



Malaria Lab Session

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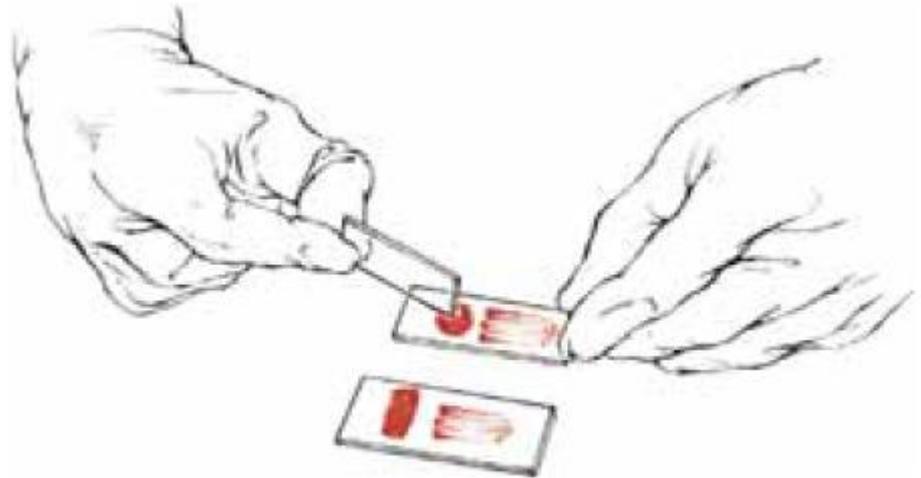
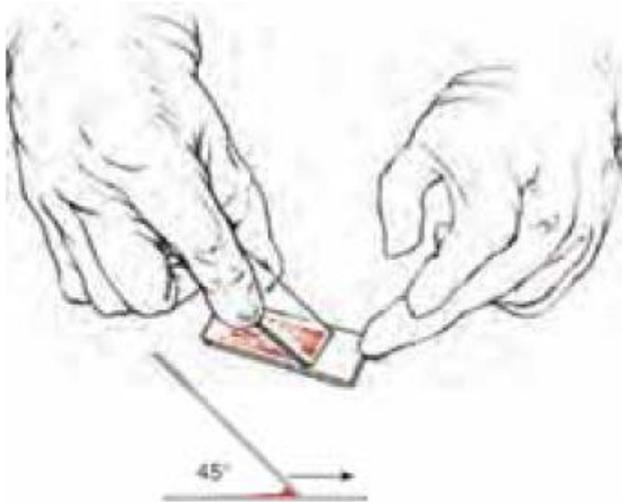
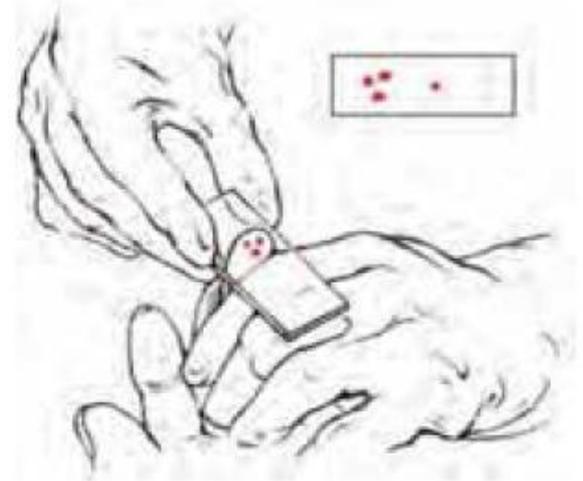
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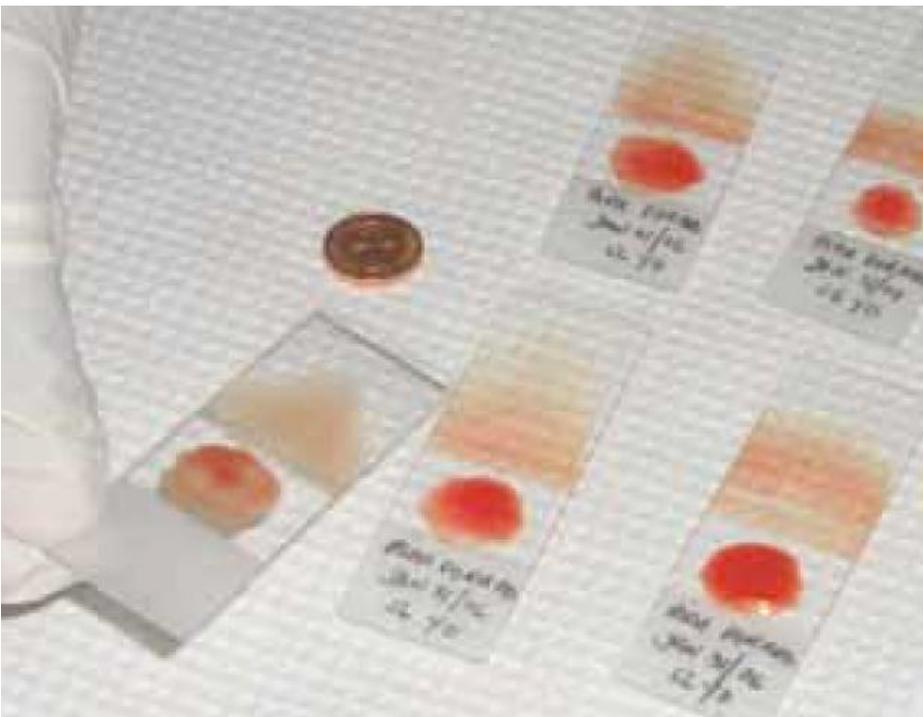


