



**SNS COLLEGE OF ALLIED HEALTH SCIENCES**

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai



**DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE  
TECHNOLOGY**

**COURSE NAME: GENERAL PATHOLOGY**

**I YEAR**

UNIT IV: INFECTIOUS DISEASES

TOPIC: VIRAL INFECTION

SUB TOPIC 7 : DENGUE FEVER



# Dengue: The Disease

- Infection of tropical and subtropical regions
- Nonspecific febrile **illness to fatal hemorrhagic disease**
- Infection caused by a virus and spread by an insect vector – the mosquito



# Structure

- The dengue virus has a roughly **spherical** structure.
- It is composed of the viral genome and capsid proteins surrounded by an envelope and a shell of proteins.
- Its an **RNA Virus**
- Cycle involves humans and mosquitos

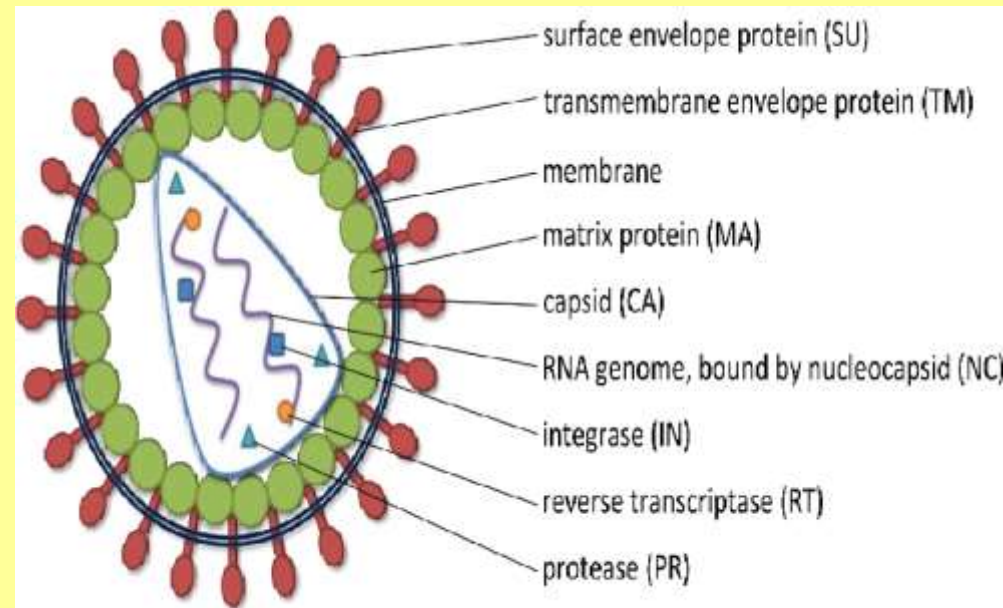


Figure 1 Structure of dengue virus



# Vector

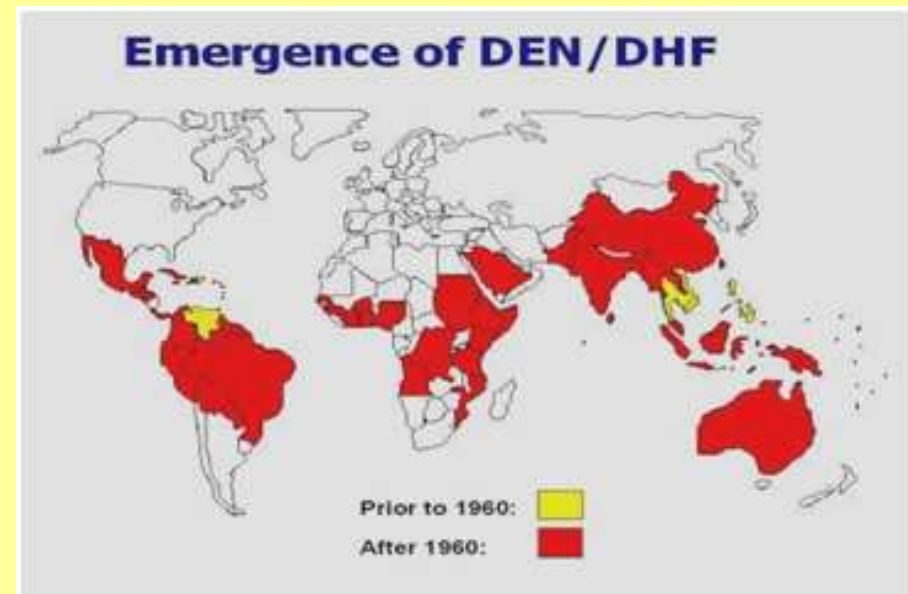
- *Aedes aegypti*, *A albopictus*
- Domestic day biting mosquito
- Prefers to feed on humans
- Breeds in stored water
- May bite several people in same household





