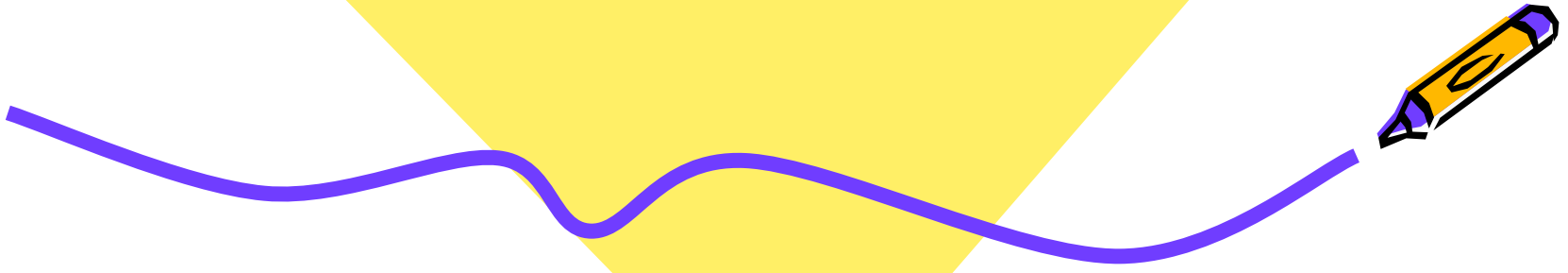
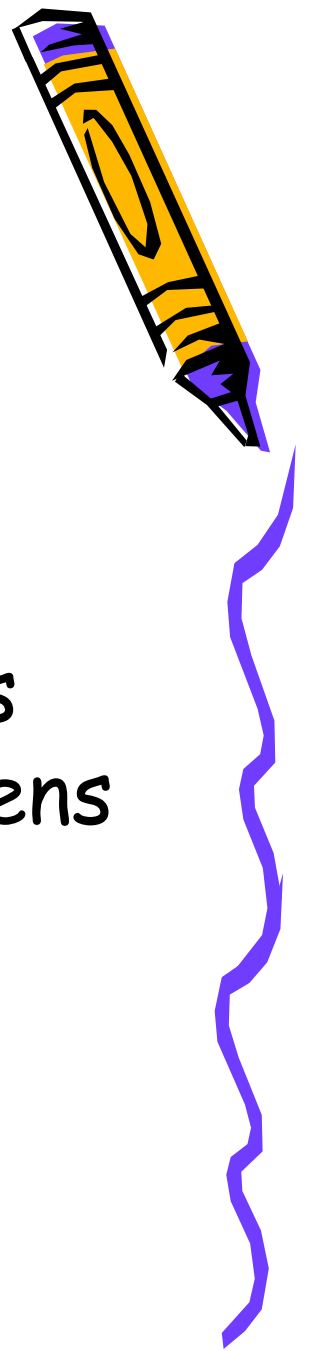




Immunological Tolerance



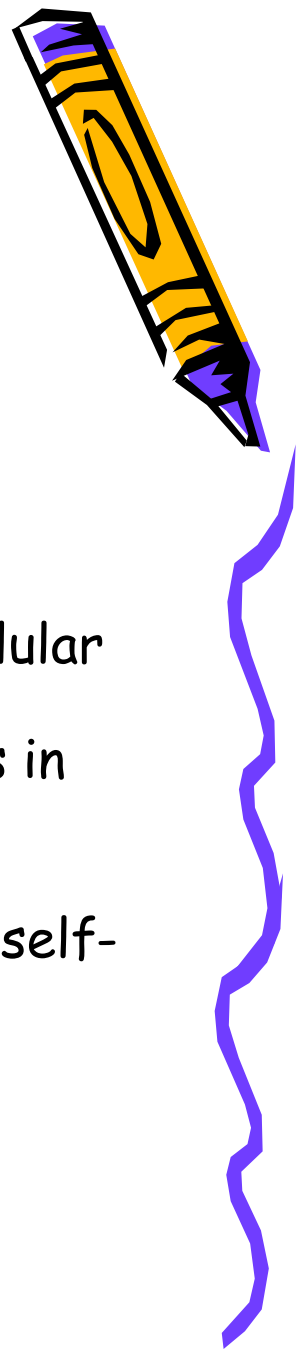
Immunological Tolerance



- Immunological non-response !!!!!
- Self Tolerance - An individual does not respond to his / her own antigens
- Tolerance to Foreign Antigens



Self Tolerance



- Necessary and important for the continuity of life
- T-lymphocyte tolerance and B-lymphocyte tolerance
- T-helper cell tolerance is important
- Because; these cells play a role in both humoral and cellular immunity
- Elimination of auto-reactive (self-reactive) cells occurs in primary lymphoid organs-CENTRAL TOLERANCE-
- Three different mechanisms work together to achieve self-tolerance



Self Tolerance

- Clonal Deletion
- Basic Principle:
- Lymphocytes specific to foreign antigens must survive!
- Lymphocytes specific to their antigens must die!



