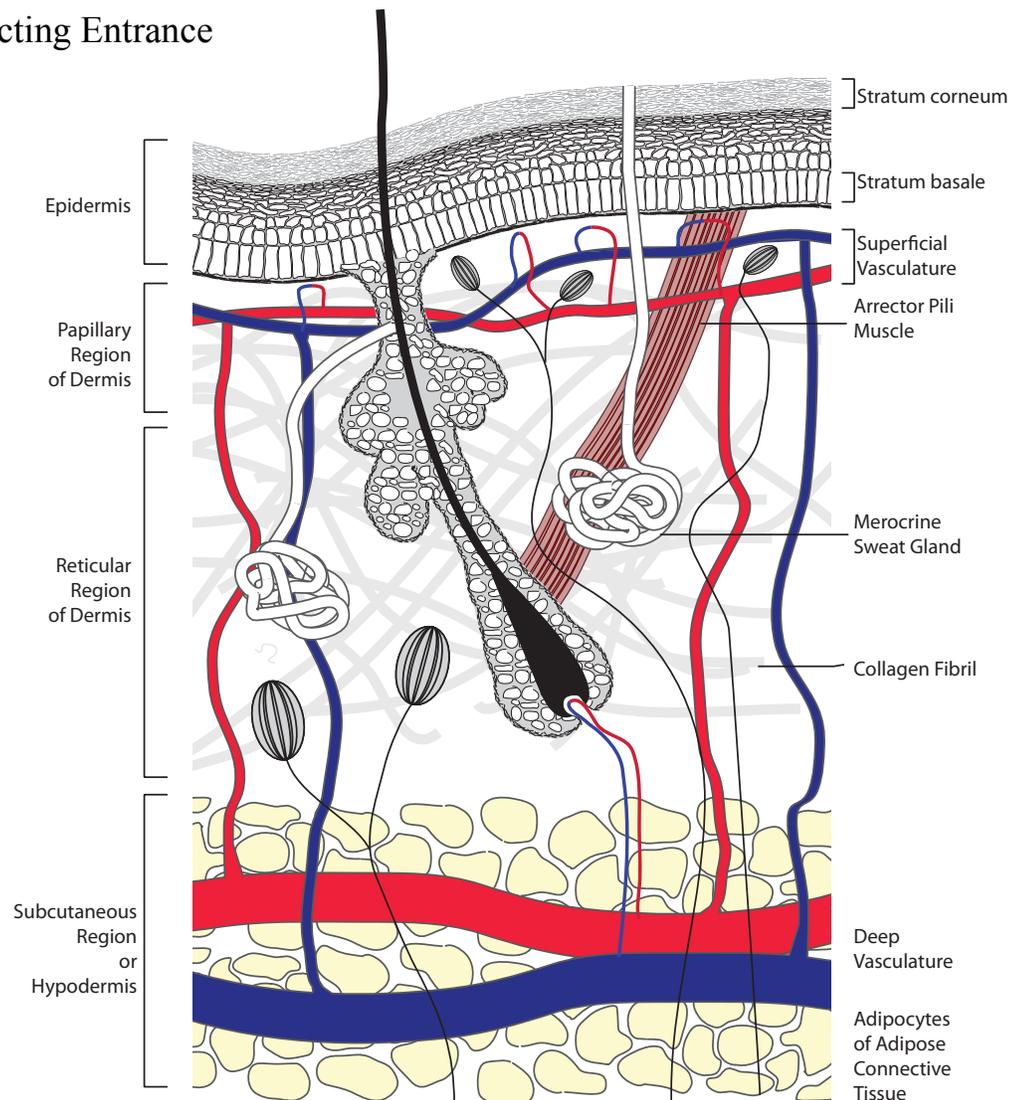


Nonspecific Host Immunity

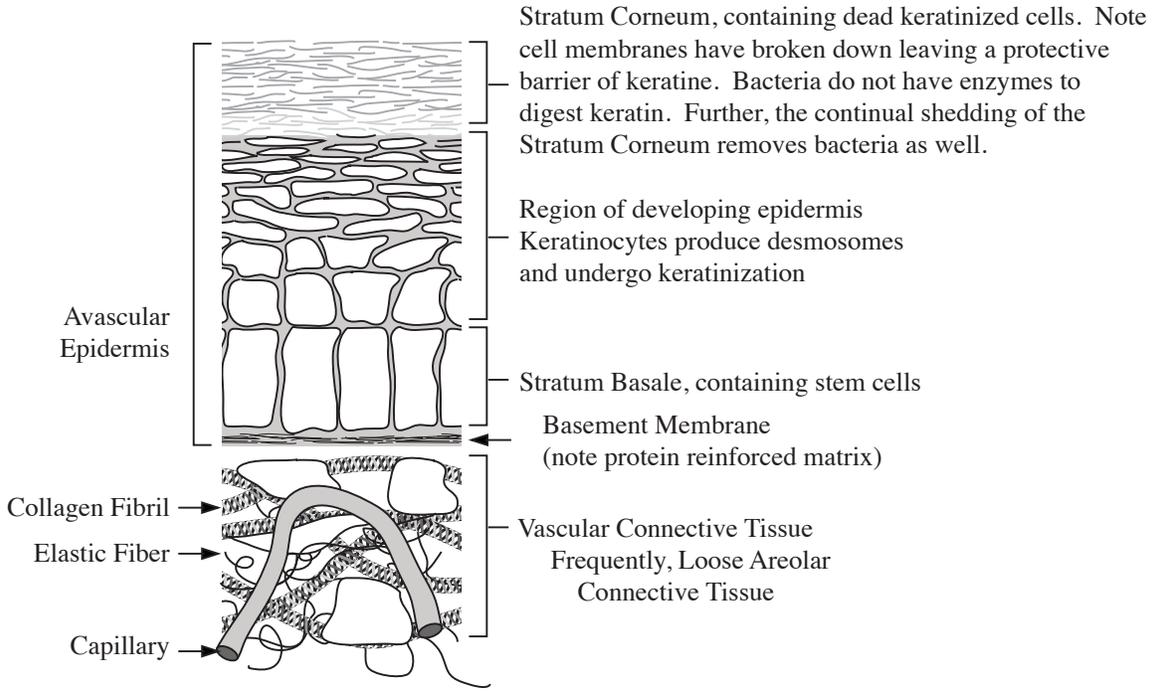
Please print and bring to class the "Laboratory Practical II Preparation Guide". We will begin using this shortly in preparation of your second laboratory Practical.

1. Introduction
 - A. Specific Resistance
 - B. Nonspecific Resistance
2. Nonspecific Defenses of the Body
 - A. Restricting Entrance



