

Malaria 4

Clinical Entomology

FACTM Pt 1

Tim Inglis

Division of Microbiology & Infectious Diseases,
PathWest Laboratory Medicine, WA



Malaria series

Malaria 1 Clinical Tropical Medicine

Malaria 2 Clinical Parasitology

Malaria 3 Public Health, Travel & Expedition Medicine

Malaria 4 Clinical Entomology



Study materials

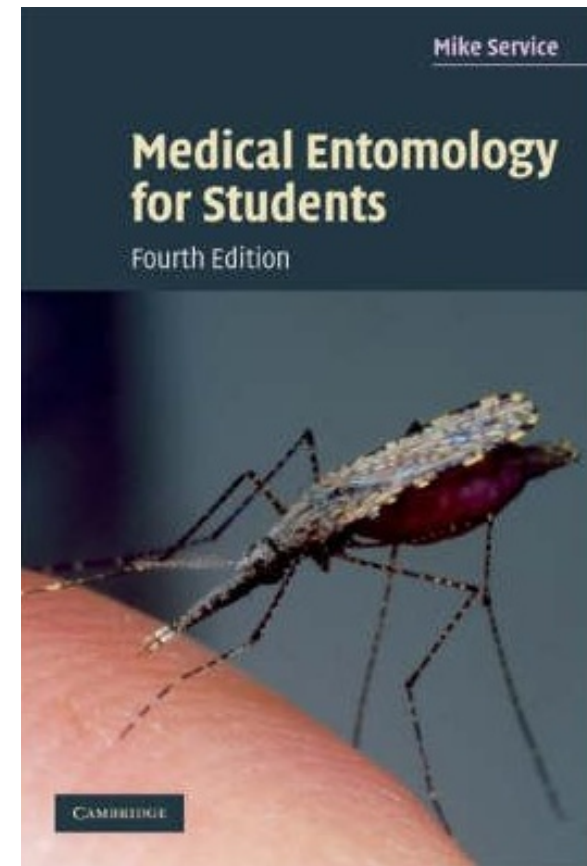
Medical Entomology for Students.
M Service. 4th edn. CUP, 2008.
ISBN 13: 9780521709286

- Recommended bookshelf
- FACTM study notes
- Specialist review articles
- Self-assessment questions

