

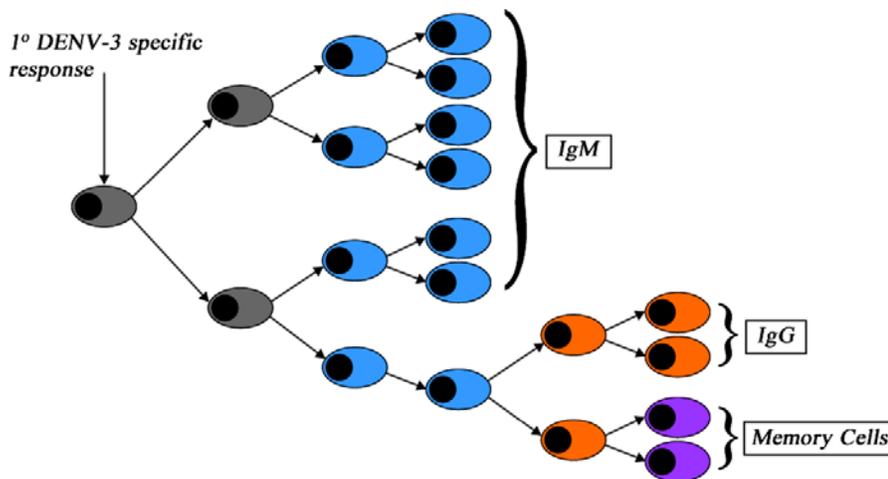
# Immune Response to DENV

DENV infected antigen presenting cells (APC) within the lymph node recruit T cells through the production of chemoattractants. The APCs process the foreign DENV proteins into small pieces for display on the cell surface. T cells that recognize the presented antigen become activated and produce pro-inflammatory mediators. This results in the activation of the two major branches of the adaptive immune response:

- Humoral immunity: helper cells make pro-inflammatory mediators that activate B cells to make antibody to eliminate DENV
- Cell-mediated immunity: cytotoxic T cells directly kill cells infected with DENV

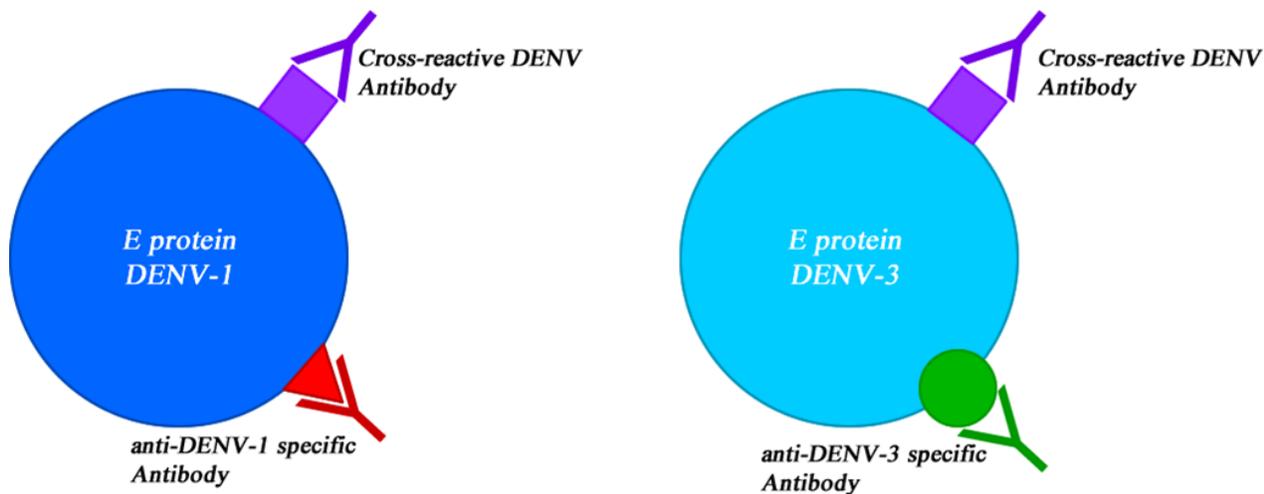
## Development of Life-long Type Specific Immunity

Soon after DENV infection, B cells become activated, proliferate and produce IgM against the infecting DENV type. Later, some B cells change to produce IgG (some IgA or IgE, too); however, the specificity of the antibody is the same. A subset of B cells become memory cells that provide life-long protection against the infecting DENV type.