Self Tolerance



- Clonal Deletion
- For the elimination of auto-reactive lymphocytes:
 - **Positive Selection**
 - Lymphocytes that recognize self MHC antigens are allowed to survive Apoptosis killing of lymphocytes that do not recognize self MHC antigens
 - **Negative Selection**
 - Lymphocytes that do not recognize self antigens are allowed to survive Apoptosis killing of lymphocytes that recognize self antigens



“The result is no immune response to self antigens ”

Self Tolerance



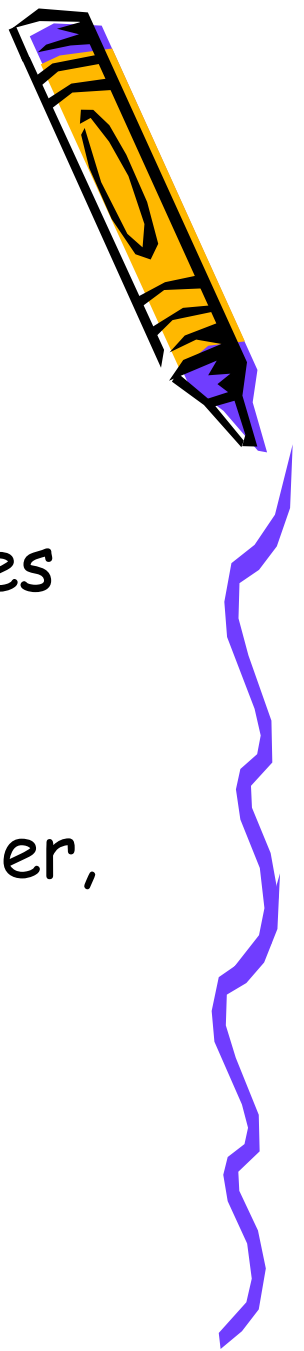
- Clonal Anergy
 - PERIPHERAL TOLERANCE
 - Clonal anergy occurs in two ways:
 - * Self antigens bind to antigen receptors without being processed by APCs
 - * Cells presenting self antigens do not contain additional stimulatory molecules

“Ultimately against self antigens no immune response!”



Self Tolerance

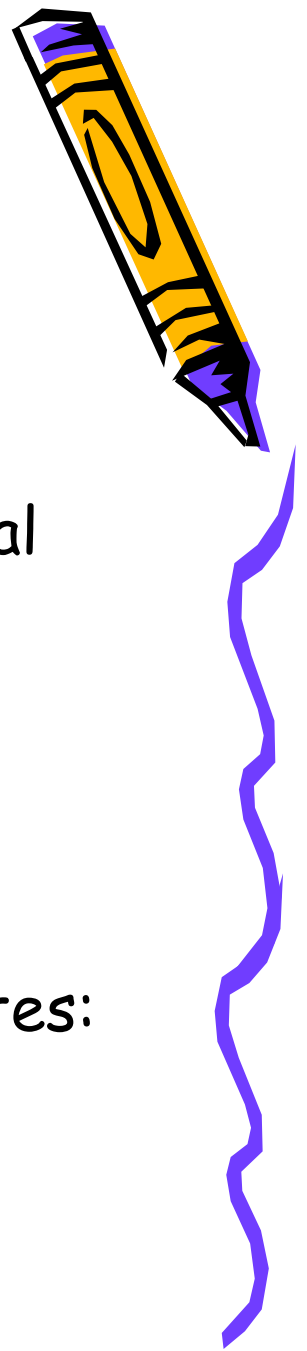
- **Immunosuppression**
- PERIPHERAL TOLERANCE
- Suppression of self-reactive lymphocytes by T-suppressor cells
- NOTE: The tolerance mechanisms for T and B-lymphocytes are the same. However, B-lymphocytes may also become reactivated self-reactive "in secondary lymphoid organs.



