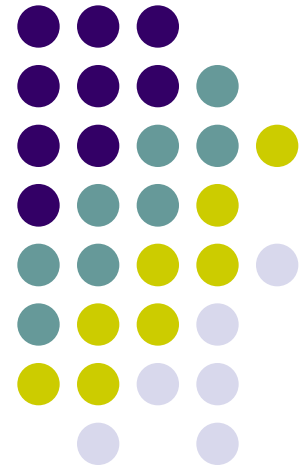


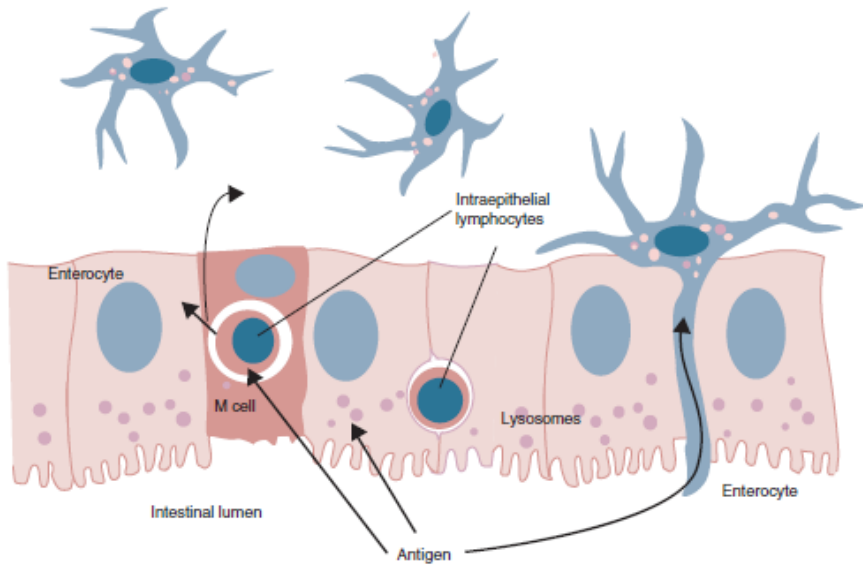
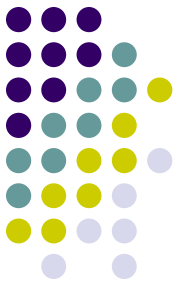
# Immunity at Body Surfaces