# Epidemiology

- 1980s: a DHF in Asia with epidemics in India, Sri Lanka and Maldives, Taiwan, Africa and Americas
- Progressively larger epidemics





# Reasons for resurgence

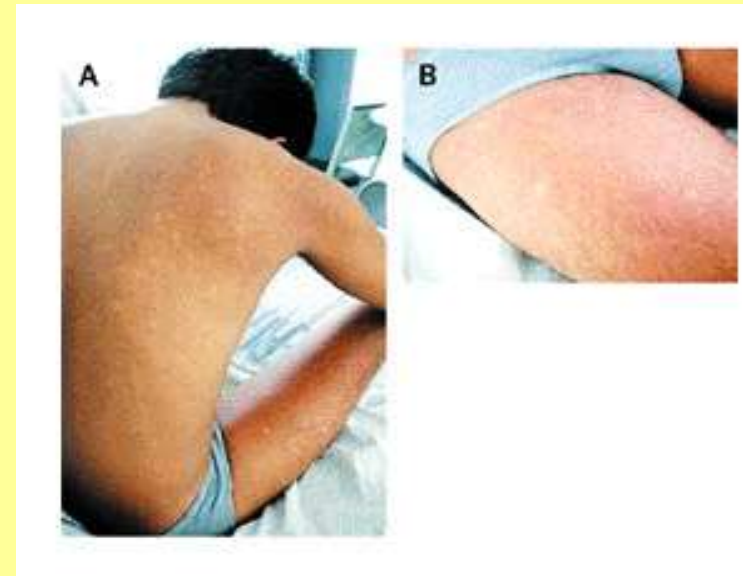
- Uncontrolled urbanization and population growth → substandard housing, inadequate water, sewer and waste management
- Deterioration of public health infrastructure
- Ineffective mosquito control in endemic regions
- Hyper-endemicity: prevalence of multiple serotypes

# Clinical Features

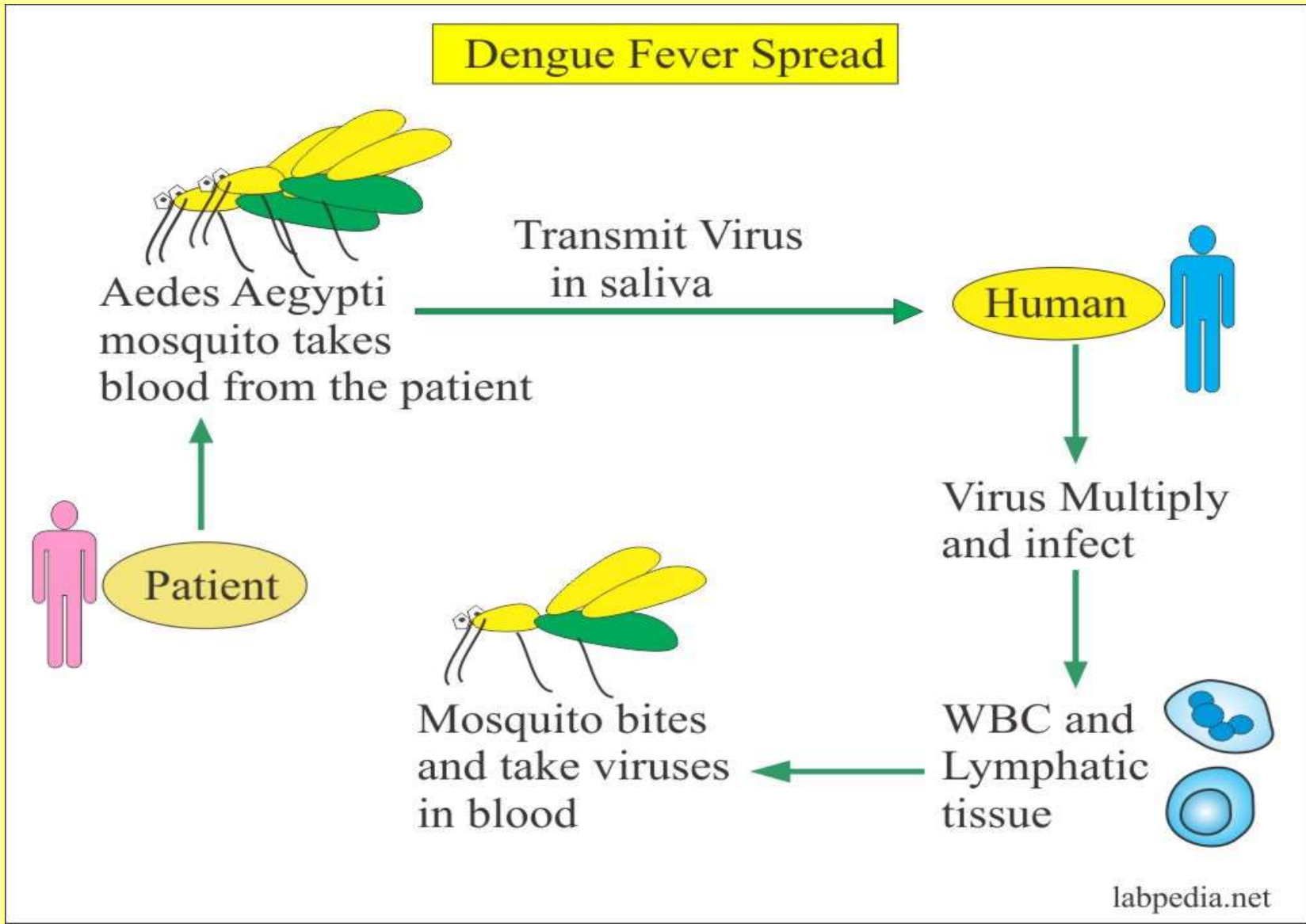
- Incubation period 2-7 days
- Sudden fever 40-41 C

