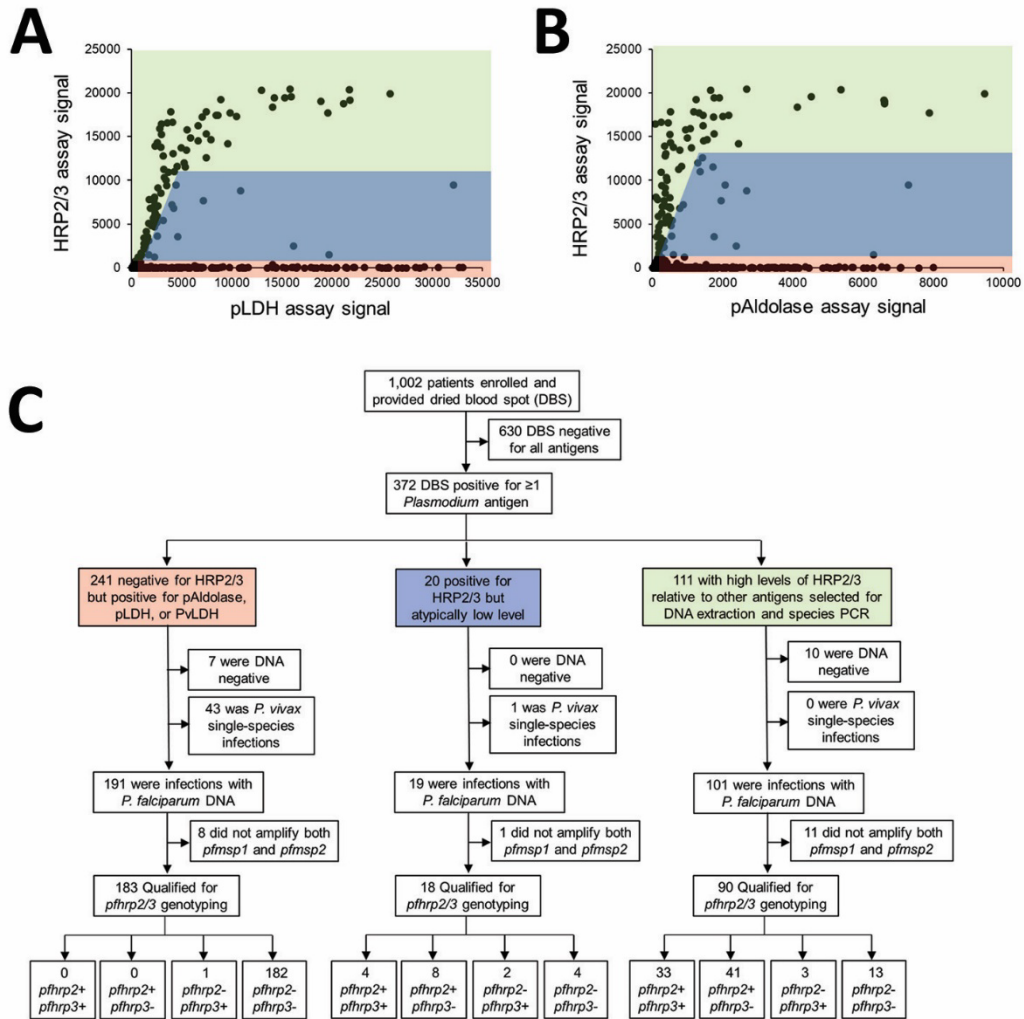
Comparison	Genotypes	pfhrp2+/pfhrp3+	pfhrp2+/pfhrp3-	pfhrp2-/pfhrp3+	pfhrp2-/pfhrp3-
Jost's D Pairwise	pfhrp2+/pfhrp3+	0.734			
	pfhrp2+/pfhrp3-	0.395	0.475		
	pfhrp2-/pfhrp3+	0.721	0.506	0.346	
	pfhrp2-/pfhrp3-				
Hendrick Pairwise G _{st}	pfhrp2+/pfhrp3+	0.924			
	pfhrp2+/pfhrp3-	0.662	0.691		
	pfhrp2-/pfhrp3+	0.948	0.832	0.630	
	pfhrp2-/pfhrp3-				

*Darker shading indicates higher level of relatedness.