Lymphoid Tissues on Mucosal Surfaces



# MUCOSAL IMMUNITY

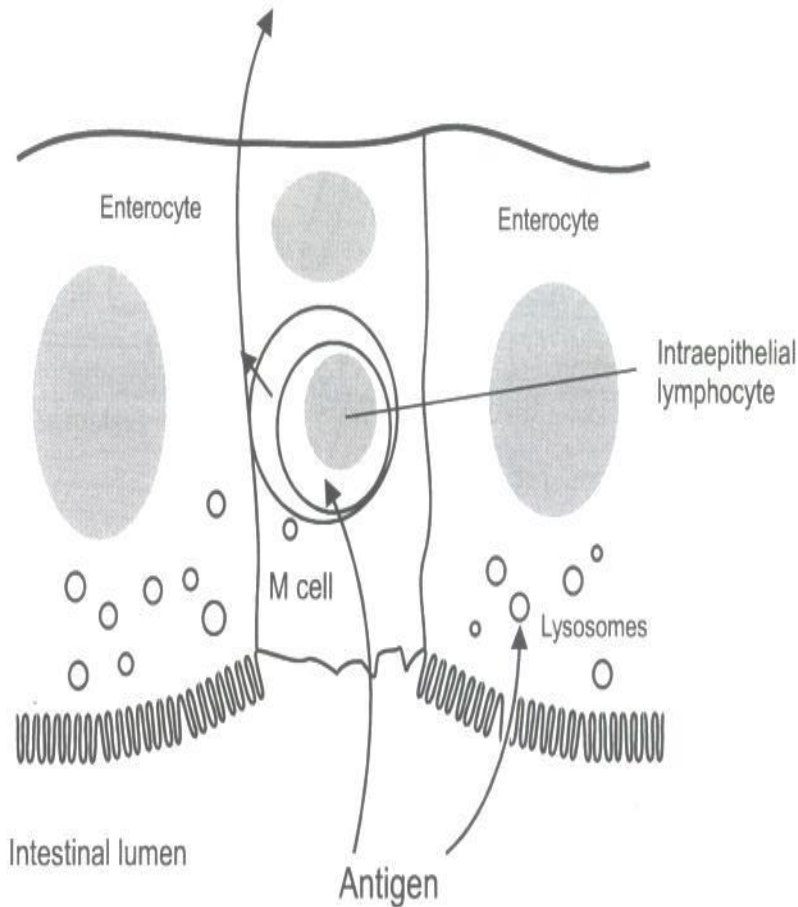
## Mucosal Lymphoid Tissues



- GALT (gut-associated lymphoid tissue)
- BALT: bronchus associated lymphoid tissue
- MALTs: mucosa-associated lymphoid tissues
  - \* Examined in two categories:
- Stimulant foci (where antigens are processed and immune response begins)
- Effector foci (where humoral and cellular immunity develop)

# MUCOSAL IMMUNITY

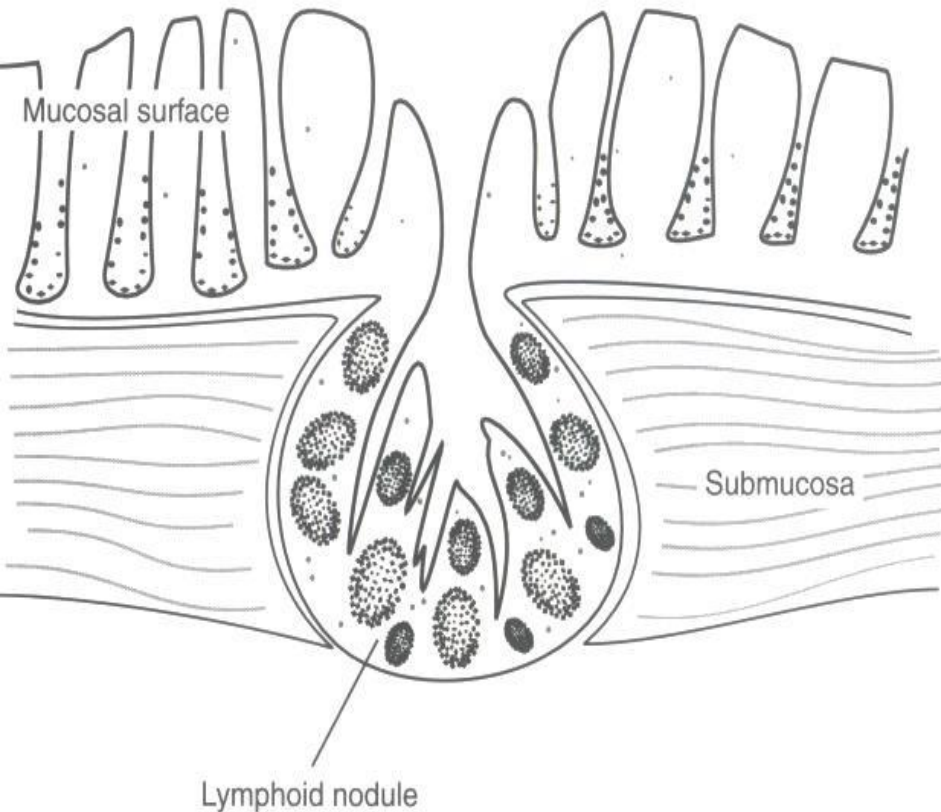
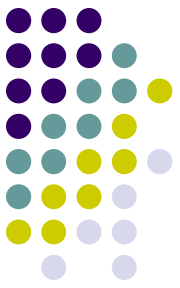
## Mucosal Lymphoid Tissues



- M cells: It is between intestinal epithelial cells and processes antigens and presents them to intraepithelial lymphocytes - Alert Focuses

