

# **IQRA NATIONAL UNIVERSITY**

## **DEPARTMENT OF ALLIED HEALTH SCIENCES**

Final-Term Examination 2020

Course Title: microbiology and pathology DPT 4<sup>th</sup>

Instructor: Dr. Imran khan

Time: 6 hours

Total Marks: 50

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**Q1. What do you know about healing and repair? Explain (15)**

**Ans:** Healing and repair is a process which occurs after injury. This process restores the normal structure and function. It usually consists of two processes.

1. Tissue regeneration
2. Fibrous organization

### **Regeneration:**

Growth of cells and tissues to replace lost structures (with restoration of normal architecture)

### **Fibrous repair:**

Conversion of an inflammatory exudate into a fibrous scar. Also called healing by fibrous repair. How? By hemostasis, inflammation, granulation tissue, etc.

**Resolution:**

Complete disappearance of an inflammatory exudate.

**Granulation tissue:**

Newly formed small blood vessels and fibroblasts, occurring in the early phase of repair (24-72h). There is often accompanying edema. Gross appearance – pink, soft, granular on the wound surface.

**How it occurs:**

The process of healing and repair starts right from the time of injury. Often, there is ongoing inflammation as well.

If you recall, in chronic inflammation, the definition also includes ongoing repair.

**Q2. What are hemodynamic disorders? Explain any 3 (10)****Ans: Hemodynamic:**

Hemodynamics is known as how blood flows in the vessels and to the organs of the body. Any type of failure in blood flow is known as hemodynamic disorder. Heart failure has traditionally been viewed as a hemodynamic syndrome characterized by fluid retention, high venous pressure, and low cardiac output.

These are some of the hemodynamic disorders:

### **1. Hyperemia:**

It indicates a local increased volume of blood in a particular tissue. In hyperemia there is an increased volume pressure of blood in a given tissue with associated capillary dilatation and a potential for fluid extravasation.

In hyperemia, increased inflow leads to engorgement with oxygenated blood, resulting in erythema.

### **2. Congestion:**

It also indicate a local increased volume of blood in particular tissue. In congestion there is an increased volume pressure of blood in a given tissue with associated capillary dilatation and a potential for fluid extravasation.

In congestion, diminished outflow leads to a capillary bed swollen with deoxygenated venous blood and resulting in cyanosis.

### **3. Hemorrhage:**

It is the extravasation of blood due to vessel rupture. It has some types which are

1. Hematoma
2. Petechiae

3. Purpura
4. Ecchymoses
5. Hemothorax

**Q3. What is renewal and regeneration? (10)**

**Ans: Renewal, Regeneration and Repair:**

Injury to cells and tissues sets in motion a series of events that contain the damage and initiate the healing process. This process can be broadly separated into regeneration and repair.

Regeneration results in the complete restitution of lost or damaged tissue.

Repair may restore some original structures but can cause structural derangements.

In healthy tissues, healing, in the form of regeneration or repair, occurs after practically any insult that causes tissue destruction, and is essential for the survival of the organism.

In mammals, whole organs and complex tissues rarely regenerate after injury, and the term is usually applied to processes such as liver growth after partial resection or necrosis, but these processes consist of compensatory growth rather than true regeneration.

Tissues with high proliferative capacity, such as the hematopoietic system and the epithelia of the skin and gastrointestinal (GI) tract, renew themselves continuously and can regenerate after injury, as long as the stem cells of these tissues are not destroyed.

Most often consists of a combination of regeneration and scar formation by the deposition of collagen.

Scar formation is the predominant healing process that occurs when the extracellular matrix (ECM) framework is damaged by severe injury.

Chronic inflammation that accompanies persistent injury also stimulates scar formation because of local production of growth factors and cytokines that promote fibroblast proliferation and collagen synthesis.

The term fibrosis is used to describe the extensive deposition of collagen that occurs under these situations.

#### **Q4. Write a detailed note on staphylococcus and streptococcus (15)**

##### **Ans: Staphylococcus:**

Staphylococcus are pathogens of man and other mammals. Traditionally they were divided into two groups on the basis of their ability to clot blood plasma (the coagulase reaction). The coagulase-positive staphylococci constitute the most

pathogenic species *S aureus*. The coagulase-negative staphylococci (CNS) are now known to comprise over 30 other species. The CNS are common commensals of skin, although some species can cause infections. It is now obvious that the division of staphylococci into coagulase positive and negative is artificial and indeed, misleading in some cases

### **Structure:**

Staphylococci are Gram-positive cocci about 0.5 – 1.0  $\mu\text{m}$  in diameter. They grow in clusters, pairs and occasionally in short chains. The clusters arise because staphylococci divide in two planes. The configuration of the cocci helps to distinguish micrococci and staphylococci from streptococci, which usually grow in chains. Observations must be made on cultures grown in broth, because streptococci grown on solid medium may appear as clumps. Several fields should be examined before deciding whether clumps or chains are present.

### **Pathogenesis:**

*S aureus* expresses many potential virulence factors. (1) Surface proteins that promote colonization of host tissues. (2) Factors that probably inhibit phagocytosis (capsule, immunoglobulin binding protein A). (3) Toxins that damage host tissues and cause disease symptoms. Coagulase-negative staphylococci are normally less

virulent and express fewer virulence factors. *S. epidermidis* readily colonizes implanted devices.

## **Streptococcus:**

Streptococci are gram-positive aerobic organisms that cause many disorders, including pharyngitis, pneumonia, wound and skin infections, sepsis, and endocarditis. Symptoms vary with the organ infected. Sequelae of infections due to group A beta-hemolytic streptococci may include rheumatic fever and glomerulonephritis. Most strains are sensitive to penicillin, but macrolide-resistant strains have recently emerged.

## **Classification of streptococci:**

Three different types of streptococci are initially differentiated by their appearance when they are grown on sheep blood agar:

Beta-hemolytic streptococci produce zones of clear hemolysis around each colony.

Alpha-hemolytic streptococci (commonly called viridans streptococci) are surrounded by green discoloration resulting from incomplete hemolysis.

Gamma-hemolytic streptococci are nonhemolytic.