Helpful Reference:

- WHO Health Library for Disasters
- <http://helid.digicollection.org/en>
- Basic Malaria Microscopy – Learner's Guide
- http://whqlibdoc.who.int/publications/2010/9789241547826_eng.pdf



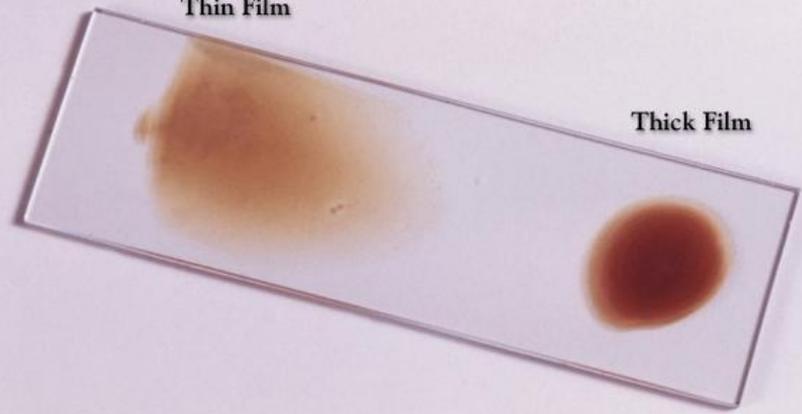




Blood Films (for microscopic analysis)

Thin Film

Thick Film



Blood Smear for malaria

Thick Film

- Red blood cells layered 10-20 times thicker v. thin film
- Red Cells are not fixed (staining caused lysis) thus the parasites are within red cell 'ghosts'
- Can evaluate large amount of red blood cells
- Sensitive (negative amore likely to rule out malaria)

Thin Film

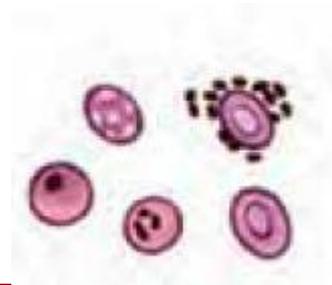
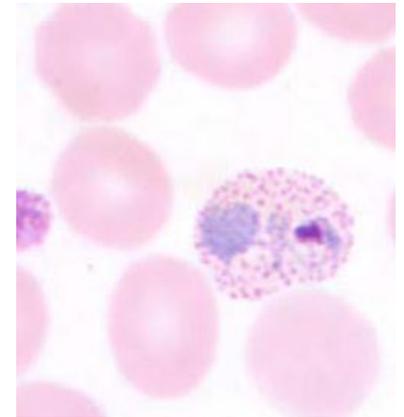
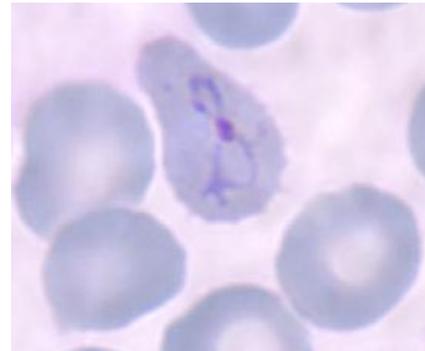
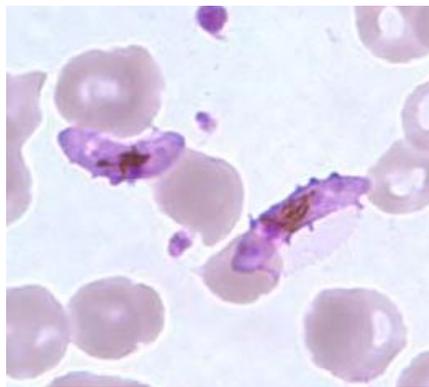
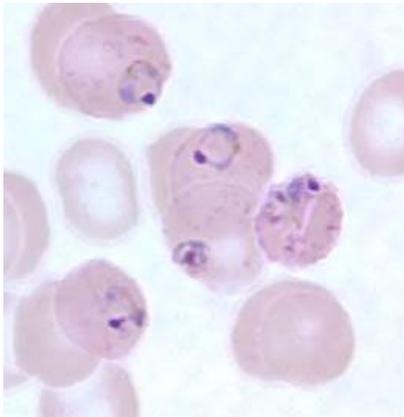
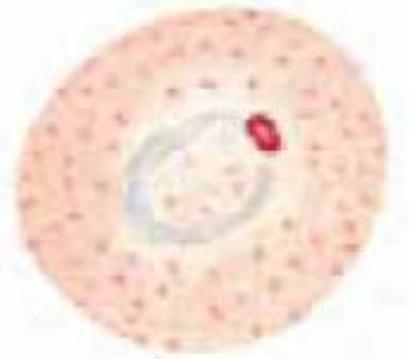
- Single layer of red blood cells
- Fixed with methanol
- Used to identify parasite species.
- Used to estimate parasitemia
- View after thick smear
- Specific