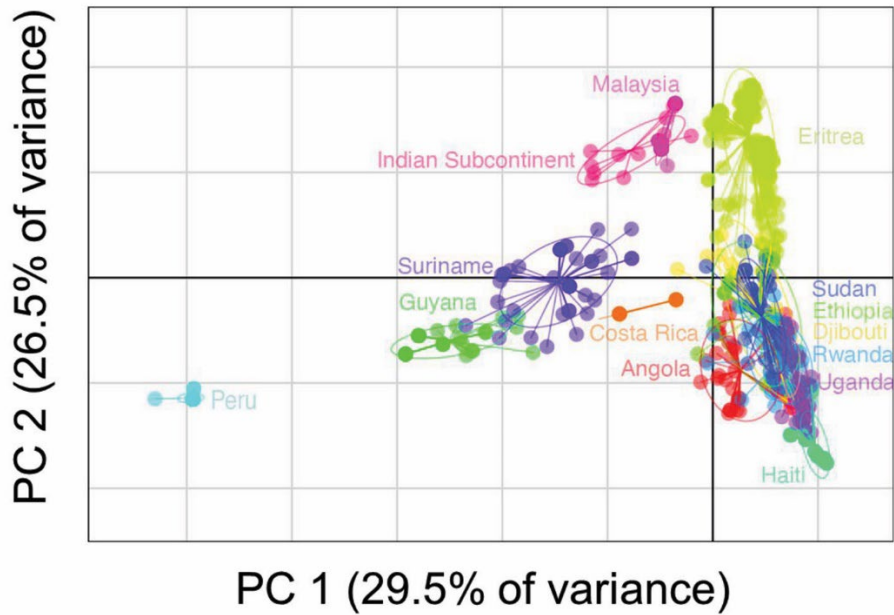
Appendix Table 3. Jost's D and Hendrick Gst relatedness of Djibouti *Plasmodium falciparum* compared to *P falciparum* from other countries*

Comparison	Genotypes	Djibouti	Angola	Costa Rica	Eritrea	Ethiopia	Guyana	Haiti	Peru	Rwanda	Sudan	Suriname
Jost's D Pairwise	Djibouti											
	Angola	0.699										
	Costa Rica	0.924	0.746									
	Eritrea	0.636	0.786	0.977								
	Ethiopia	0.486	0.670	0.894	0.752							
	Guyana	0.949	0.875	0.895	0.985	0.954						
	Haiti	0.657	0.630	0.821	0.882	0.634	0.999					
	Peru	0.926	0.864	0.895	0.970	0.903	0.460	1.00				
	Rwanda	0.586	0.478	0.875	0.724	0.516	0.932	0.519	0.966			
	Sudan	0.772	0.600	0.943	0.756	0.744	0.966	0.731	0.997	0.603		
	Suriname	0.867	0.919	0.917	0.813	0.916	0.514	0.925	0.804	0.905	0.892	
	Uganda	0.598	0.496	0.924	0.791	0.494	0.970	0.474	0.993	0.375	0.633	0.941
Hendrick Pairwise Gst	Djibouti											
	Angola	0.796										
	Costa Rica	0.965	0.844									
	Eritrea	0.761	0.861	0.990								
	Ethiopia	0.610	0.758	0.944	0.835							
	Guyana	0.976	0.933	0.957	0.993	0.976						
	Haiti	0.803	0.769	0.921	0.941	0.769	1.00					
	Peru	0.976	0.948	0.976	0.991	0.963	0.802	1.00				
	Rwanda	0.702	0.587	0.928	0.816	0.620	0.964	0.676	0.988			
	Sudan	0.849	0.699	0.969	0.838	0.816	0.982	0.839	0.999	0.700		
	Suriname	0.927	0.953	0.961	0.895	0.950	0.714	0.966	0.938	0.944	0.936	
	Uganda	0.716	0.609	0.958	0.866	0.604	0.985	0.641	0.998	0.486	0.730	0.966