i. Integument

a. Keratinized Stratified Squamous Epithelium

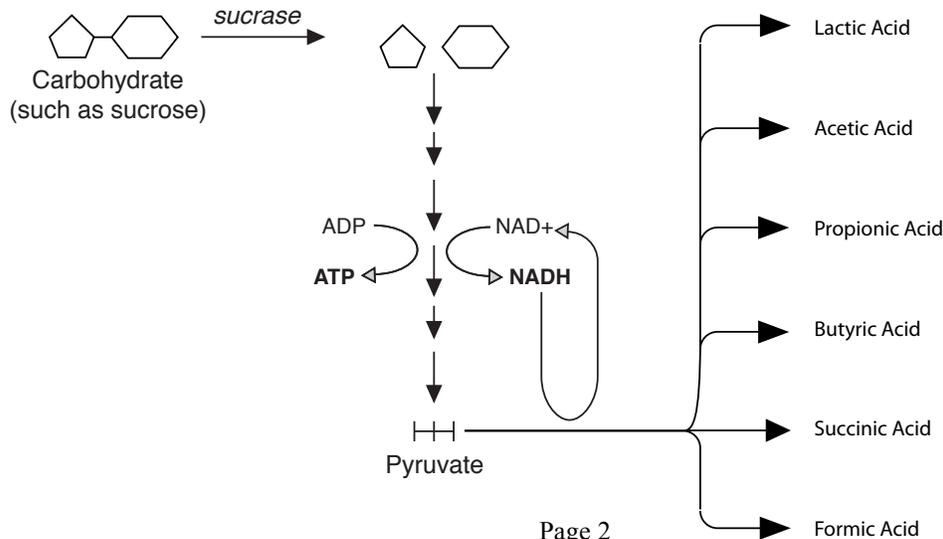


ii. Acid

a. Sebum

b. Stomach

c. Normal Flora



Normal Bacterial Flora may produce a number of metabolic byproducts that acidify the skin surface.

This illustration depicts bacteria that have enzyme systems for glycolysis. In order to continue ATP production, NADH will be **oxidized** as Pyruvate is **reduced**. The resultant acids may contribute the epidermis "**acid mantle**" that inhibits potential pathogenic species of bacteria.

d. Urinary System and pH Regulation

iii. Mucous Membranes

- Mucous always on the move

a. Examples

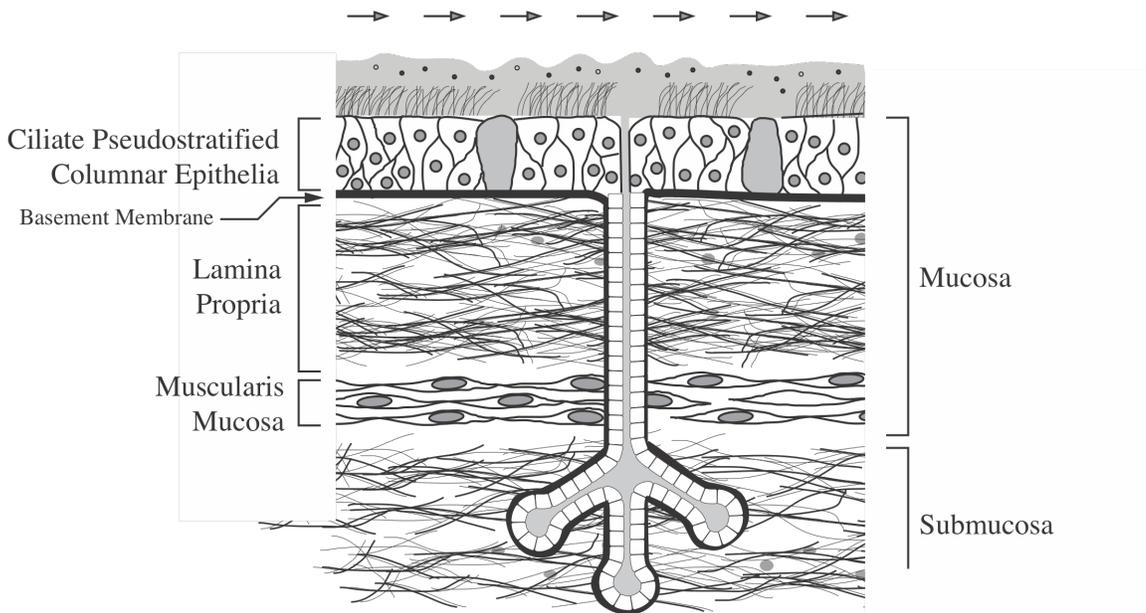
Organ

Epithelia

- | | |
|--|---|
| <ul style="list-style-type: none"> • Small Intestine and Colon • Stomach • Esophagus • Oral and Buccal Cavities • Urinary Bladder, Ureters • Trachea, Primary Bronchi, Secondary Bronchi, Tertiary Bronchi • ETC. – There are many more | <ul style="list-style-type: none"> Simple Columnar Epithelia Simple Columnar Epithelia Stratified Squamous Epithelia Stratified Squamous Epithelia Transitional Epithelia Ciliated Pseudostratified Col. Epi. |
|--|---|