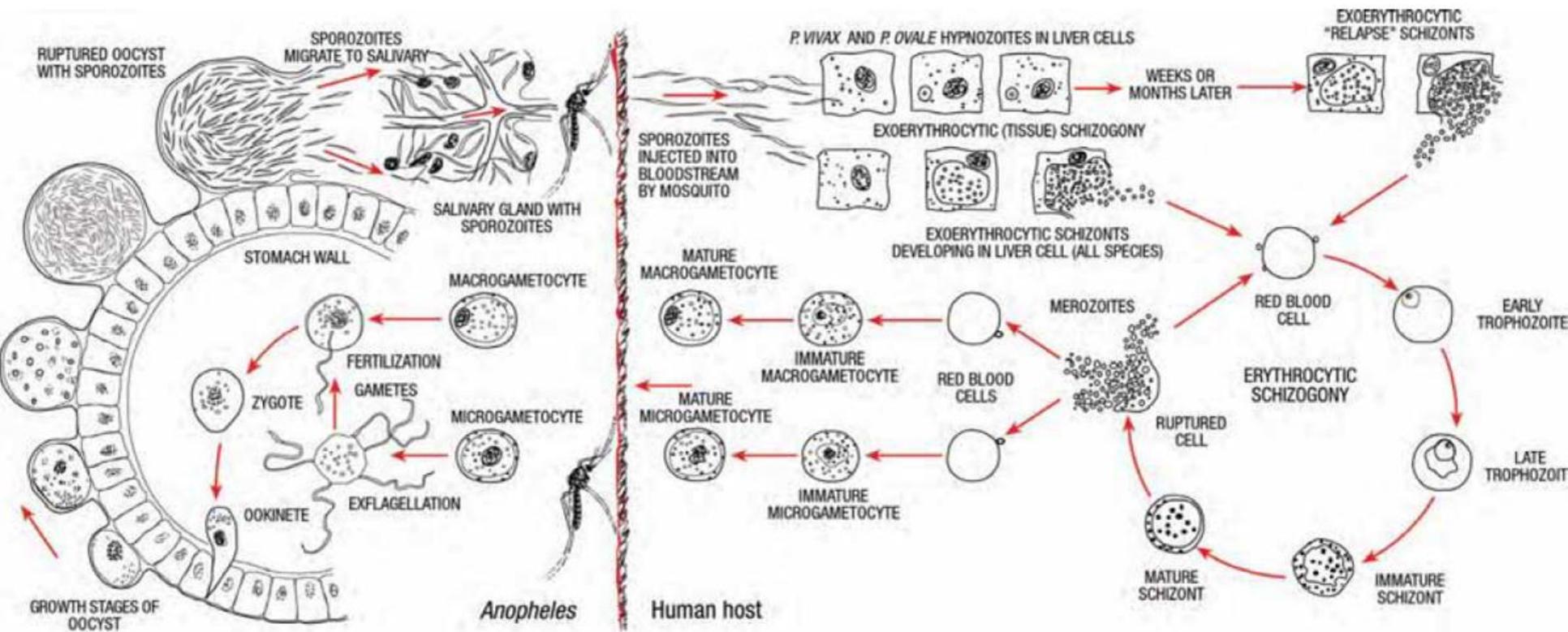
STAINING:

http://www.dpd.cdc.gov/dpdx/HTML/PDF_Files/malaria_staining_benchaid.pdf



Chromatic = red
Cytoplasm = blue
Don't see both = Not malaria



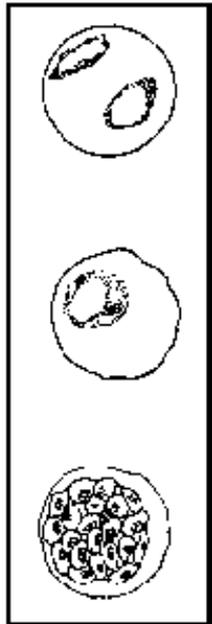


Key Morphological Differences Between Human *Plasmodium* Species in Blood Smears

<i>P. falciparum</i>	<i>P. vivax</i>	<i>P. ovale</i>	<i>P. malariae</i>
numerous rings	enlarged erythrocyte (younger cells)	similar to <i>P. vivax</i>	compact parasite
smaller rings			
NO trophozoites or schizonts seen	Schüffner's dots diffuse and fine	compact trophozoite	merozoites in rosette
crescent-shaped gametocytes	'ameboid' trophozoite	fewer merozoites in schizont	
		Elongated, erythrocyte	



	vivax	ovale	malariae	falciparum
Ring Stage				
Trophozoite				
Schizont				
Segmenter				
Gametocytes				



sequestered



Malaria species differentiation in thin films

Host red blood cell



Not enlarged



Enlarged



Sometimes distorted with crenation, pinkish, bluish and darkened rim



Stippling as coarse Maurer dots or clefts (sometimes absent)