Blog <http://micrognome.priobe.net>

Web www.priobe.net

FACTM <http://lifeinthefastlane.com/exams/actm-fellowship/>



Summary

Anopheles

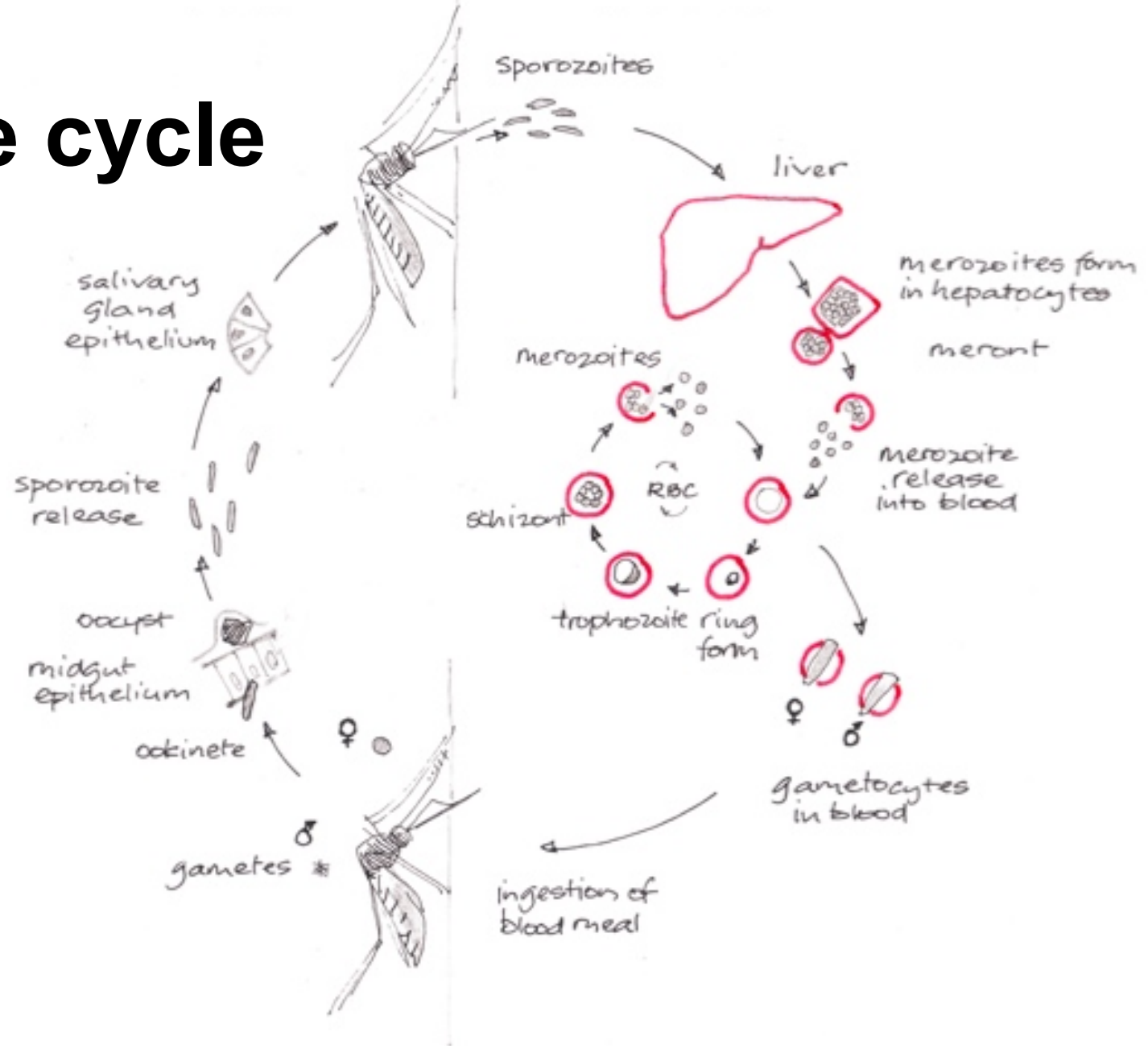
- **Mosquito** – 30 important spp, of around 475
- **Definitive host** – *Plasmodium* spp sporogony
- **Life cycle:** multiple stages, fastest in tropics, susceptible to environmental change, opportunities for disease control
- **Other diseases:** filariasis, some arbovirus infections

The Anopheles mosquito is a self-propagating, self-propelled syringe armed to the teeth with malaria parasites.