# MUCOSAL IMMUNITY

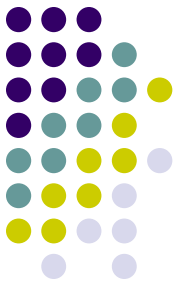
## Mucosal Lymphoid Tissues



- Effector foci: B and T-lymphocyte communities  
B-lymphocytes expressing IgA have affinity to all mucosal surfaces in the body  
Th2 cells are found in the subepithelial area

# MUCOSAL IMMUNITY

## Antibody Response-Immunoglobulin A

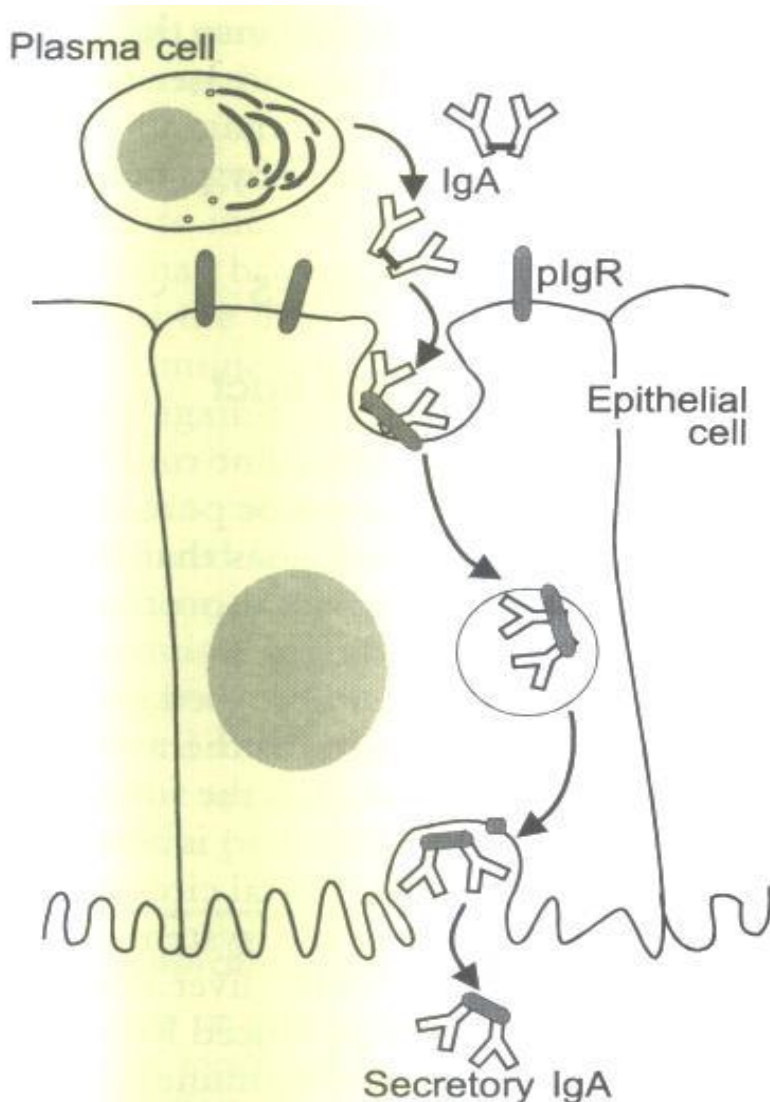
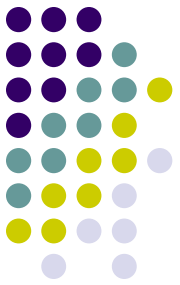


### *Synthesis mechanism of IgA on mucosal surfaces:*

1. **Step:** Processing of antigen by APC (M cells, B-lymphocytes, macrophages, dendritic cells)
2. **Step:** Presenting to Th2 cells
3. **Step:** B-lymphocyte stimulation of Th2s (TGF-beta)
4. **Step:** Proliferation of B-lymphocytes, isotype change, affinity maturation (IL-2,4,5,10) and conversion to plasma cells (IL-6) antibody synthesis