P. falciparum



Not distorted and no change in colour



No stippling, except with intense staining

P. malariae



Markedly enlarged, round or angular

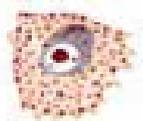


Stippling as fine Schüffner dots

P. vivax



Slightly enlarged, sometimes distorted with fimbriated ends or oval in shape

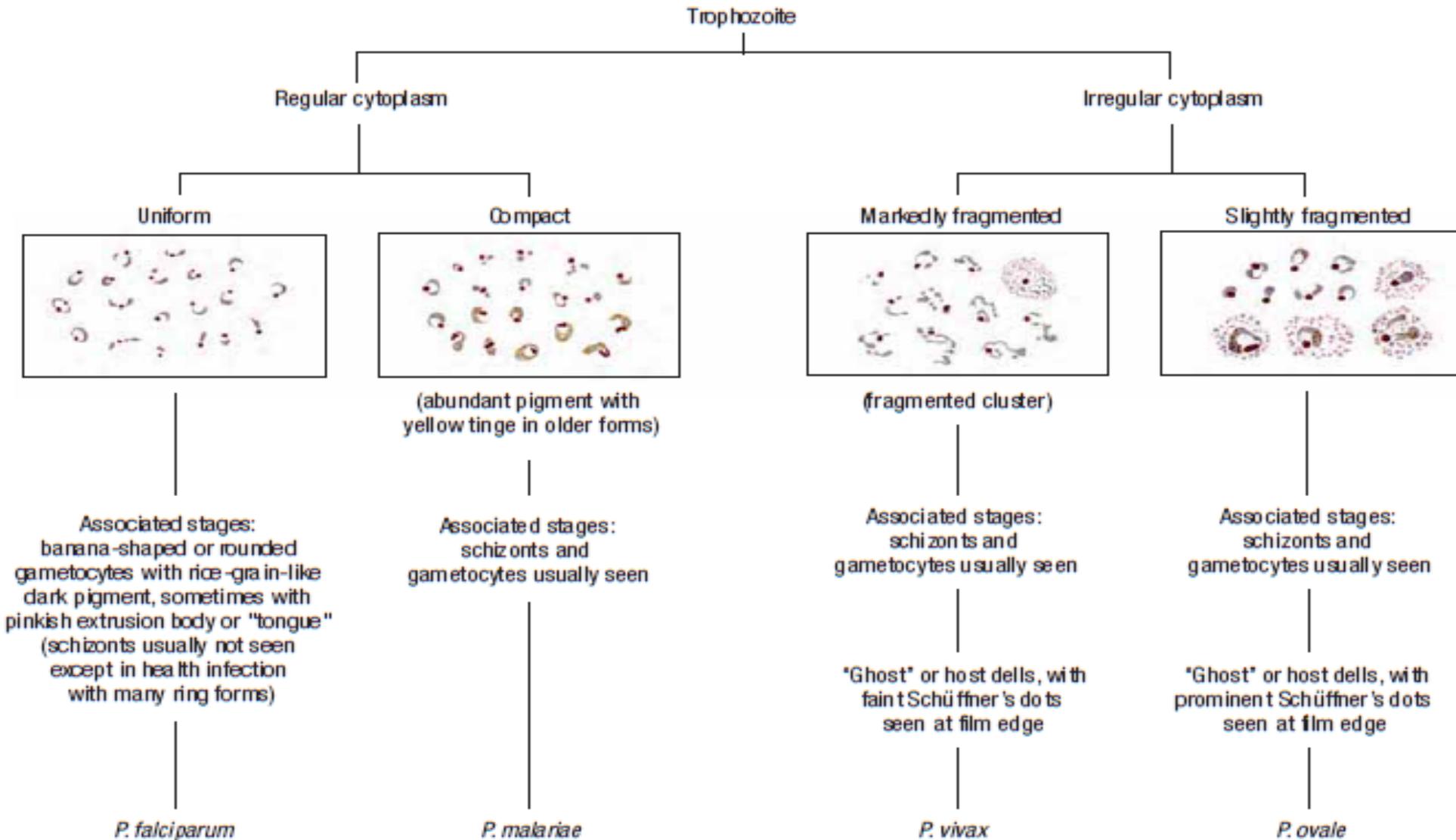


Stippling as Schüffner dots more prominent along cell margin

P. ovale

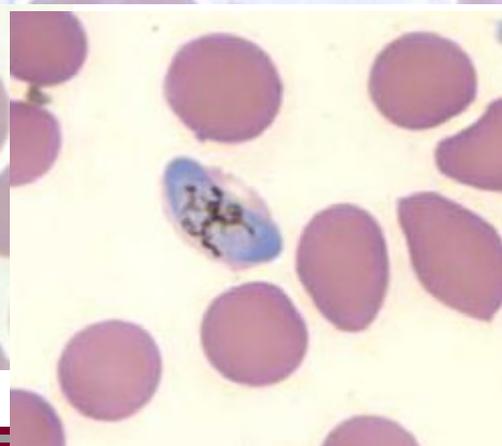
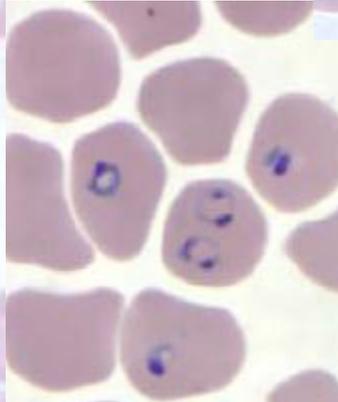
