Life Cycle of Plasmodium:

1. **Sporozoites:** The infectious form of Plasmodium which enters the human body through the bite of a female Anopheles mosquito.

2. Multiplication of parasites inside the liver cells.

3. Attack of the RBCs by the parasites causing the rupture of the RBCs.

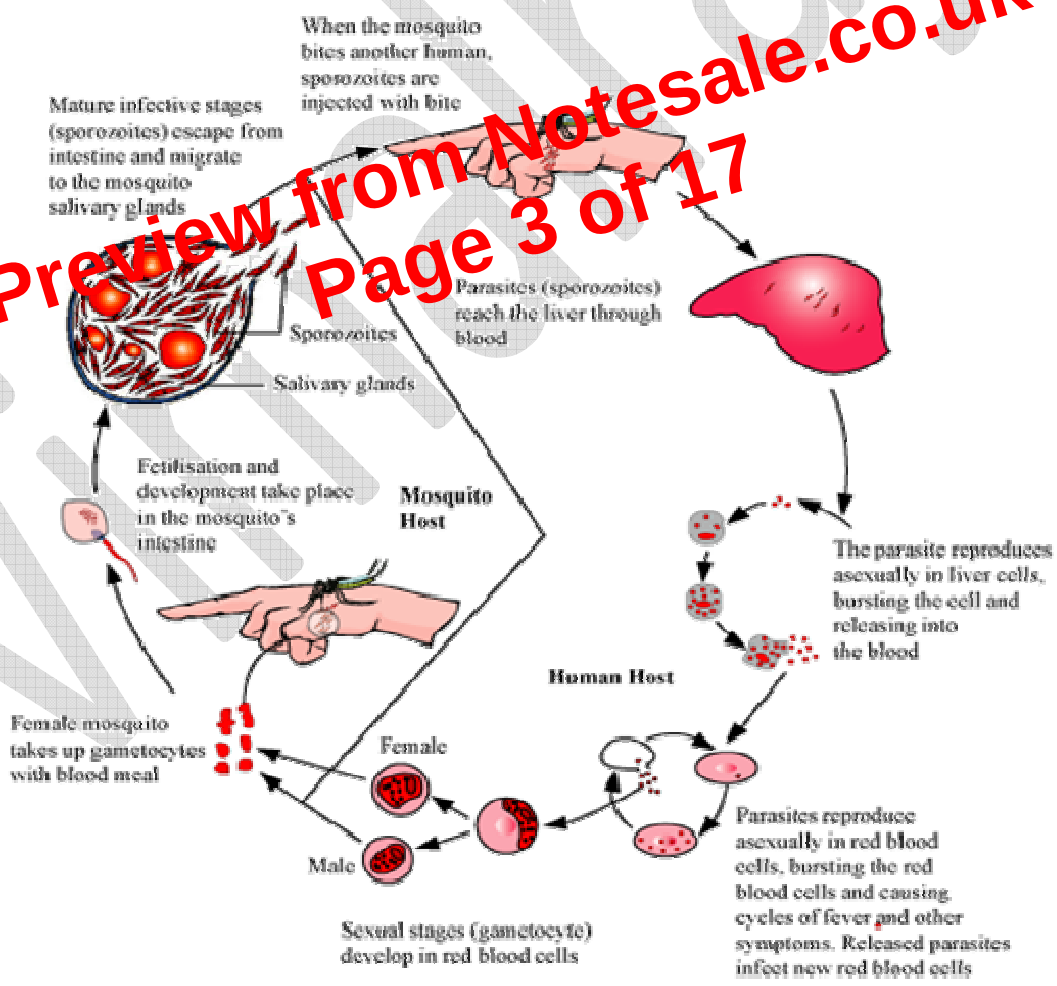
4. Release of a toxic substance called **haemozoin** by the ruptured RBCs that causes chills and recurring fevers every three to four days.

5. Transfer of the parasites into the body of the female Anopheles mosquito when the infected person is bitten by the mosquito.

6. Multiplication of the parasites within the mosquito to form sporozoites. These sporozoites are stored in the salivary glands of the mosquito.

7. The infected mosquito bites an uninfected person and the cycle repeats.

• **It is important to note that the malarial parasite Plasmodium requires two hosts to complete its life cycle- the human host and the female Anopheles mosquito.**



Several genes called **cellular oncogenes(c-onc) or proto oncogenes** have been identified in normal cells which can be activated under certain conditions and therefore lead to **oncogenic transformation of the cells**.

Cancer Detection and Diagnosis:

Early detection of cancers is essential as it allows the disease to be treated successfully in many cases. Cancer detection is based on:

- **Biopsy**: a piece of the suspected tissue cut into thin sections is stained

- **Histopathological studies** of the tissue (thin sections are examined under the microscope)

- Blood and bone marrow tests: for increased cell counts in the case of leukemias.

- Radiography: (use of X-rays),

- CT (computed tomography): This technique uses X-rays to generate a three-dimensional image of the internals of an object.

- **MRI (magnetic resonance imaging):** MRI involves use of strong magnetic fields and non-ionizing radiations to accurately detect pathological and physiological changes in the living tissue.

-**Antibodies against cancer-specific antigens:** Used for detection of certain cancers.

- **Techniques of molecular biology**: To detect genes in individuals with inherited susceptibility to certain cancers.

Identification of such genes may be helpful in prevention of cancers. Such individuals may be advised to avoid exposure to particular carcinogens to which they are susceptible (e.g. tobacco smoke in case of lung cancer).

Treatment of cancer:

- Treatment of cancer can be done by one or combinations of different approaches. The common approaches for

treatment of cancer are **surgery, radiation therapy, chemotherapy** and **immunotherapy.**

- In **radiotherapy,** tumor cells are **irradiated lethally**, taking proper care of the normal tissues surrounding the tumor

mass.

- Several **chemotherapeutic drugs** are used to kill cancerous cells. These drugs may be specific for particular tumors.

Most drugs have side effects like hair loss, anemia, etc.

- Majority of the cancers are treated by a combination of all the above methods.

- Tumor cells avoid detection and destruction by immune system. Therefore, they are treated with substances called **biological response modifiers**. They are substances such as α-interferon which activate their immune system and help in destroying the tumor.