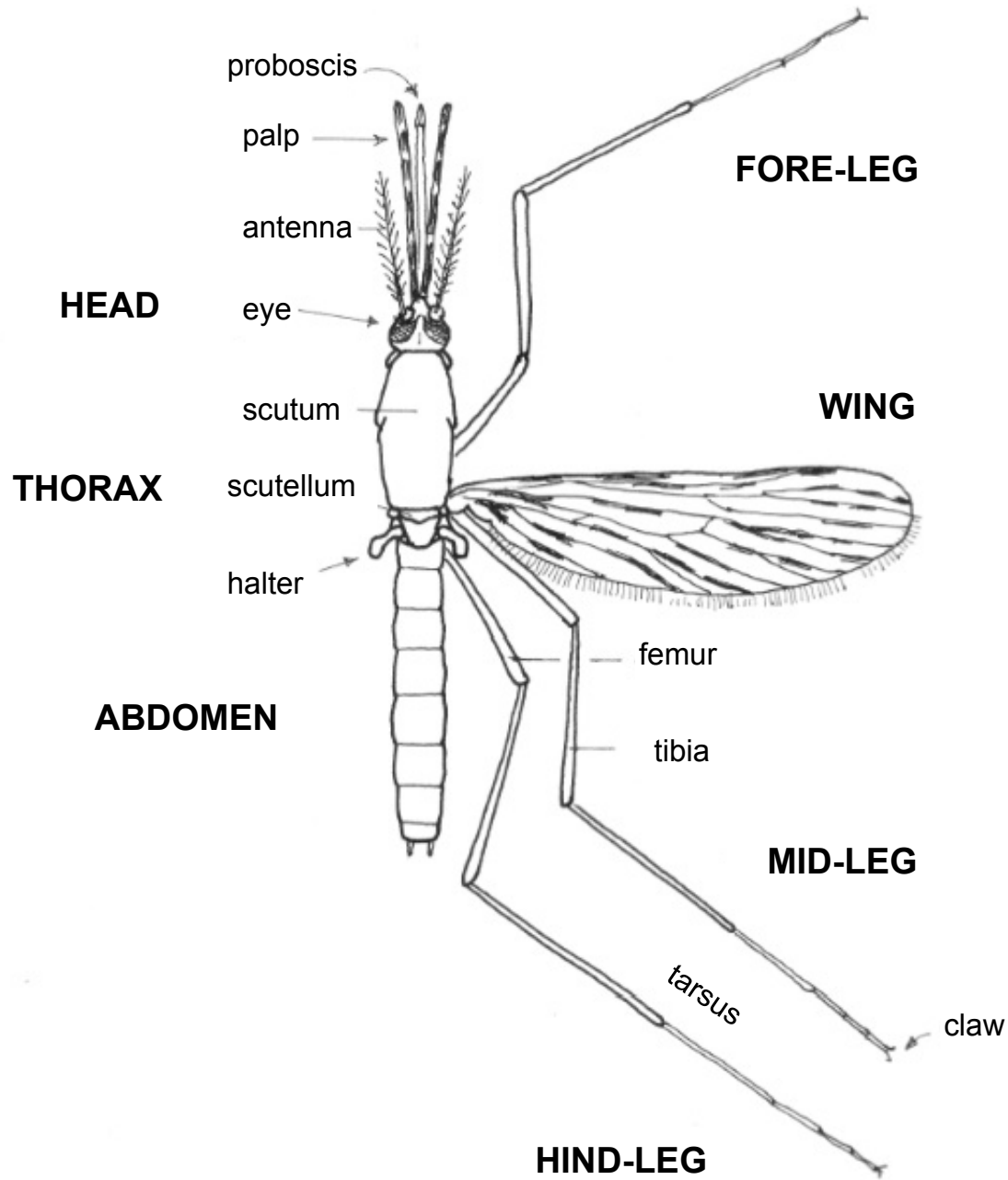


Life cycle

MOSQUITO HUMAN



Anopheles adult



Anopheles features



adult: biting angle



egg: air floats



larva: palmate hairs,
no siphon



pupa: spines



adult wing: wing scales
adult head: long palps



Anopheles biting behaviour

- **Sporozoite rate**
 - maximum = 1-5%
 - circa 5-10 per bite
- **Dusk to dawn** (*crepuscular, nocturnal*)
- **Human or other animal** (*anthropophagic, zoophagic*)
- **Inside or outside** (*endophagic, exophagic*)
- **Resting outdoors or indoors** (*exophilic, endophilic*)



Anopheles breeding

- **Amplification in stages:**
 - Egg
 - Larval instars
 - Pupa,
 - adult
- Eggs intolerant of desiccation
- Clean water, generally permanent, only small amounts needed
- Larvae sensitive to shadow & movement
- Faster breeding at higher temperatures



Anopheles species

- **Australia:** *An farauti*, *An koliensis*, *An punctulatus*
- **Southeast Asia:** *An aconitus*, *An anthropophagus*, *An balabacensis*, *An campestris*, *An culicifacies*, *An dirus*, *An donaldi*, *An flavirostris*, *An fluviatilis*, *An letifer*, *An leucosphyrus*, *An maculatus*, *An mimicus*, *An nigerimus*, *An sinensis*, *An sundiacus*



Control measures

- **Personal:** behaviour, clothing, repellent, bed nets
- **Public health:**
 - Larval control
 - Drainage
 - Petroleum oil, Paris Green
 - Pyriproxifen
 - *Bacillus thuringiensis*
 - Mosquito fish
 - Adult control
 - Residual house spray: DDT, organophosphorus insecticides
 - Nets: ITNs, LLINs



Emerging issues

- Changing distribution
- Insecticide resistance
- Wetlands
- Climate change
- Use of DDT
- DDT alternatives



Malaria series

Malaria 1 Clinical Tropical Medicine

Malaria 2 Clinical Parasitology

Malaria 3 Public Health, Travel & Expedition Medicine

Malaria 4 Clinical Entomology

The Anopheles mosquito is a self-propagating, self-propelled syringe armed to the teeth with malaria parasites.