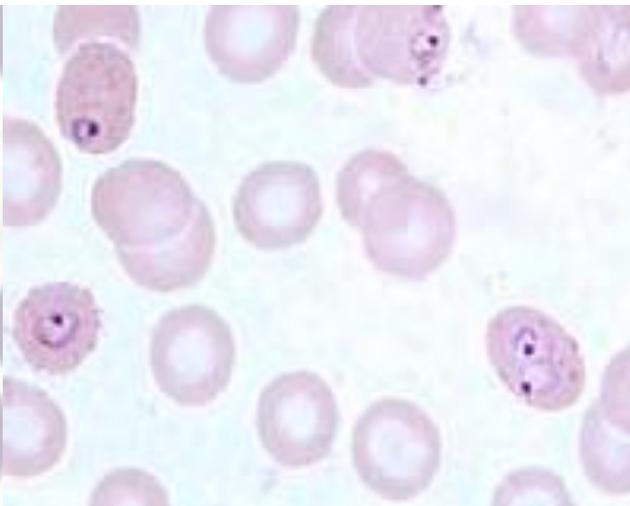
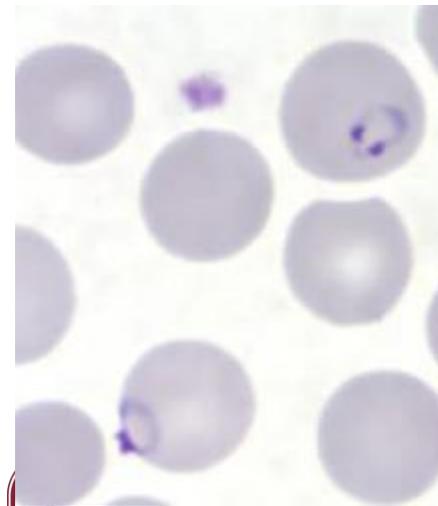
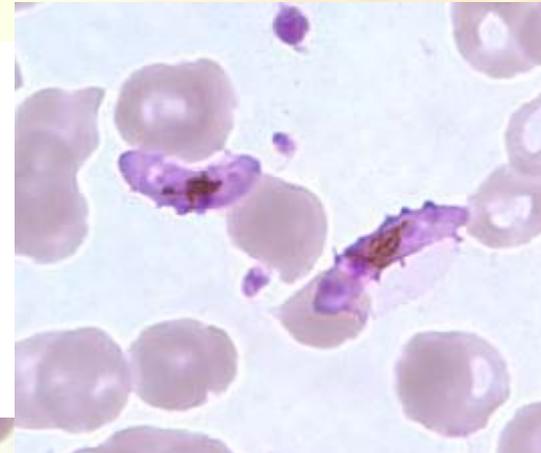
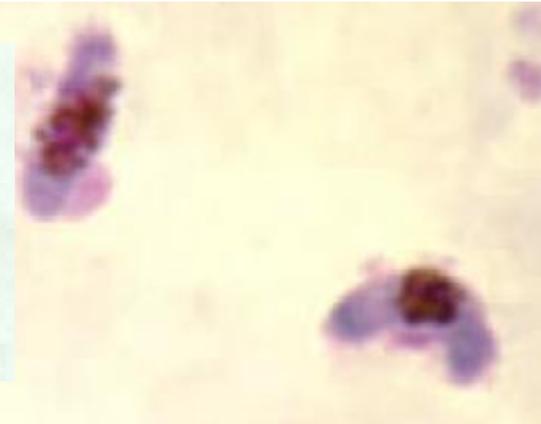
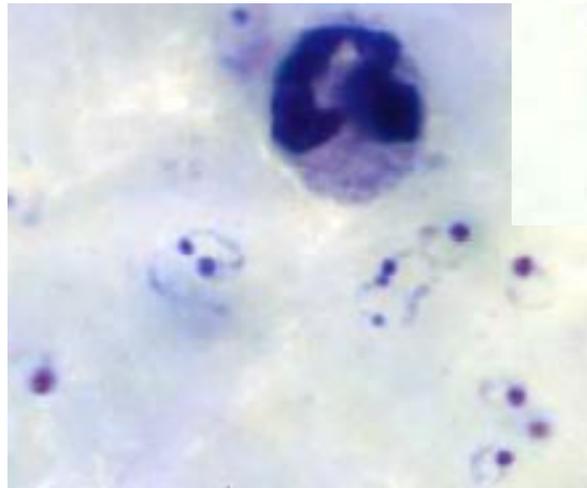
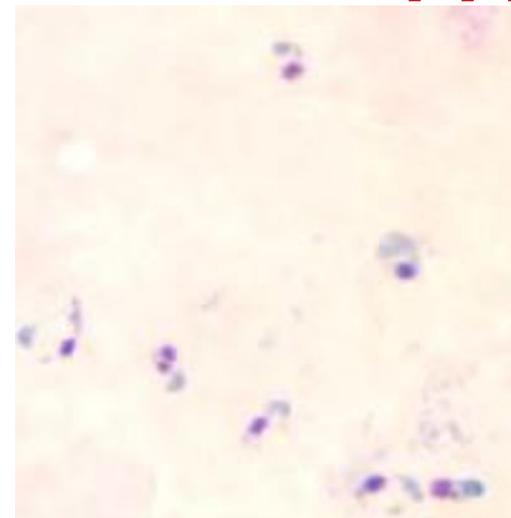
Malaria species differentiation in thin films using host-cell changes and presence of stippling (Giemsa stain)

Differentiation of malaria parasite species in thick films

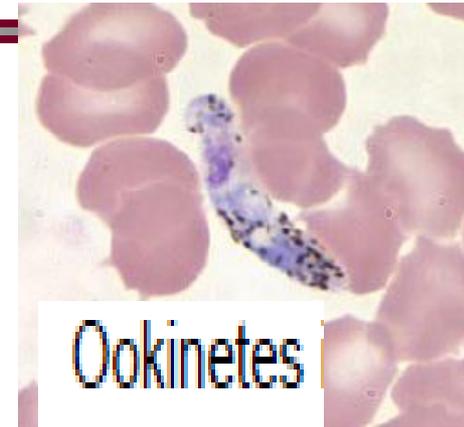
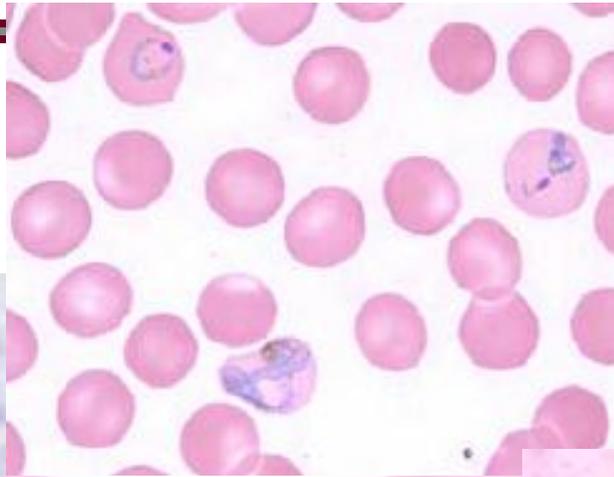