b. Respiratory Tree Example

- Ciliated Pseudostratified Columnar Epithelia

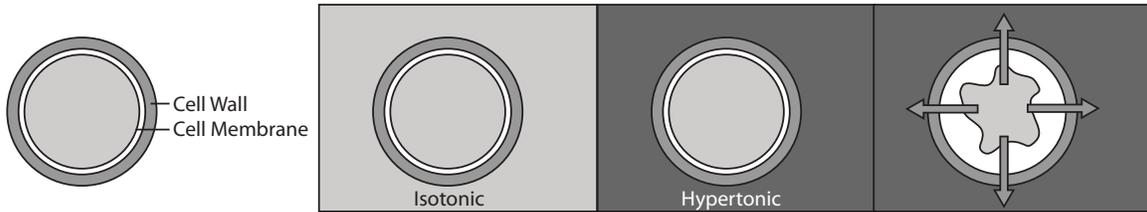


c. IgA

iv. Sweat

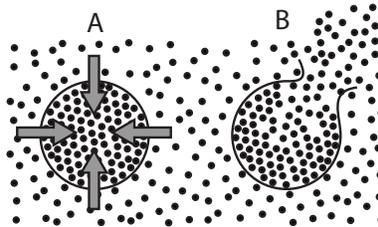
a. Removal of Microorganisms

b. Creation of hypertonic environment



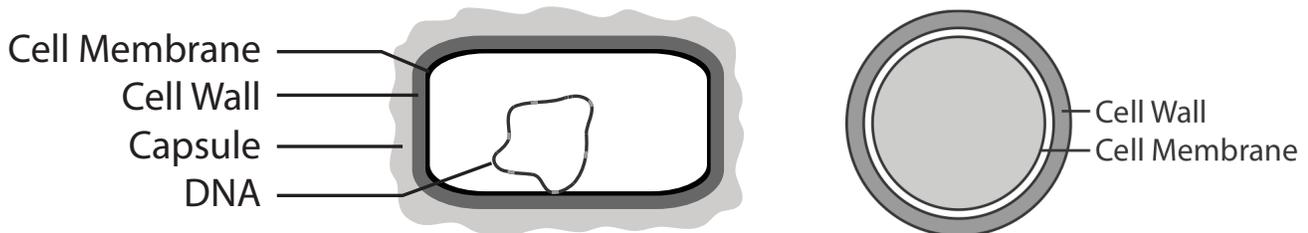
v. Lysozyme

a. Effect of Osmosis

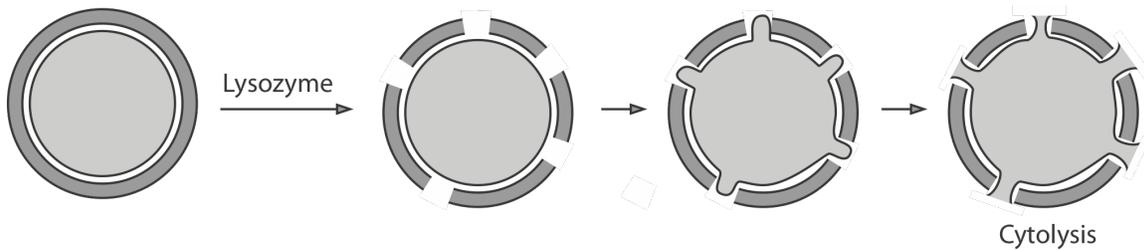


Basic Bacterial Anatomy

Simplistic Illustration



Effect of Lysozyme



vi. Nasal Hairs



vii. Normal Bacterial Flora

- a. Competitive Inhibition
- b. Lowering of pH
- c. Effect of Broad-Spectrum Antibiotics
 - Yogurt

3. Review of Phagocytosis – See Handout!

- | | |
|-----------------------|------------------|
| A. Pseudopodia | E. Phagolysosome |
| B. Phagocytic Vesicle | F. Residual Body |
| C. Phagosome | G. Exocytosis |
| D. Lysosome | |