# MUCOSAL IMMUNITY

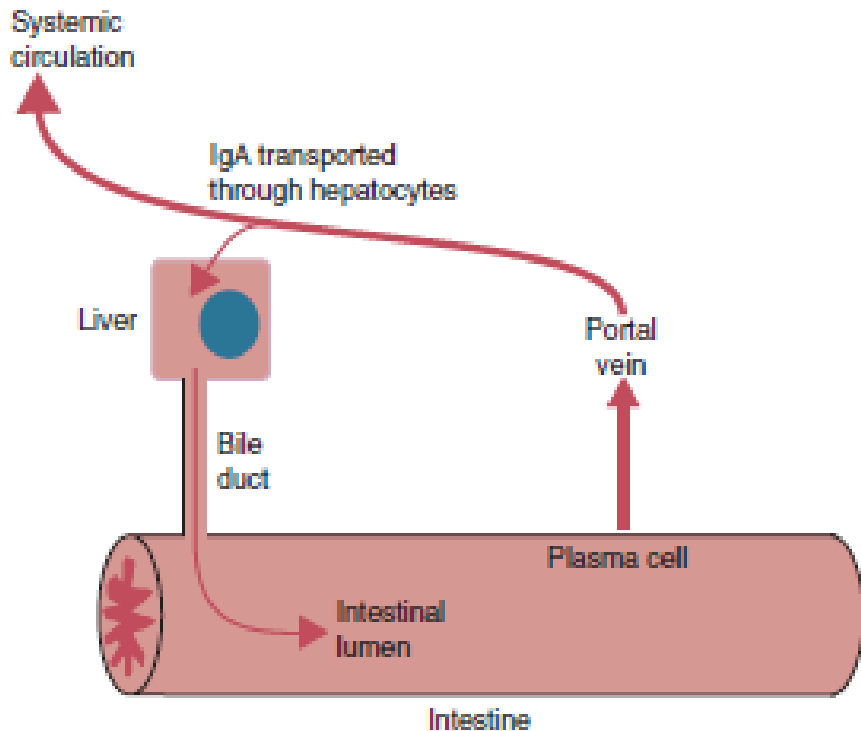
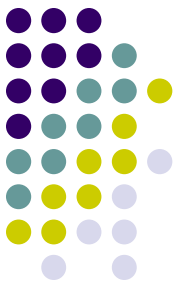
## Antibody Response-Immunoglobulin A



- Dimeric IgA synthesis occurs in plasma cells in the intestinal submucosa
- Dimeric IgA binds to polymeric IgR on the epithelial cell surface and is introduced into the cell by endocytosis.
- Moves into lumens within vesicle It binds to the cell membrane to switch to lumen and the cell-bound portion of pIgR is cut with proteolytic enzymes.
- IgA-pIgR complex is released to the cell surface and released to the lumen
- **pIgR = secretory component**

# MUCOSAL IMMUNITY

## Antibody Response-Immunoglobulin A

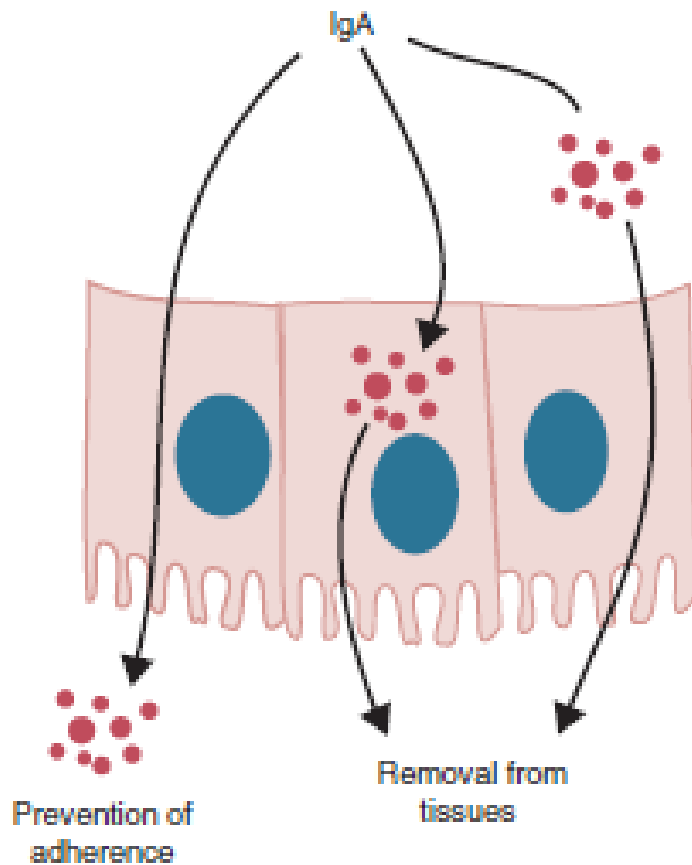
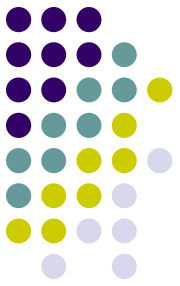


