

# Malaria



- ▶ Malaria is caused by the single-celled protozoan parasite *Plasmodium*
- ▶ Malaria, one of the world's biggest killers,
  - ▷ infects up to half a billion people each year
  - ▷ kills more than two million people annually
  - ▷ causes a child to die every 30 seconds
- ▶ About 40 % of the world's population is at risk from the disease

## *Plasmodium*

There are four species of *Plasmodium* that can cause malaria in humans. *Plasmodium falciparum* is the deadliest.

## How is malaria spread?

Malaria is transmitted from person to person through an insect vector. The blood-sucking mosquito, *Anopheles gambiae*, is the primary vector for human malaria.

When an infected mosquito bites a human to drink blood, parasites are injected into the bloodstream. From here, they make their way into the liver and red blood cells to grow. Bursting from the blood cells, the parasites circulate in the bloodstream, where they can infect more blood cells or be taken up by another mosquito.

## Symptoms

When the parasite is inside liver cells the human host shows no sign of the disease. Bouts of 'flu-like illness (chills, fever, sweats) only occur when the parasites burst from the red blood cells.

Infected red blood cells can also clump together, blocking blood flow and damaging internal organs, including the brain.

## Control of malaria

Strategies for preventing the spread of malaria:

- ▶ **targeting mosquitoes:** reducing breeding grounds, using insecticides, or introducing the natural mosquito pathogen, *Bacillus thuringiensis*

- ▶ **preventing bites:** bed-nets prevent mosquitoes biting at night
- ▶ **prophylaxis:** treatment with antimalarial drugs prevents infection for visitors to malaria zones.

## Treatment

Malaria is curable if adequately and promptly treated. Several antimalarial drugs are available, although resistance to some of these is spreading. Combination therapy prolongs the useful life of the drugs by using two or more with differing modes and sites of action.

## Vaccines

The *Plasmodium* parasite has a complex life cycle, both in the human host and mosquito vector. While in human liver and blood cells it is protected from the immune system. Because of this, developing an effective vaccine has proved difficult and currently there is no vaccine to prevent malaria.

However, several malaria vaccines are being developed and tested.

## Malaria in the UK

Although considered a disease of the tropics, malaria was once endemic in the UK. It was only officially declared eradicated from Europe as late as 1975. However, since this time, the annual number of imported cases in the UK has increased to approximately 2000. The huge growth in international travel means that people worldwide are at risk from this disease.

# MICROBIOLOGY AWARENESS CAMPAIGN

The Society for General Microbiology (SGM) Microbiology Awareness Campaign aims to highlight the important issues relating to microbiology. Through its many members, the SGM can offer impartial and expert information on all microbiological topics. Enquiries are welcome.

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