4. Foundational Discussions for Wound Healing

- Foundational discussions – see “Foundational Handouts for Wound Healing “Essay”

A. Anaerobic Bacteria (See details of handout)

- i. Obligate Anaerobic Bacteria
- ii. Growth Potential and the Generation Time
- iii. Environmental Stress and Endospore Production Process
- iv. Iron oxide and Endospores
- v. Favorable Environmental Conditions

- B. Blood Clotting Review
 - i. Function of Endothelia
 - ii. Intrinsic Pathway
 - iii. Extrinsic Pathway
 - iv. Common Pathways
 - v. Polymerization of Fibrinogen to Fibrin
- C. Temperature and the effects on Bacteria
 - i. Normal Human Body Temperature
 - ii. Temperature and Physiological Stress
 - iii. Bacterial and Temperature
 - iv. Fever
 - v. Neutrophils, Pyrogen, and Basal Metabolic Rate
 - vi. Effects of Fever
- 5. Inflammatory Response and Wound Healing
 - A. Hemostasis and Wound Stabilization
 - i. An initial break damages dermal blood vessels and inserts microorganisms
 - ii. Blood enters wound with Fibrinogen and Immunoglobulins.
 - iii. Reflexive vasoconstriction reduces blood flow
 - iv. Extrinsic and Intrinsic Hemostatic Pathways both lead to Common Pathways and then polymerization process.
 - v. Fibrin clot forms and further reduces blood loose and isolates bacterial.
 - B. Inflammatory response
 - i. Mast cells and Basophile secrete histamine

- ii. Histamine induces vasodilation of undamaged blood vessels
 - iii. Vasodilated vessels become porous allowing nutrients, oxygen and other resources to enter damaged area.
 - Oxygen inhibits germination of endospores of obligate anaerobes such as *Clostridium tetani*
 - Review life cycle of *Clostridium tetani* steps on handout.
 - iv. Vasodilation also causes local edema and increased drainage into lymphatic system
 - v. Margination, Diapedesis, positive chemotaxis, and phagocytosis by neutrophils
 - Both Endogenous and Exogenous Pyrogens may induce fever (see handout)
 - Plasminogen Activation → Fibrinolysis
 - Review Phagocytosis steps on handout
 - vi. Margination, Diapedesis, positive chemotaxis, and phagocytosis by Monocytes
 - Monocytes → Macrophages
 - Review Phagocytosis steps on handout
- C. Injury Resolution and Granulomatous Tissue
- i. Stratus basalis begins to grow. Blood vessels begin to repair. Anastomosis formation
 - ii. Stem Cell proliferation begins epidermis replacement
 - iii. Fibroblasts migrate into damaged area and secrete collagen.
 - iv. Scab forms

- v. Clot material removed by Eosinophils
- D. Final Stages
 - i. Normal blood flow restored
 - ii. Bacteria and damaged tissue removed
 - iii. Irregularly places collagen leaves scar
 - iv. Scab falls off.
 - v. Tissue remodeling over time results in fading of scar
- 5. Nonspecific Antiviral Response: Interferon (Have handout in hand)
 - A. Simplified Overview of Viral Life Cycle
 - i. Adhesion
 - ii. Penetration
 - iii. Uncoating
 - iv. Replication
 - v. Synthesis
 - vi. Release
 - B. Interferon
 - i. Interferon Gene (INF)
 - ii. Antiviral Replication Protein Gene Set (AVR)
- 6. Complement (Pull out Handout on the ***COMPLEMENT SYSTEM !!***)
 - A. Functions
 - B. Pathways
 - i. Classic Pathway
 - ii. Alternate Pathway
 - C. Outcomes
 - i. Opsonization of Bacteria

- ii. Enhanced Inflammatory Response
- iii. Cytolysis

NOTE: you should have a very clear idea of the importance of the complement system, but you do not need to know the individual proteins. We may “gloss over” the “gory details” by saying that there is a “cascade of reactions”. But we do need to have a clear idea of what initiates the system (there are two) and what are the specific outcomes (there are three).