- IgA-positive B-lymphocytes stimulated in the intestine pass into the bloodstream and are transported to other mucosal surfaces.
- Thus, against a pathogen in the intestine, other mucosal surfaces of the body (breast, respiratory system, etc.) specific IgA production

Immunological memory does not develop in IgA response in mucosa

# MUCOSAL IMMUNITY

## Antibody Response-Immunoglobulin A

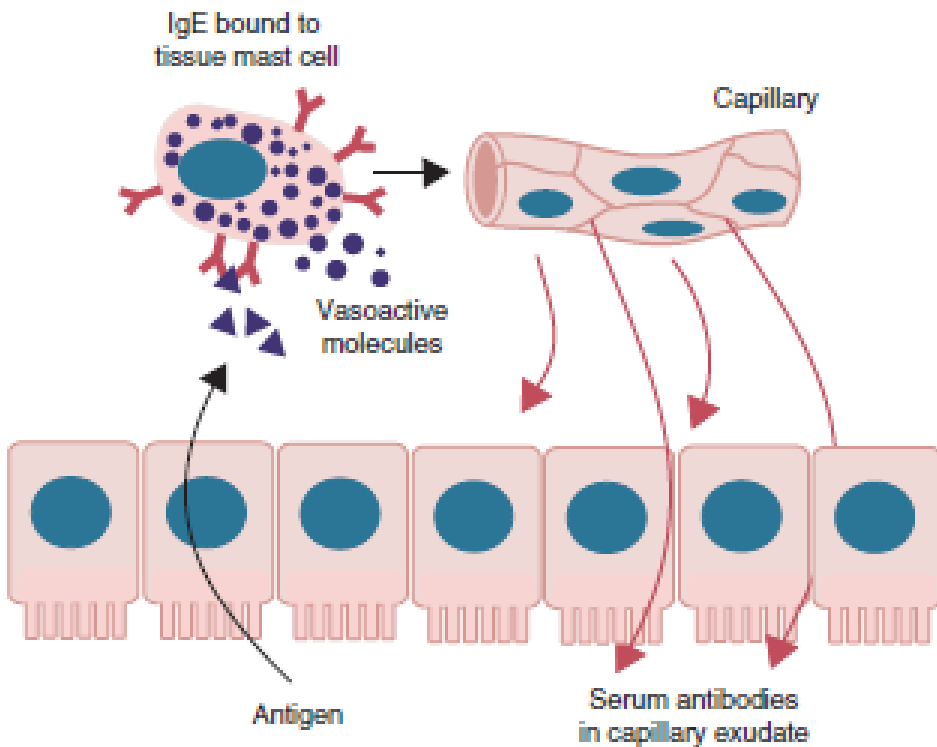
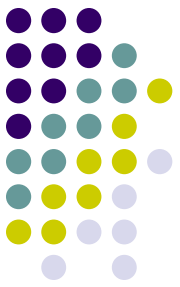


- The most important function of IgA is **IMMUNE EXCLUSION**.
- Immune exclusion occurs in the lumen-in-cell-submucosa.
- There is no other example of this mechanism in the immune system.