• Tolerance to Foreign Antigens

Immune non-response

- Tolerogen
- Peripheral tolerance - mature lymphocytes
- Dose-induced tolerance formation: immunological paralysis
- Tolerance due to entry route in the body: oral tolerance
- Negative signal transmission by APC
- T-suppressor cell activation
- Low-dose continuous stimulation of B-lymphocytes: clonal depletion
- Polymeric antigens-BCR blockade



Tolerance in Reproductive System



*Sperm tolerance

- Does not contain sperm MHC antigen
- Immunosuppressive substances in seminal plasma

*Tolerance to fetus:

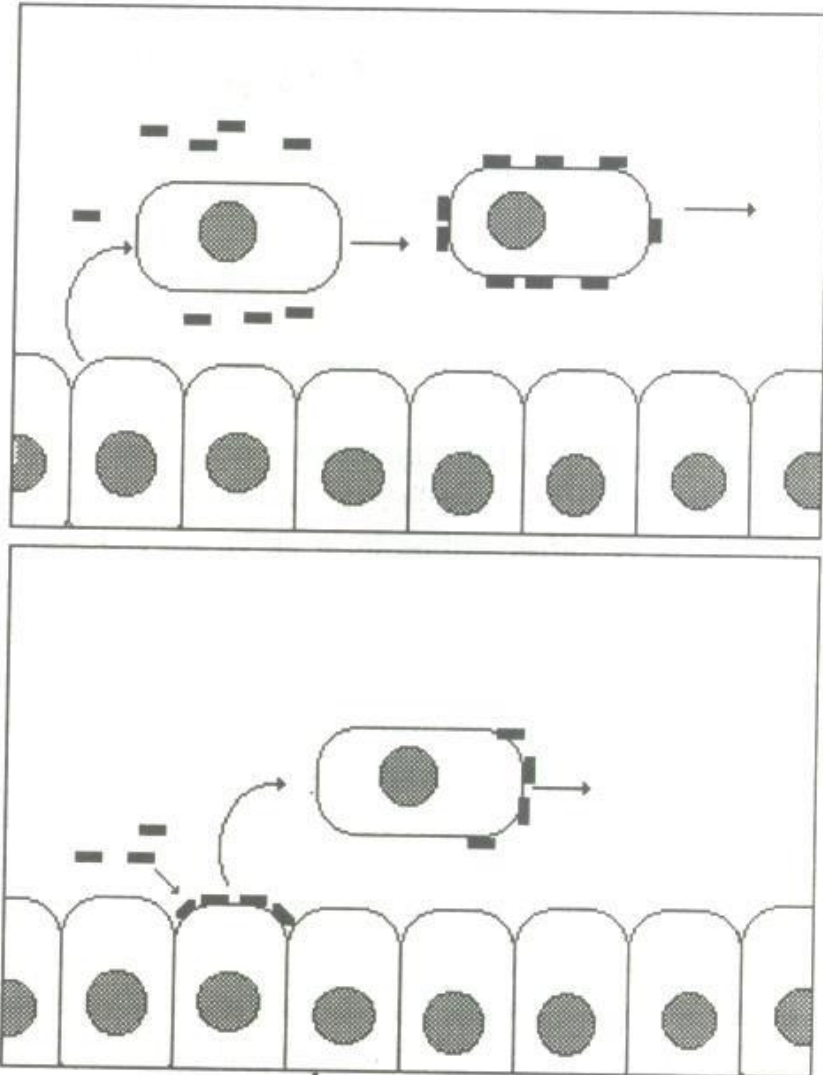
- The fetus is antigenic for mother
- Father's MHC antigens, trophoblasts in close contact with the uterus
- Immunosuppressive mechanisms:
 - MHC antigen free in oocytes and embryos
 - MHC class Ib molecules are found in trophoblasts
 - Cytotoxic T-lymphocytes and antibodies occur in the mother during pregnancy
 - Maternal antibodies have a positive effect on pregnancy
 - Progesterone and estrodiol synthesis from the placenta suppress the mother's immune response





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MUCOSAL IMMUNITY Natural Defense Mechanisms



