

Comparison of the *Plasmodium* Species Which Cause Human Malaria

<i>Plasmodium</i> species	Stages found in blood	Appearance of Erythrocyte (RBC)	Appearance of Parasite
P. falciparum	Ring	normal; multiple infection of RBC more common than in other species	delicate cytoplasm; 1-2 small chromatin dots; occasional appliqué (accollé) forms
	Trophozoite	normal; rarely, Maurer's clefts (under certain staining conditions)	seldom seen in peripheral blood; compact cytoplasm; dark pigment
	Schizont	normal; rarely, Maurer's clefts (under certain staining conditions)	seldom seen in peripheral blood; mature = 8-24 small merozoites; dark pigment, clumped in one mass
	Gametocyte	distorted by parasite	crenate or sausage shape; chromatin in a single mass (macrogametocyte) or diffuse (microgametocyte); dark pigment mass
P. vivax	Ring	normal to 1-1/4 X, round; occasionally fine Schüffner's dots; multiple infection of RBC not uncommon	large cytoplasm with occasional pseudopods; large chromatin dot
	Trophozoite	enlarged 1-1/2-2 X; may be distorted; fine Schüffner's dots	large ameboid cytoplasm; large chromatin; fine, yellowish-brown pigment
	Schizont	enlarged 1-1/2-2 X; may be distorted; fine Schüffner's dots	large, may almost fill RBC; mature = 12-24 merozoites; yellowish-brown, coalesced pigment
	Gametocyte	enlarged 1-1/2-2 X; may be distorted; fine Schüffner's dots	round to oval; compact; may almost fill RBC; chromatin compact, eccentric (macrogametocyte) or diffuse (microgametocyte); scattered brown pigment
P. ovale	Ring	normal to 1-1/4 X, round to oval; occasionally Schüffner's dots; occasionally fimbriated; multiple infection of RBC not uncommon	sturdy cytoplasm; large chromatin
	Trophozoite	normal to 1-1/4 X; round to oval; some fimbriated; Schüffner's dots	compact with large chromatin; dark-brown pigment
	Schizont	normal to 1-1/4 X; round to oval; some fimbriated; Schüffner's dots	mature = 6-14 merozoites with large nuclei, clustered around mass of dark-brown pigment
	Gametocyte	normal to 1-1/4 X; round to oval; some fimbriated; Schüffner's dots	round to oval; compact; may almost fill RBC; chromatin compact, eccentric (macrogametocyte) or more diffuse (microgametocyte); scattered brown pigment
P. malariae	Ring	normal to 3/4 X	sturdy cytoplasm; large chromatin
	Trophozoite	normal to 3/4 X; rarely, Ziemann's stippling (under certain staining conditions)	compact cytoplasm; large chromatin; occasional band forms; coarse, dark-brown pigment
	Schizont	normal to 3/4 X; rarely, Ziemann's stippling (under certain staining conditions)	mature = 6-12 merozoites with large nuclei, clustered around mass of coarse, dark-brown pigment; occasional rosettes
	Gametocyte	normal to 3/4 X; rarely, Ziemann's stippling (under certain staining conditions)	round to oval; compact; may almost fill RBC; chromatin compact, eccentric (macrogametocyte) or more diffuse (microgametocyte); scattered brown pigment

Keypoints for *Plasmodium* Species Which Cause Human Malaria

Infected RBCs

Size	Shape	Schüffner's Dots
<p><N, N: PM</p> <p>N: PF</p> <p>>N: PO</p> <p>> >N: PV</p>	<p>Crescent: PF (gametocytes)</p> <p>Ameboid: PV</p> <p>Fimbriation: PO</p> <p>Elongated: PO</p>	<p>PV, PO</p>

Parasites Found In Circulating Blood

Rings	Trophozoites	Schizonts (mature)	Gametocytes
<p>Rings only (±gametocytes): PF</p> <p>Numerous: PF</p> <p>Multiply infected RBCs: PF</p> <p>Accessory chromatin dots: PF</p> <p>Delicate: PF</p>	<p>Ameboid: PV</p> <p>Compact: PO PM PF (rarely seen)</p> <p>Band form: PM</p>	<p>6-12 nuclei: PM</p> <p>6-14 nuclei: PO</p> <p>12-24: PV</p> <p>8-24: PF (rarely seen)</p> <p>Rosettes: PM</p>	<p>Crescent: PF</p> <p>Round: PV PO PM</p>

Certain morphologic key characteristics of the infected erythrocytes and parasites can be used to orient the diagnosis towards one of the four *Plasmodium* species that infect humans, as shown above. These characteristics are by no means absolute, however. The final diagnosis should be based on the combined findings for the various characteristics: what is the most probable species, based on the available findings.

Legend

PF: *P. falciparum*
PV: *P. vivax*
PO: *P. ovale*
PM: *P. malariae*