# MUCOSAL IMMUNITY

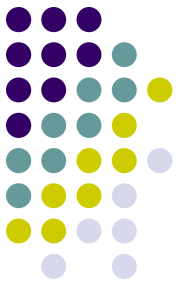
## Antibody Response-Immunoglobulin E



- IgEs are also produced in mucosal lymphoid tissues and are usually bound on the surface of mucosal mast cells.
- IgEs meet microorganisms that cross the IgA barrier and pass into submucosa
- The most important function of IgE is **IMMUNE ELIMINATION**.
- IgEs have important functions in immune response to **parasites and allergic reactions**.

# MUCOSAL IMMUNITY

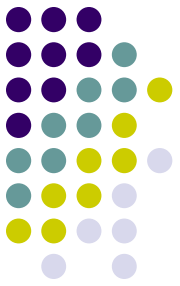
## Antibody Response-Immunoglobulin G



- It is high in milk and colostrum of ruminants,
- IgGs are more functional in the respiratory system than intestines (Why?)
- The most important functions; complement activation, opsonization, ADCC)

# MUCOSAL IMMUNITY

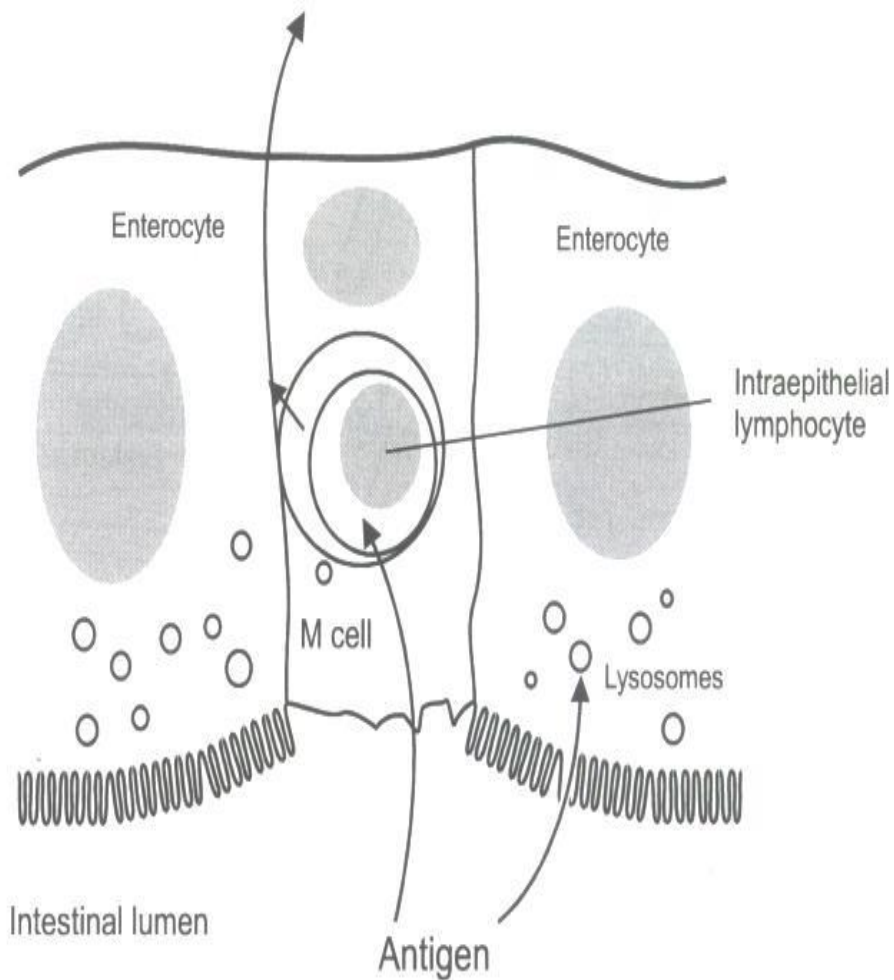
## Antibody Response-Immunoglobulin M



- There is no IgM activity on mucosal surfaces in adults,
- The most important and active IgM in the mucous membranes of newborns (Why?)
- Its function is immune exclusion.

# MUCOSAL IMMUNITY

## Cellular Response



- Intraepithelial lymphocytes - Immune system cells that first encounter antigen on mucosal surfaces
- Functions
  - Direct cytotoxic effect against parasites and bacteria,
  - ADCC
  - Macrophage activation by synthesizing cytokines