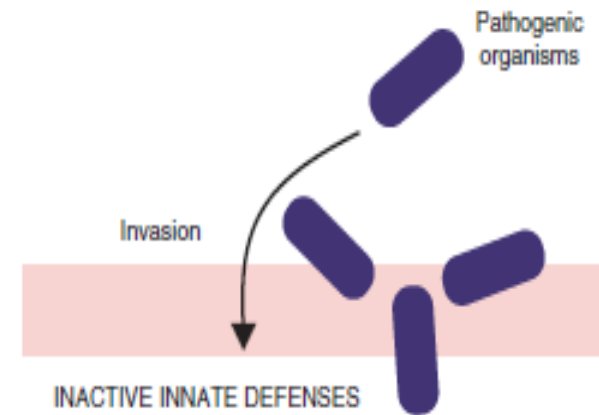
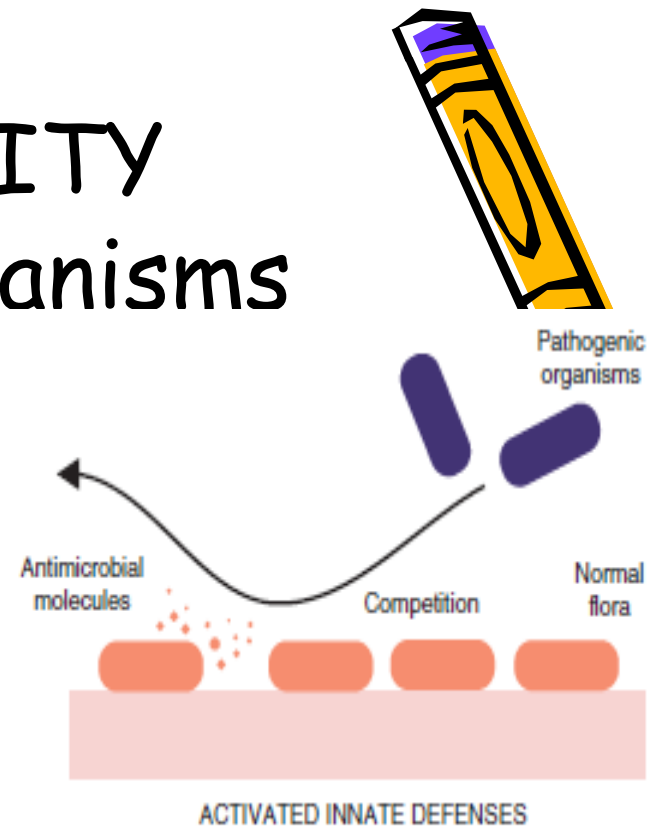
- Digestive Tract
- Epithelial Barrier-cell regeneration (20-50 million cells / m)
- Mucus
- Stomach acidity (pH 3-4)
- Bile Salts
- Intestinal peristaltic
- Antimicrobial agents (lysozyme, lactoperoxidase, lactoferrin)



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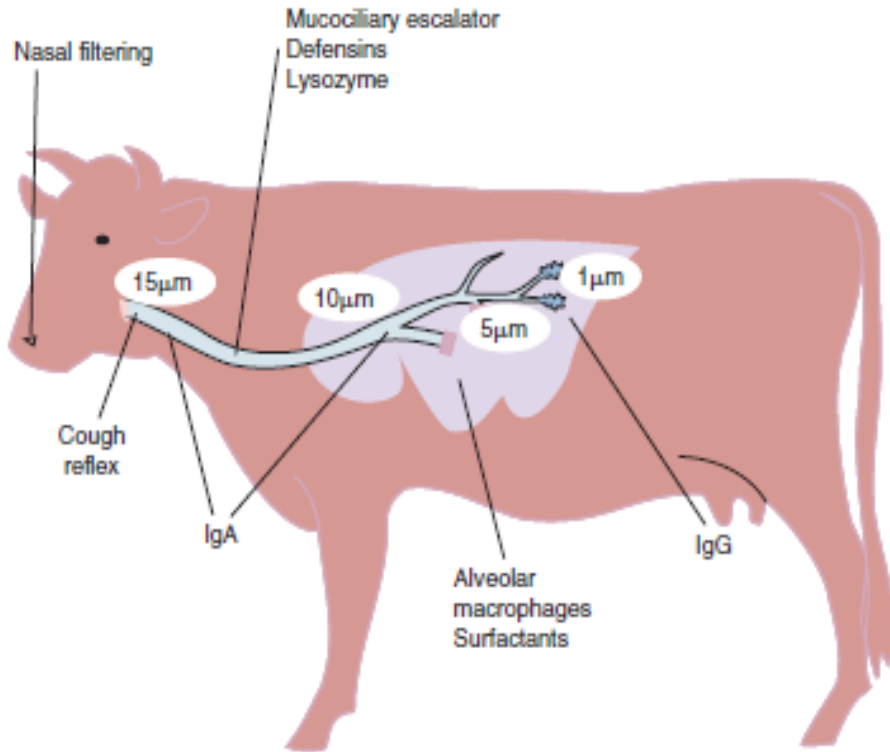
Natural Defense Mechanisms

