

malaria of man.

③ Death rate is very high because the infected RBCs tend to clump masses, thus blocking up small blood vessels of internal organs, such as brain, spleen, lungs, etc.

④ Fever recurs every second or third day that is, after 36 to 48 hours.

3) Quartan :-

① It is caused by *P. malarial*.

② The fever recurs every fourth day, that is, after 72 hours.

③ Death rate is low.

④ Chronic infection may result in lethal kidney conditions.

4) Oval or mild tertian :-

① It is caused by *P. ovale*.

② The fever recurs third day or after 48 hours.

③ It is not greatly harmful and is mainly confined to tropical Africa.

5) Quittodean :-

It is caused by mixed infection of more species.

CONTROL OF MALARIA :-

The war waged on the malaria parasite is fought by attacking it simultaneously on three major fronts. In other words, all the control measures fall under

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the following three categories :-

- A. Elimination or destruction of fever i.e. Anopheles mosquito.
- B. Prophylaxis, i.e. prevention of infection.
- C. Therapy, i.e. treatment of infection in the Patient.

A. ELIMINATION OF ANOPHELES :-

If the Anopheles mosquitoes are completely destroyed, the infection from one person to another can be checked. It is achieved by using the following methods:-

1) ELIMINATION OF BREEDING PLACES :-

① The mosquito larval & pupal must develop in water; therefore, elimination of breeding places is of primary importance.

② Drains and septic tanks must be properly maintained. Swampy areas, marshes and stagnant water, such as Ponds, Ponds, Pits and open ditches must be drained off.

③ Water should also be prevented from standing in gutters, drains and depressions.

④ If possible, the breeding grounds may be filled up.

⑤ The bushes & shrubs should be cleared off.

⑥ Open drains should be closed or made underground.

2) DESTRUCTION OF LARVAE & PUPAE :-

It is easier and more convenient to kill aquatic larval & pupae than the winged adults of the mosquitoes.

④ Proper drainage :-

The young stages of mos can be prevented by not allowing water to stand in gutters, drains, streams, ditches etc.

⑤ Oil Screens :-

The larval & pupal may be by covering or spraying the surface water with Petroleum or Paraffin oil crude or kerosine oil.

These substances produces thin film of oil on the surface, so the larvae and pupal die due to suffocation & lack of respiration.

⑥ Chemical Larvicides :-

oil solution or emulsions DDT, DDD & benzene hexachloride are effective larvicides that kill the mosquito larvae & pupal by poisoning as well suffocation.

⑦ Biological Methods :-

Larvicide fishes like stickleback minnows, trout, etc. should be introduced in the ~~amamental~~ fountains, ditches, ponds, lakes, canals, tanks etc.

Aquatic nymphs & adult insects (dragon flies), which are natural enemies of mosquito, should be encouraged.

Aquatic insectivorous plants, such as bladder wort (*Utricularia*) can also devour the larval & pupal of mosquito.

3/ DESTRUCTION OF ADULT MOSQUITOES :-

① By traps & killing by hands.

② Fumigation :-

Sulphur, Pyrethrum, cresol, tarcamphor or other fumes. The smoke of gaslie is now considered to be effective in driving the mosquitoes out.

③ Spraying :-

Mosquitoes can be killed inside human dwellings by using mosquito-bombs or by occasionally spraying them with DDT, flit, gammexane, Pyrethrum & other insecticides.

④ Sterilization :-

Sterilization has also been effective in controlling mosquito population in some part of the world (particularly Japan).

⑤ Genetic Control :-

Prof. Hannes Laven of West Germany found in 1974 that if a paris female mosquito (*Culex fatigans*) was crossed with a Hamburg male mosquito, the egg laid would never hatch. This gave rise to his theory of "incompatibility", that certain strains of mosquitoes when crossed can not breed.

B. PROPHYLAXIS or PREVENTION OF INFECTION

1/ Defence against mosquito bites :-

① The houses should be built on high ground having good drainage and away from vegetation and marshy places.

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⑤ The houses should be made proof by adequate screening all doors, windows etc.

⑥ Mosquito nets should be used.

⑦ The exposed part of the body should be protected by the use of veils, gloves & boots etc. or by the application of repellents, such as antimosquito creams (e.g. odorous), mustard oil, and dimethyl phthalate or dimethyl carbate.

2) Use of Prophylactic drugs like quinine, Paludrine, Daraprim & Chloroquin.

3) Reduction of susceptibility to infection
The chances of infection can be greatly minimized by maintaining proper health. It can be achieved by getting proper nourishment and by following regularity in life.

C. THERAPY or TREATMENT OF MALARIA:-

Plasmodium does not produce antibodies or antitoxins in human blood like germs of other infectious diseases, such as Cholera and small pox.

Therefore, treatment of malaria by inoculations or vaccinations is out of question. In allopathy various synthetic drugs such as Quinine, Atabrin, Camoquin, chloroquin, mepacrine (Atabrin), Poludrine, Plasmoquinin, Resochin, Pamaquine and pentaquine etc. are used as suppressants various stages of the parasites.

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Why are two alternative hosts necessary for completion of its life-history?

The life-history of malaria parasite is digenetic i.e. it includes a Primary or definitive host (man) and the other Secondary or intermediate host (female Anopheles).

Inside the Primary host it passes a major part of its life cycle. It feeds, grows & multiplies to maintain the continuity of race. Due to the presence of parasite inside the body, the primary host suffers from its effect.

The necessity of secondary host can be discussed under the following heads:—

1) Plasmodium is an endoparasite, living inside the R.B.C. for its dispersal from one host to another it needs a blood-sucking intermediate host which sucks the parasite with the blood and being infected inoculates the sporozoites into its host. Thus, it acts as a vector.

2) Repeated multiplication of the parasite in the blood results in its numerosity which reduces number of R.B.Cs. causing anemia. The existence of parasite is thus threatened by the shortage of food and reduction of the resistance in host. The only prospective measure is to enter a new host. Thus, secondary host avoids the disintegration of parasite.

3) The sexual part of its life-cycle is passed in the stomach of female Anopheles. This provides an added vigour to the parasite to rejuvenate & receive the vigour.

lost during asexual multiplication.

Thus, the introduction of a 2nd host like Anopheles in the life-history of malaria parasite is a wise step to maintain the continuity of race, to spread it far and wide and to avoid the extinction of race.

Ques:- Illustrate the chief differences between the four malaria parasites?

Ans:-

	<i>P. Vivax</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. falciparum</i>
1) Period of Incubation	11-14 days	18-21 days	9 days	9-12 days
2) Period of Schizogony	48 hrs.	72 hrs.	48 hrs.	24-48 hrs.
Number of merozoites	12-24	6-12	6-12	18-24
Arrangement of merozoites	In two rings	Rosette like	Irregular	Irregular
Shape of merozoite	Round	Round	oval	crescent.
3) Pigments	Yellowish brown.	Dark brown	Dark yellowish brown	Dark brown