## Serotype Cross-Reactivity in Dengue

DENV types have similar envelope or E proteins so during infection, cross-reactive (heterotypic) antibodies against all DENV types are made. DENV types are immunologically distinct and induce the production of antibodies that are type-specific (homotypic).

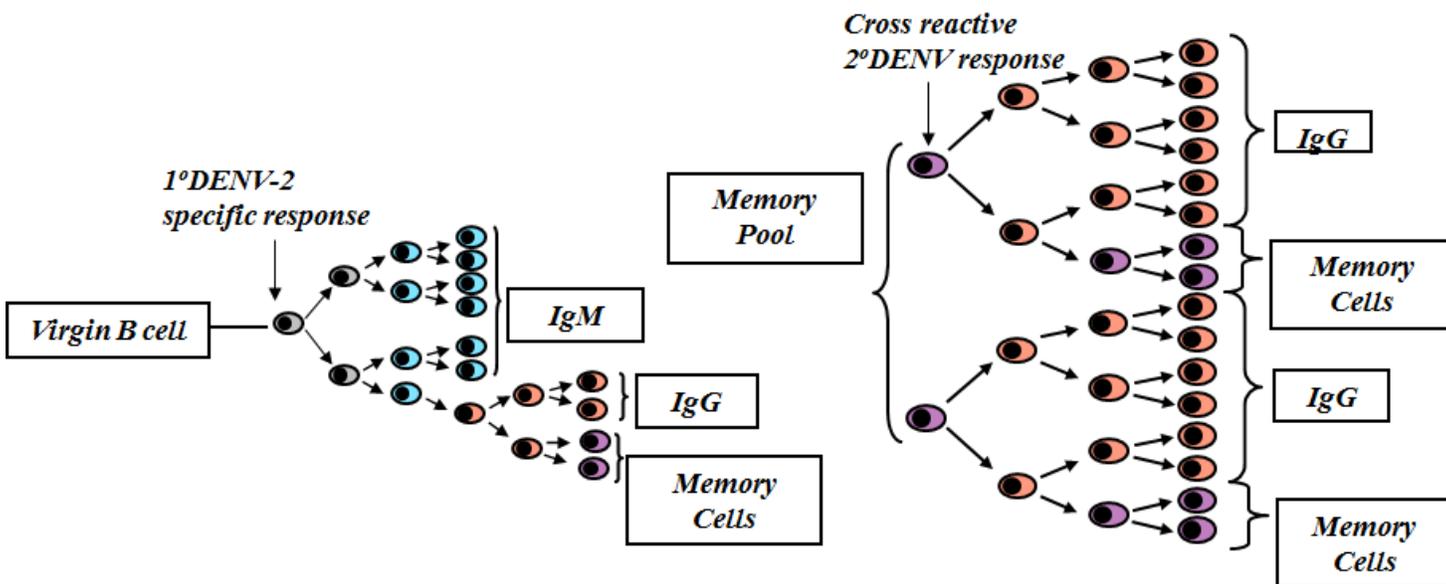


# Immune Response to DENV

## Secondary DENV Infections

If a person is re-infected with the same DENV type, memory B cells recognize it and will start to divide, resulting in the production of new B cells that make homotypic IgG and memory cells. The antibody can eliminate DENV so quickly that the person does not become noticeably ill.

If a person has a second DENV infection with a new DENV type, the primary response is to make heterotypic antibodies against cross-reactive antigens to the first DENV type. This process is called original antigenic sin. Memory B cells are responsible for the production of these heterotypic antibodies. During this second exposure, virgin B cells will also produce homotypic antibodies against the infecting DENV type.



-  Virgin B cell
-  IgM producing B cell
-  IgG producing B cell
-  Memory cell