Malaria species differentiation in thick films based on patterns of cytoplasm and stippling in trophozoites (Giemsa stain)

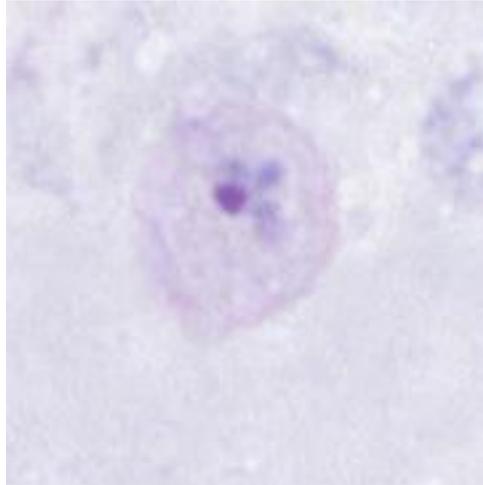
P. falciparum



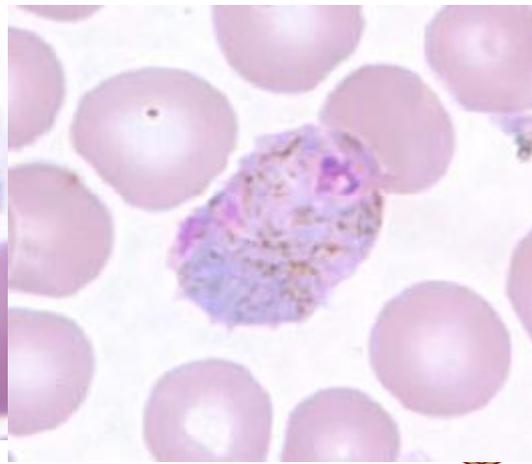
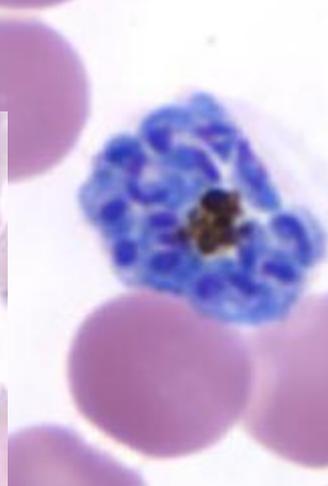
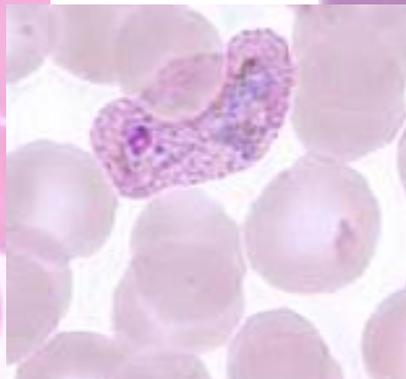
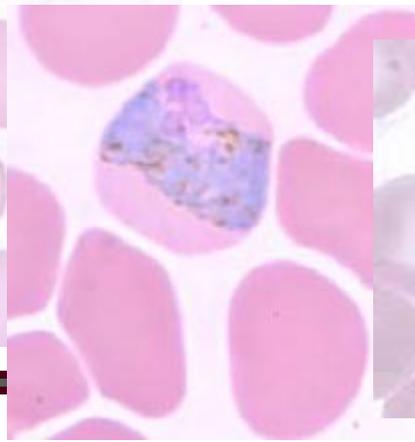
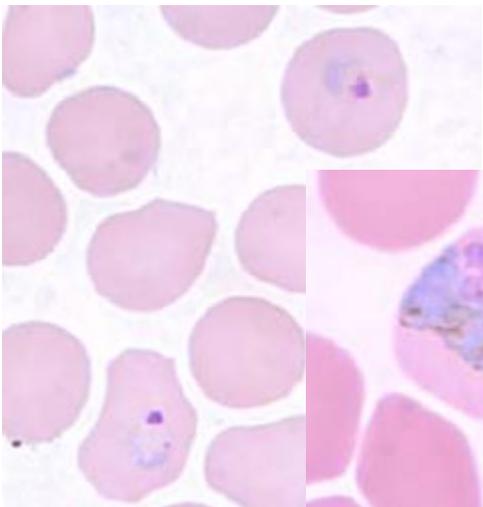
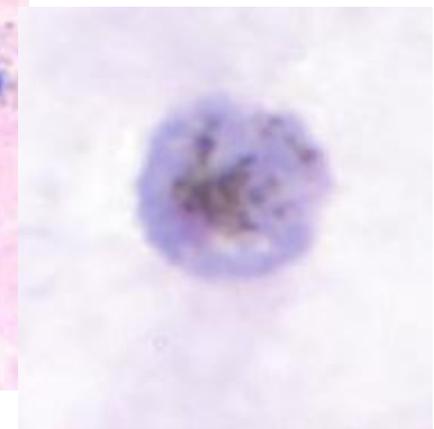
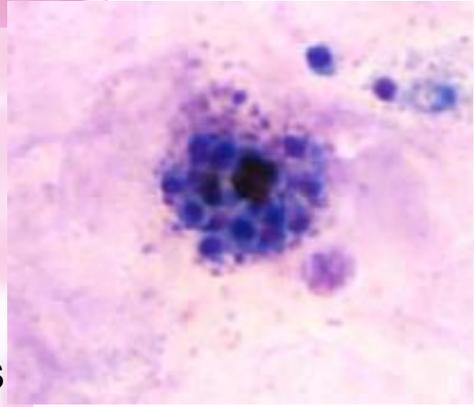
P. vivax



