BIOLOGICAL MATERIAL BEING MAINTAINED AT THE CENTRE

MOSQUITO SPECIES

An. stephensi

From urban and semi-urban areas

Nehru Place, Delhi
Okhla, Delhi
Chennai, Tamil Nadu
Gurgaon, Haryana
Nanak Enclave, Delhi
Hardwar, Uttaranchal

From rural areas

Ladpur, Haryana

Morphological mutants

Red eye (r) – sex linked recessive
Black larvae (bl) – autosomal semi-dominant
Golden yellow (gy) – autosomal recessive
Creamish white eye (cw) – new mutant
Reddish brown eye (rb) – new mutant

Biochemical variants

Bahadurgarh (EST-2)

An. culicifacies Complex

Species A

Dehra, Uttar Pradesh
Burari, Delhi
Rourkela, Orissa

Species B

Acrocentric Y-chromosome lines

Ladpur, Haryana
Haldwani, Uttaranchal

Submetacentric Y-chromosome lines

Rameswaram, Tamil Nadu
Rourkela, Orissa

Insecticide resistant lines

DDT resistant – Ladpur, Haryana
Malathion resistant – Ladpur, Haryana

Species C

Submetacentric Y-chromosome line

Jabalpur, Madhya Pradesh

Insecticide resistant line

DDT resistant – Jabalpur (M.P.)

An. fluviatilis Complex

Species S and T – Rourkela,Orissa
Species T and U – Hardwar, Uttaranchal
Species T – Haldwani and Hardwar, Uttaranchal

An. sundaicus

Cyclic colonies established from Car Nicobar
Katchal, Tressa (A&N Islands)

An. annularis

Nathupura, Delhi

Aedes aegypti

Delhi

Culex quinquefasciatus

Delhi
Pondicherry
Sonepat, Haryana
Mewat, Haryana

Insecticide resistant lines

Malathion resistant – Sonepat, Haryana
Permethrin resistant – Sonepat, Haryana

Lambdacyhalothrin resistant	–	Sonepat, Haryana
Deltamethrin resistant	–	Sonepat, Haryana
Cyfluthrin resistant	–	Sonepat, Haryana
Fenthion resistant	–	Sonepat, Haryana

Morphological mutants

Red eye (re)
Scarlet eye (se)

PARASITE SPECIES

Human and Nonhuman Malaria Parasites Available at the Parasite Bank

Human Plasmodia
- Nonadapted cryopreserved isolates of *P. falciparum*, *P. vivax* and *P. malariae*
- Sera/plasma from infected patients

P. falciparum
- Adapted/characterized isolates
- Different stages of the parasite from culture
  - Merozoites (from culture supernatant)
  - Ring (by synchronization)
  - Gametocytes (by Hypoxanthine treatment)
  - Free parasites for antigen preparation (by Saponin lysis and ultrasonication)

P. vivax
- Sporozoites harvested from artificially fed mosquitoes

Nonhuman Plasmodia
- Different species of avian, simian and rodent plasmodia
- Rodent plasmodia infected rats/mice
- Sera/plasma from respective vertebrate hosts

Cell Lines
- Hepatoma cell line: Hep G2 A16 used in the *in vitro* cultivation of pre-erythrocytic stage malaria parasites
- Myeloma cell line: SP2
- Hybridomas: 2A 10 (anti-*P. falciparum* sporozoite antibody secreting cells)
  2 F2 1 A7 (anti-*P. vivax* sporozoite antibody secreting cells)

Parasite Bank is fully established as a National Resource Centre. The human and non-human parasites cryopreserved/maintained and other biological material produced in the bank are being used for collaborative studies and supplied to various organizations.

Details of *P. falciparum* Isolates Adapted/Cryopreserved

Place of collection	No. of isolates collected	Adapted/Cryopreserved
Delhi	175	70
Ghaziabad (Uttar Pradesh)	27	22
Shankargarh (Uttar Pradesh)	39	27
Baharaich (Uttar Pradesh)	21	–
Gautam Budh Nagar (Uttar Pradesh)	39	–
Shahjahanpur (Uttar Pradesh)	6	6
Mandla (Madhya Pradesh)	23	15
Jagdalpur (Chhattisgarh)	14	6
Sonapur (Assam)	25	2
Rourkela (Orissa)	33	9
Rameswaram (Tamil Nadu)	1	1
Jaisalmer (Rajasthan)	39	27
Bharatpur (Rajasthan)	35	1
Alwar (Rajasthan)	25	–
Nuh (Haryana)	25	2
Kolkata (West Bengal)	19	–
Visakhapatnam (Andhra Pradesh)	12	–
Bissam Cuttack (Orissa)	22	–
Total	**580**	**188**

Details of Characterized *P. falciparum* Isolates

Species/Strains of parasite	No. of isolates
Adapted isolates susceptible to chloroquine	54
Adapted isolates resistant to chloroquine	52
NF-54: an infective gametocyte producing strain of *P. falciparum*	1
3D 7A : a clone of NF-54	1
A-4 : a clone with binding property to CD36	1
Dd2: a clone which can invade trypsin treated erythrocytes	1
Field isolates which can invade trypsin treated erythrocytes	3
Field isolates which can invade neuraminidase treated but not trypsin treated erythrocytes	3
Field isolates which can invade normal erythrocytes but not neuraminidase or trypsin treated erythrocytes	3
Field isolates which can invade both neuraminidase treated and trypsin treated erythrocytes	5
Field isolates which can form rosettes	3
Field isolates which can bind to CSA	1
Field isolates which can bind to CD36	9
Field isolates which can bind to ICAM-1	2
Isolates with isoenzyme profile of GPI, GDH, ADA and LDH markers	22
Isolates with MSP-1, MSP-2 and GLURP markers	40

Nonhuman Malaria Parasites available at the Parasite Bank

Parasite species	Source	Susceptibility to antimalarials
Simian malaria		
P. cynomolgi bastianelli	NICD, Delhi	Not done
P. knowlesi	–do–	–do–
P. fragile	CDRI, Lucknow	–do–
Avian malaria		
P. gallinaceum	NICD, Delhi	Not done
P. relictum	Wild, Delhi	–do–
Rodent malaria		
P. berghei NK-65	PGI, Chandigarh	Not done
P. berghei NK-65*+	CDRI, Lucknow	CQ sensitive
*P. berghei**	–do–	CQ resistant
P. berghei	–do–	Quinine resistant
P. chabaudi	INSERM, Paris	Not done
P. vinckei petteri 279 BY	–do–	–do–
P. yoelii yoelii 265 BY**	–do–	–do–
*P. yoelii nigeriensis***+	LSHTM, London	–do–
P. yoelii nigeriensis	CDRI, Lucknow	Multi-resistant
P. yoelii	ICGEB, New Delhi	Not done

*Oocyst positive in *An. stephensi*; **Oocyst and sporozoite positive in *An. stephensi*; +Infective gametocyte producing strain.

EXPERIMENTAL ANIMAL FACILITY

Rabbits, pigeons, domestic fowls, laboratory mice, etc. were procured, maintained and utilized for research purpose throughout the year as per the guidelines issued by the concerned authorities. These animals were housed at 22, Sham Nath Marg and 2, Nanak Enclave buildings and were used as blood meal source to mosquitoes of different species and strains maintained at the Centre. Laboratory mice were used in screening the antimalarials, host-parasite intraction studies and maintenance of rodent plasmodia at the parasite bank. Experiments on animals were performed with the approval of the Scientific Advisory Committee (SAC) and Institutional Animal Ethics Committee (IAEC) of the Centre.