Anthropology 455
Human Biology of the Pacific

Malaria

tropical parasitic disease
40% World’s population at risk of malaria

300-500 million acute illnesses/year
1-3 million deaths/year
3 billion at risk
Malaria in Africa

90% deaths occur in Africa
One African child dies every 30 seconds from malaria

History

- Chinese 2700 B.C.
- Romans: "miasma" : bad air or swamp gas - "mal air ia"

Ancient Remedies

- Chinese: qinghao (Artemesia annua)
- Cinchona ledgeriana, Peru 15th century
Quinine, 1820

History
Charles Louis Alphonse Laveran
Protozoa: Plasmodium

Cause/Transmission
Parasite: Plasmodium
Anopheline mosquitoes
Protozoan Parasites

*Plasmodium falciparum*
*Plasmodium vivax*
*Plasmodium ovale*
*Plasmodium malariae*

Symptoms

- fever, shivering, pain in the joints and headache, repeated vomiting, generalized convulsions and coma...
- Cerebral malaria
- Resistance to chloroquine
- Infants, pregnant women

Prevalence

- Africa, Asia and Latin America >100 countries
- Parasites resistant to quinine
- More lethal strains of malaria
- *Plasmodium falciparum* replacing *P. vivax*
- Malaria control efforts failing
- Economic and political factors
Control & Treatment

Laveran (1889):
- malaria parasite
Ross (1897):
- mosquito
- DDT
- Chloroquine drugs

Tropical Africa

Outside Africa

India, Brazil, Afghanistan, Sri Lanka, Thailand, Indonesia, Vietnam, Cambodia, China
Cultural Adaptations

Housing
DDT
Quinine

Immune Responses

Genetic Mutations
Adaptations
- hemoglobinopathies (e.g., Hb S, E, C etc.)
- Sickle cell anemia: a single amino acid substitution on the \( \beta \)-chain

Thalassemias
"anemia by-the-sea"
Cooley's Anemia or Mediterranean Anemia
major (absence of any chains)
or minor (inadequate production \( \alpha+ \), \( \beta+ \) chains)
**G6PD**

- glucose-6-phosphate dehydrogenase
- X-linked
- *P. vivax*

**Red Cell Membrane Disorders**

- Duffy negative & *P. vivax*
- Ovalocytosis

**Malaria in the Western Pacific**

- 4 species of *Plasmodium* in Melanesia
- *P. vivax* predominant
- *P. falciparum* increasing
Malaria: Australia, Papua New Guinea, Solomon Islands

Reported cases (1994) per 100,000 population:
- Australia – 4
- Fiji - 0
- New Zealand - 0
- Papua New Guinea - 14,974
- Solomon Islands - 35,980

Papua New Guinea

Spread of Malaria in Melanesia
Genetic Polymorphic Evidence
Thalassemias
- β-thalassaemia
- α-thalassaemia
G6PD
Ovalcytosis
K. M. Kelly