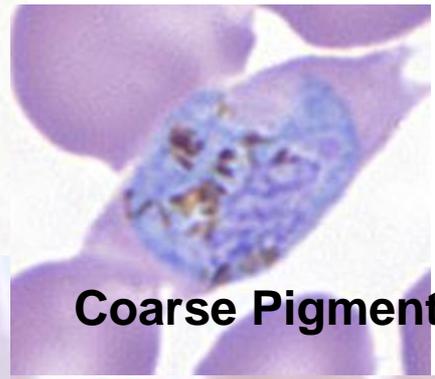
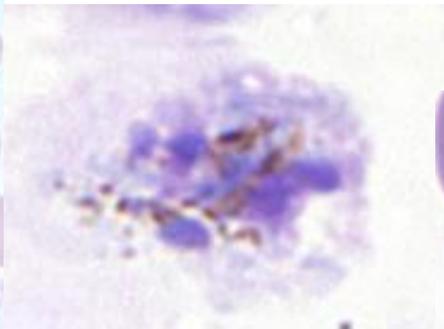
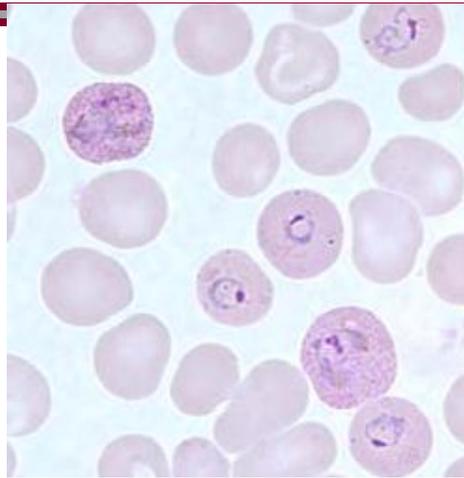
Ookinetes



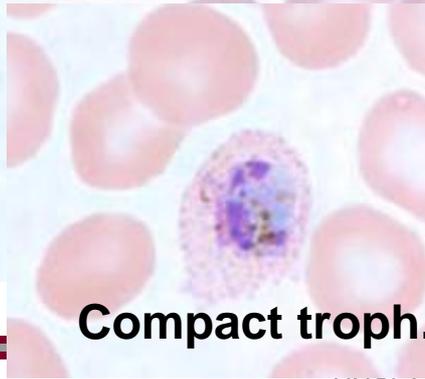
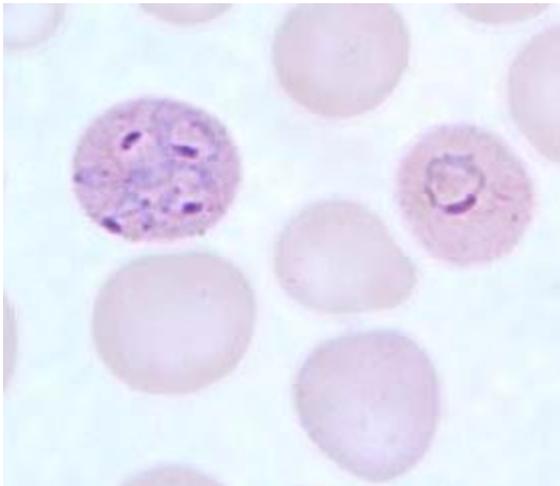
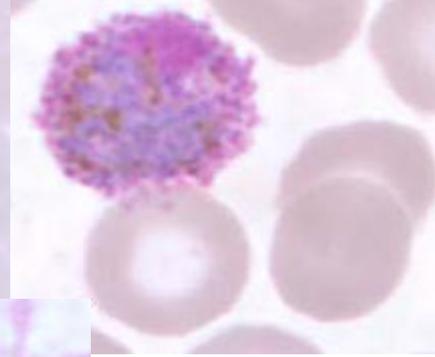
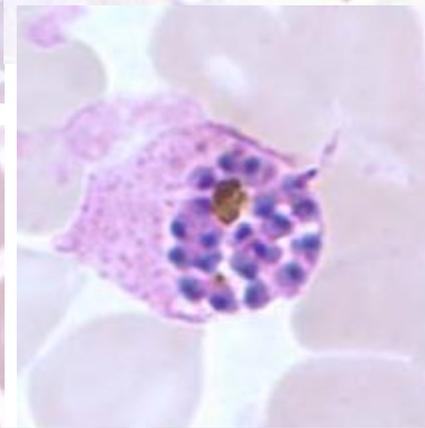
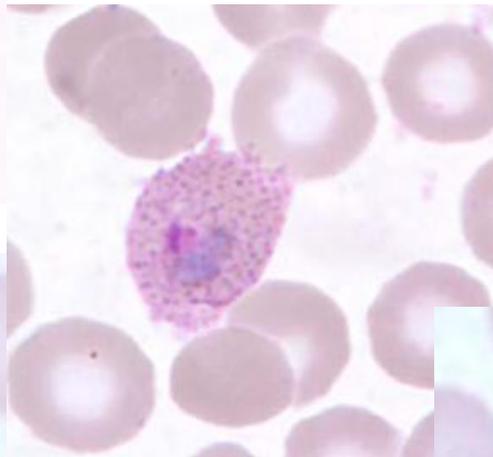
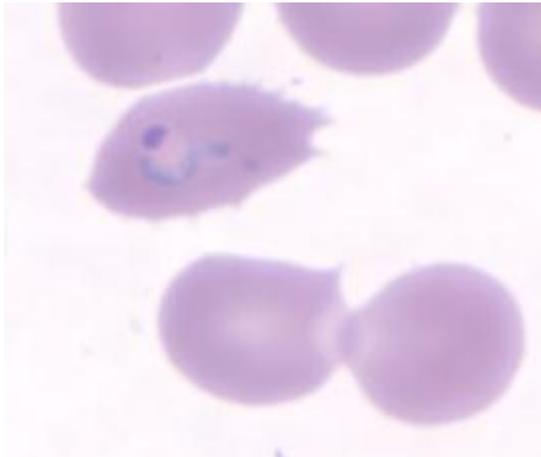
Giemsa – Schuffner's dots



