

Using Fruit flies for Experiments to Study Diseases

It is very important to know how mosquitoes carry disease and transmit it from person to person. Scientists do not have much information about these mechanisms. The reason for this is that the insects are difficult to manipulate and not conducive to laboratory studies.

David Schneider, a fellow of White Head Institute says that fruit flies are more suitable to be used instead of mosquitoes for research studies on diseases that are transmitted from mosquitoes to man. He indicates that the characteristics of fruit flies have made them an excellent model to study human diseases. These characteristics have been highlighted as follows,

- flies have many genetic markers
- genetic screening can be conducted simply and in large numbers in flies
- parts of the immune system of humans are very similar to the immune system of flies

Schneider injected a form of *Plasmodium*, the parasite that causes malaria in chickens, into the body cavity of fruit flies. When he allowed carrier flies to infect chickens, the chickens developed malaria. He also observed that a component of the immune system of flies, known as **macrophage**, was able to destroy *Plasmodium* in an attempt to fight the infection. In carrying malaria, mosquitoes act not only to pass infected blood from one person to another but they provide an environment for the parasite to grow and develop.

Another advantage of using fruit flies instead of mosquitoes is that genes can be knocked out to determine whether the parasite grows better or

worse when a particular gene is missing. In addition the factors that are critical to a parasite's survival inside the mosquito can also be identified when flies are used. Because of these reasons the experiments have led to develop drugs that prevent the growing of the parasite in mosquito. Sensitive stages in the parasite's life cycle could be potential targets for anti-malarial drugs and vaccines because parts of immune system of human are almost similar to the immune system of flies. This approach will definitely help scientists to understand how a fight is launched against infection and will hopefully lead to new ways to treat malaria.

Another possibility is that a better understanding of how mosquitoes carry malaria might lead to **transmission blocking vaccines**. Malaria blocking vaccines have been particularly elusive because *Plasmodium* hides inside human cells making it difficult for the immune system to locate and purge it from the body. Furthermore the parasite acts like a chameleon constantly changing its surface so that it is difficult for the immune system to recognize it.

David expresses the view that if transmission-blocking vaccines could be developed based on this new approach it will be a new beginning in disease control process for malaria and other diseases.

Reference:

"Can we win the malaria war" the article published in Sunday Observer dated 10 December 2000.