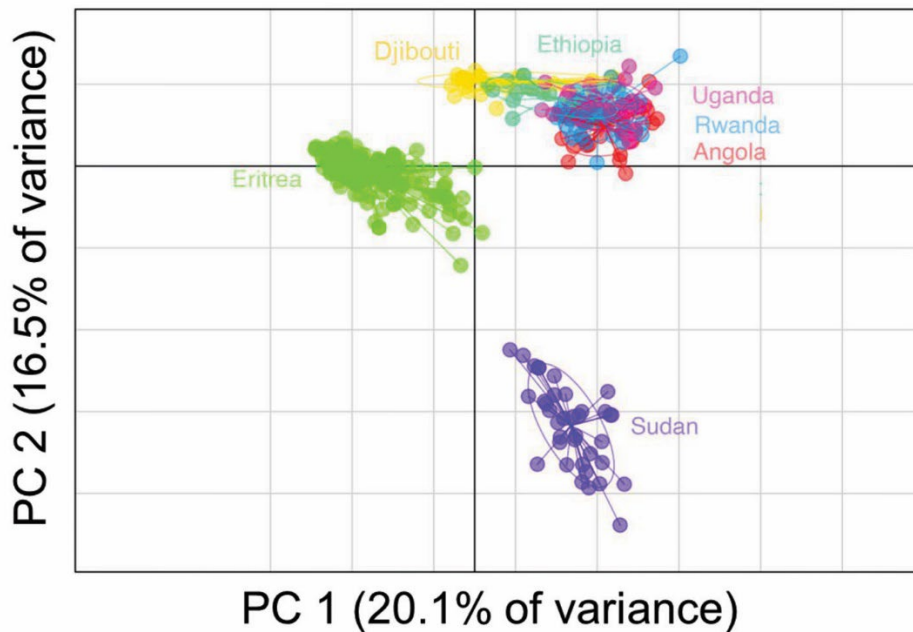
*Darker shading indicates higher level of relatedness.



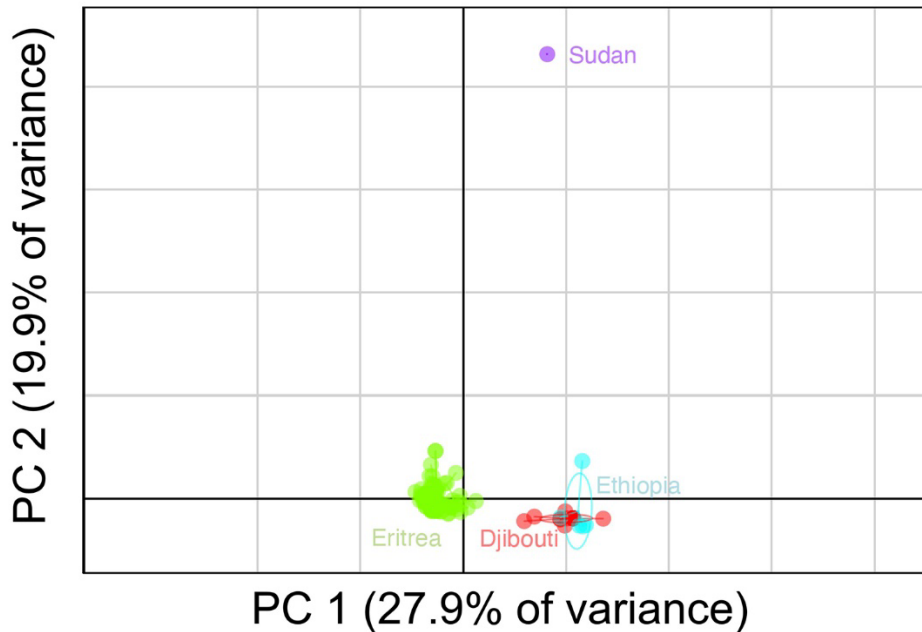
Appendix Figure 1. Comparison of the HRP2/3 assay signal with other pan-*Plasmodium* antigen targets to categorize sample set into high and low HRP2/3 levels. Scatterplots for HRP2/3 immunoassay signal as compared to pan-*Plasmodium* lactate dehydrogenase (A) or pan-*Plasmodium* aldolase (B) signals. C) Flowchart for genotype reporting for all samples if dichotomizing by HRP2/3 category. For all panels, red shading indicates complete absence of HRP2/3 assay signal, blue shading indicates relatively low HRP2/3 signal when compared with pan-*Plasmodium* targets, and green shading indicates high HRP2/3 signal compared with pan-*Plasmodium* targets.



Appendix Figure 2. Relatedness of Djibouti *Plasmodium falciparum* parasites with other global isolates with limited neutral microsatellite data. Inclusion of Asian isolates with only 4 neutral microsatellite targets published (TA1, Poly α , PfPK2, 2490). Plots shown with PC1 on x-axis and PC2 on y-axis, with 95% confidence ellipses



Appendix Figure 3. Relatedness of Djibouti *Plasmodium falciparum* parasites with other African isolates. Plots shown with PC1 on x-axis and PC2 on y-axis, with 95% confidence ellipses.



Appendix Figure 4. Relatedness of Djibouti *Plasmodium falciparum* parasites with other African isolates lacking only *pfhrp3*. Plots shown with PC1 on x-axis and PC2 on y-axis, with 95% confidence ellipses.

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