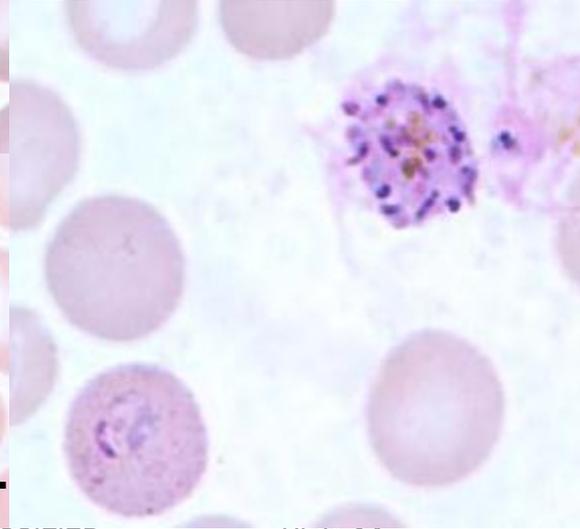
P. ovale



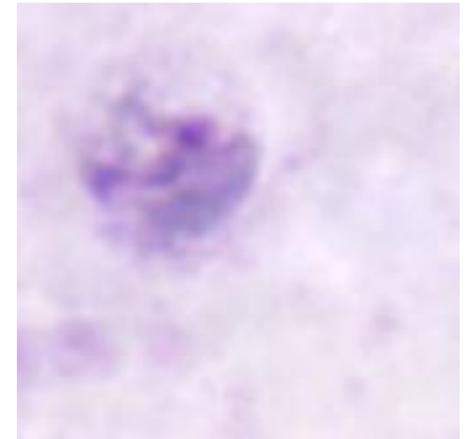
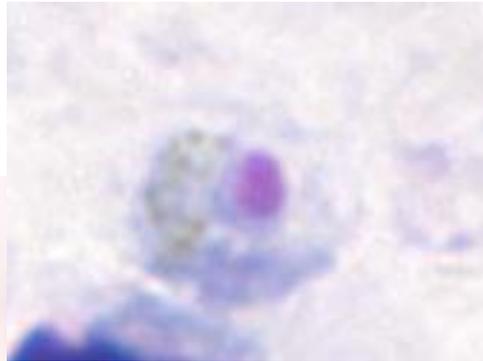
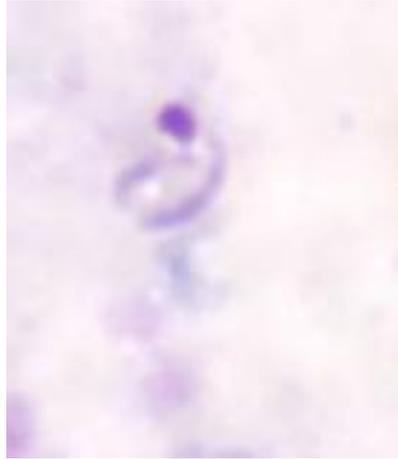
Coarse Pigment



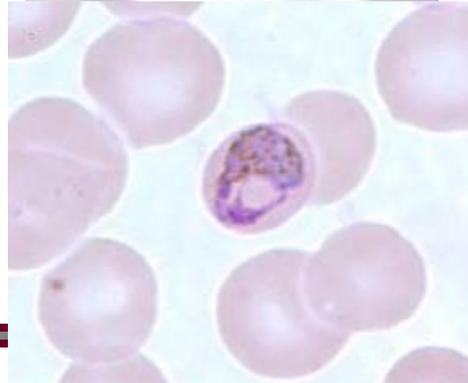
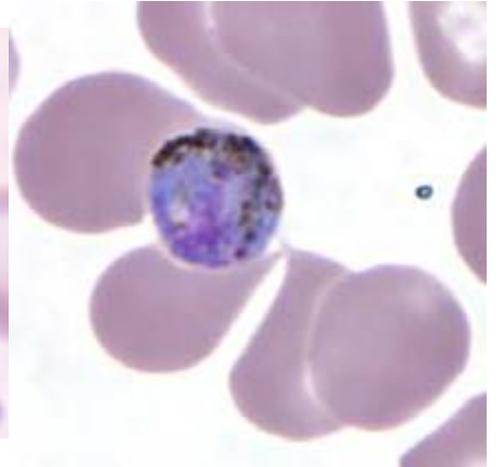
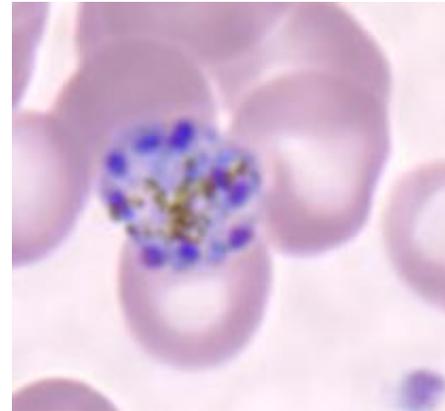
Compact troph.



P. malariae



Unlike Vivax, Not Enlarged



The End