Nonspecific constitutional symptoms

- Severe muscle aches, retro-orbital pain
- Hepatomegaly
- Rash
- Fever subsides in 2-7 days



# Spread







# Pathogenesis

- Increased Vascular Permeability
- Bone Marrow Suppression
- Decreased levels of Anticoagulants

# Pathogenesis

Dengue Infection



Infected monocytes



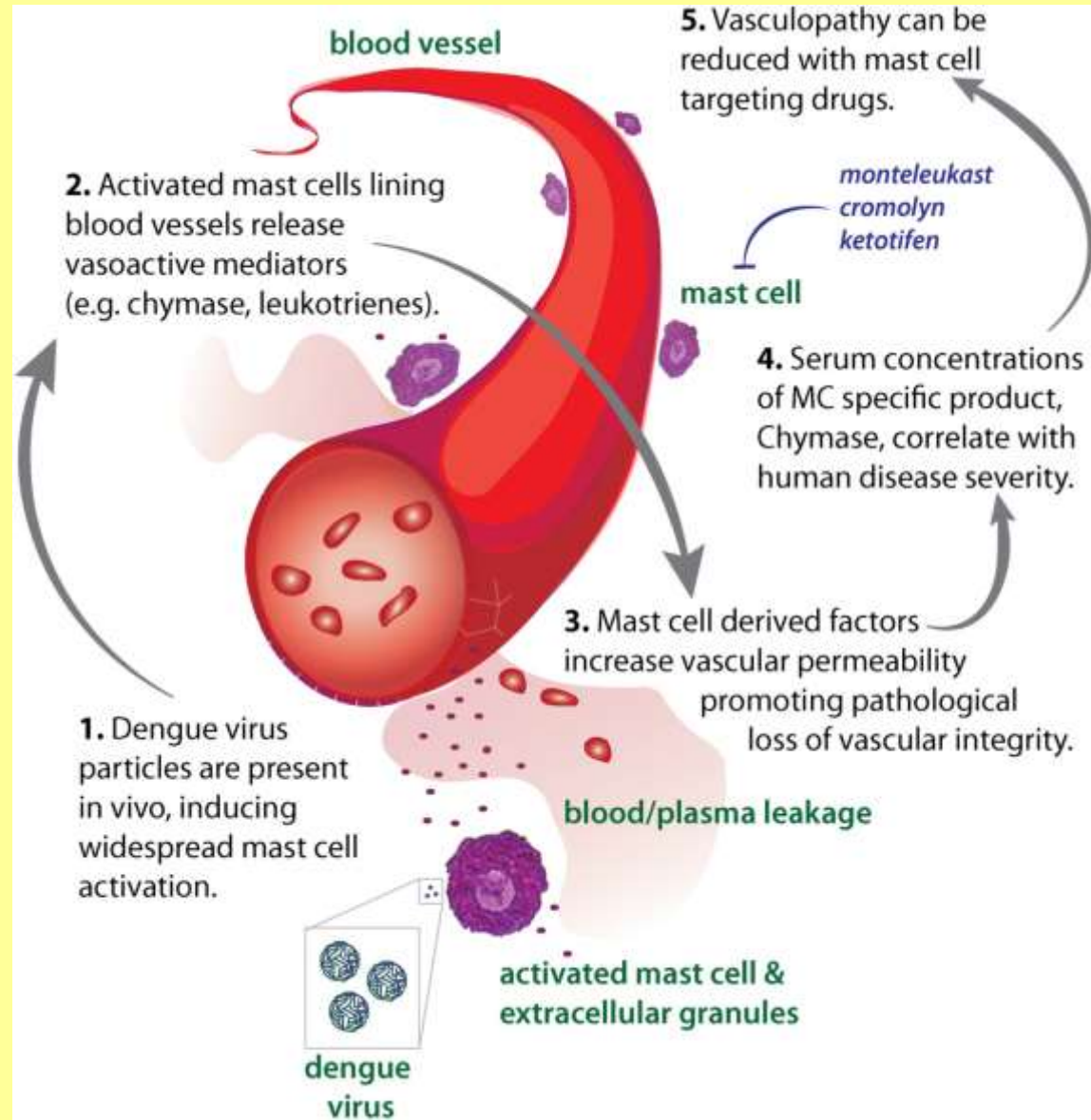
Vasoactive mediators



**Increased Vascular permeability**



Plasma leaking

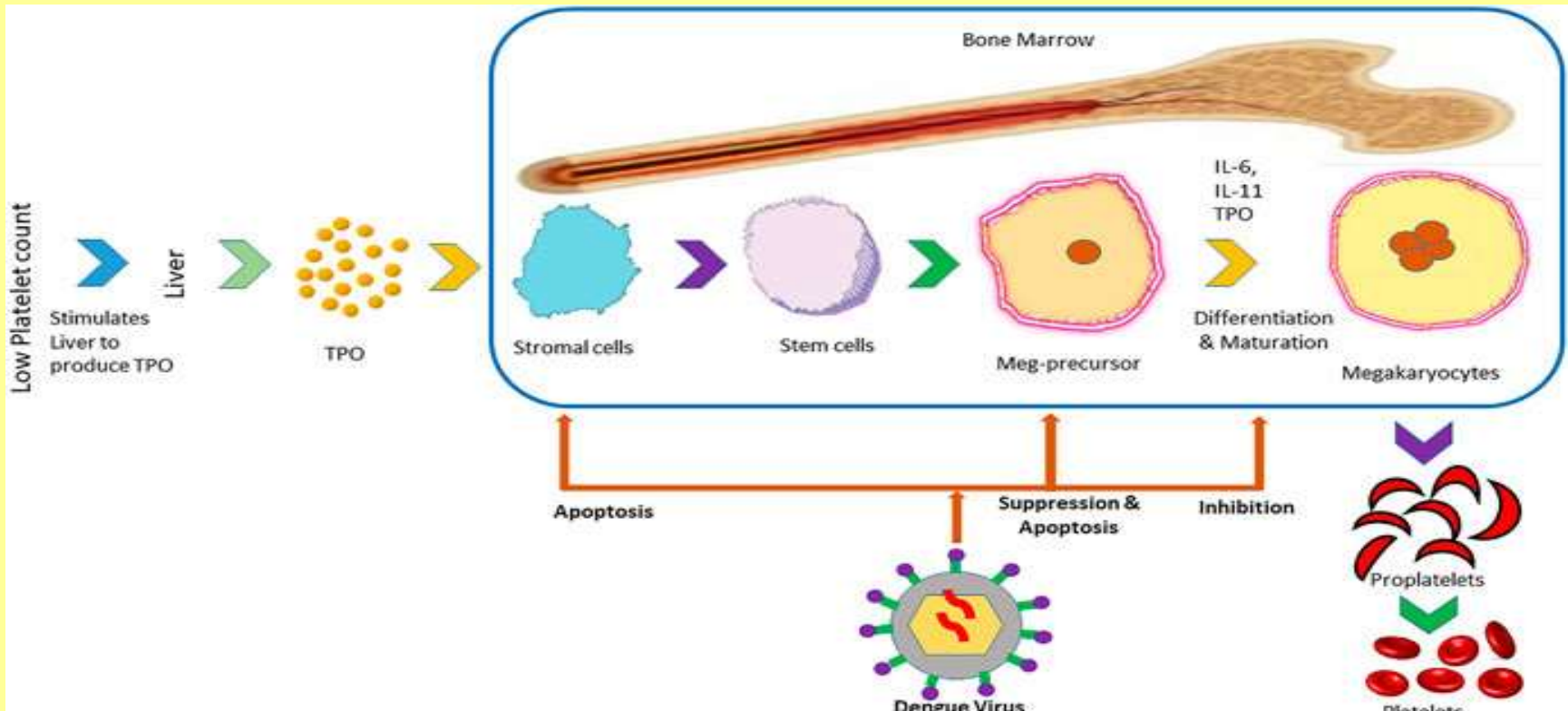


# Pathogenesis

## Bone Marrow Suppression



Leucopenia, Thrombocytopenia, Neutropenia





# Pathogenesis

Decreased level of fibrinogen, prothrombin factor II, VII, IX, X, XII, Antithrombin III



Disseminated intravascular coagulation



PT, TT may be normal or increased



C3 & C5 levels decreased and C3a & C5a elevated



# Causes of Thrombocytopenia

- **Depression of bone marrow** leading to impaired production of megakaryocytes
- **Increased platelet destruction**
  - Virus Itself
  - Circulating Immune Complex
  - Antiplatelet Antibodies
- **Peripheral Sequestration** and Consumption as in DIC