- Digestive System
- microflora
- COMPETITIVE EXCLUSION



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Natural Defense Mechanisms



- **Respiratory system**
- Epithelial Barrier
- mucus
- Mucosal enzymes microflora
- Turbinates
- Cyber epithelial surface Alveolar
- macrophages and neutrophils

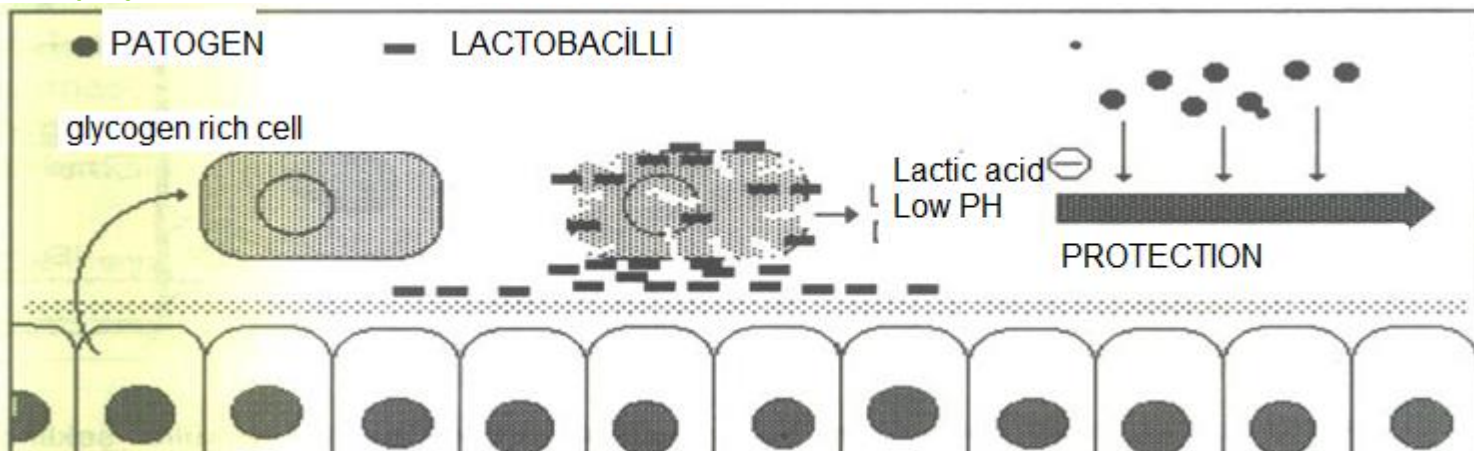


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Natural Defense Mechanisms

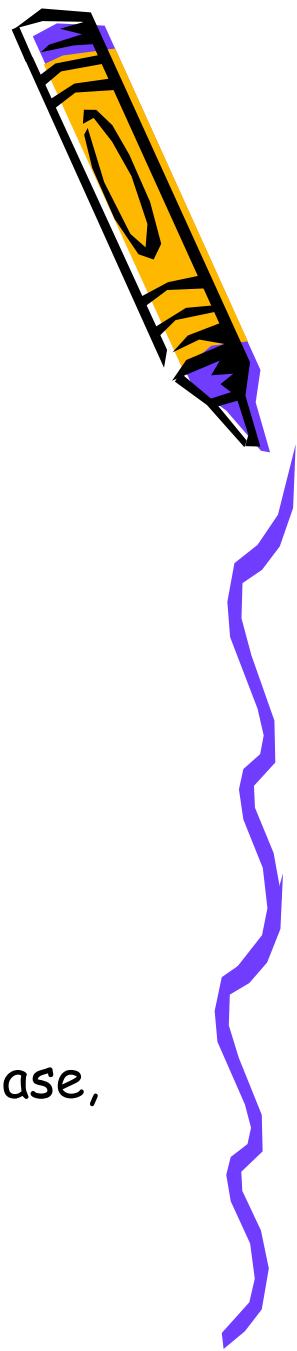


- Urogenital System
- Mucus
- Enzymes (lysozyme, lactoferrin, lactoperoxidase)
- Microflora (lactobacilli)
- Vaginal epithelial cells and glycogen source (estrogen hormone)
- Uterus - normally sterile
- viscous mucus covering the cervical canal in the
- **luteal phase**
- increased mucus content and neutrophil infiltration in the
- **secretory phase**



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Natural Defense Mechanisms



- Urinary Tract
 - Urine flow
 - Low pH of urine
- Mammary Gland
 - Closed nipple with keratin in **non-dairy animals**
 - Periodic discharge of milk from the mammary in **dairy animals**
 - Complement in milk, lysozyme, lactoferrin, lactoperoxidase, neutrophil