# Spectrum of Clinical Manifestation



- Undifferentiated fever
- Dengue Fever (DF) with the Fever- Myalgia (FM)
- Dengue Haemorrhagic Fever (DHF)
- Dengue Shock Syndrome (DSS)



# Undifferentiated fever

- First infection with dengue virus presents with undifferentiated viral illness.
- Nausea vomiting and myalgia

Guess ?????





# Dengue Fever

- IP of 2 – 7 days
- Sudden onset of fever, chills, headache
- Anorexia, Nausea, vomiting
- Back pain with severe myalgia, arthralgia
- Retro-orbital pain
- Macular rash – in axillary area
- Maculo - papular rash on trunk – extremities
- Leucopenia







# Dengue Haemorrhagic Fever

**Fever or history of acute fever lasting 2-7 day**  
**Hemorrhagic tendencies evidenced by at least one of the following :**

- Positive tourniquet test
- Petechial
- Bleeding from mucosa and GIT
- Hematemesis melena



**Thrombocytopenia  $< 100000/mm^3$**

**Plasma leakage**



# Dengue Shock Syndrome (DSS)

- All four DHF Criteria plus

## **Signs of circulatory failure as:**

- Rapid and weak pulse
- Narrow pulse pressure {  $< 20$  mmHg }
- Hypotension
- Cold clammy skin , restlessness



# Four Grades of DHF/DSS

**Grade 1** - Fever, Const. Symptoms, +ve tourniquet test

**Grade 2** - Grade 1 + Spontaneous bleeding

**Grade 3** - Signs of circulatory failure

**Grade 4** - Profound shock - B.P. Pulse not recordable



# Laboratory Diagnosis

- Complete Blood Counts
- Platelet Count
- SGOT, SGPT
- Serum Albumin
- Urine for Protein , hematuria
- Chest X ray
- IgM -capture ELISA within(3-5 days)
- IgG ELISA significant of past infection
- Reverse transcription PCR confirmatory



# Management

- **Group A** – patient who may be sent home.  
(With Antipyretics)
- **Group B** – patient who needs in hospital management. (IV Fluids)
- **Group C** – Patients who need emergency treatment and Intensive care. (Anti viral Therapy)



# Vector Control of Dengue

- Mosquito control is expensive
- Destruction of breeding sites
- Individual measures to avoid vector contact
  1. Mosquito screens, repellents
  2. Permethrin impregnated clothing
- Non degradable tires, long life plastics-avoid





# Immunization

- Each serotype produces life long immunity
- Vaccine is only recommended for prior infected patients

