Reaction of Body to Injury

Surgery

Stage: 2

Learning Objectives

To understand

1- concept of homeostasis.

2-Definition of response to injury or trauma.

3-Phases of the response.

4- Metabolic component of the response.

5-Mediators of the response.

6-Concept of systemic inflammatory response syndrome (SIRS).

Homeostasis

A coordinated physiological process that maintain a balanced constant conditions in the internal environment .It is the foundation of normal physiology.

Examples:

Maintaining temperature, oxygen, water and electrolytes and blood pressure.

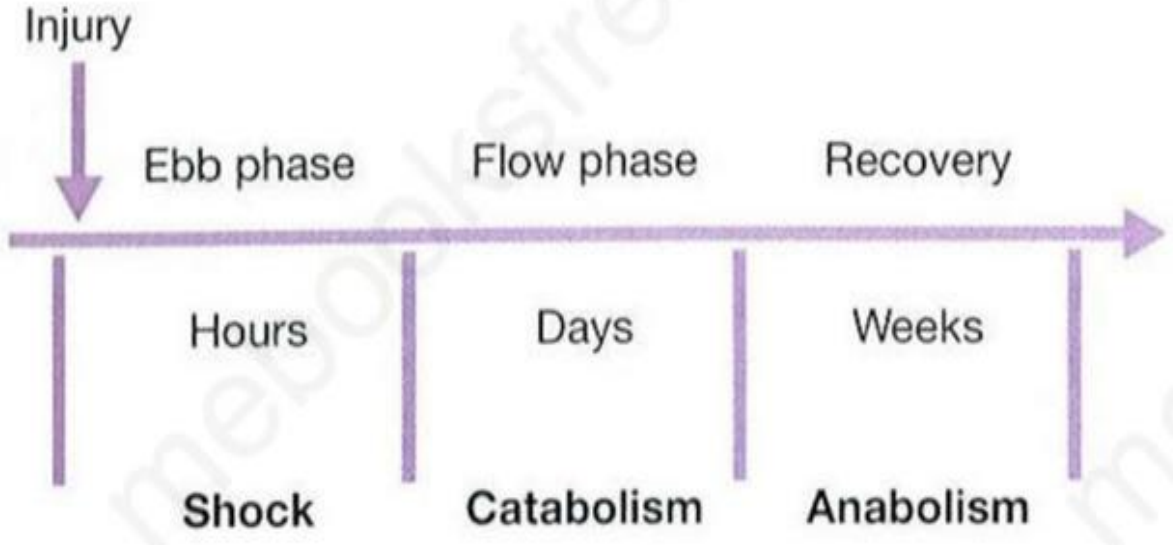
Metabolic response(reaction of body)to injury

Is activation of groups of metabolic, hormonal and immunological changes following injury to restore homeostasis.

Phases of the response:

1-Ebb phase.

2-Flow phase.



Metabolic response(reaction of body)to injury

Phases of the response

Ebb phase

Characterized by:

1-Occurs during the first few hours after injury.

2-Patients were cold and hypotensive.

Metabolic response(reaction of body)to injury

Phases of the response

Flow phase

If the patients survive the Ebb phase, they entered the Flow phase.

It is divided into:

1-Catabolic Flow phase.

2-Anabolic Flow phase.

Metabolic response(reaction of body)to injury

Phases of the response

Catabolic Flow phase

Characterized by:

1-The initial flow phase.

2- It lasts about a week.

3-High metabolic rate.

4-Break down of protein and fat stores.

5-Weight loss.

Metabolic response(reaction of body)to injury

Phases of the response

Anabolic Flow phase

Characterized by:

1-The late flow phase.

2-follow the catabolic phase.

3-Last from two to several weeks.

4-Protein and fat stores are restored.

5-Weight gain.

Metabolic response(reaction of body)to injury

Components of the response

Metabolic changes

1-Hypermetabolism..

2-Enhanced protein breakdown.

3-Increased fat oxidation.

Metabolic response(reaction of body)to injury

Mediators of Metabolic Response

1-Neuro-endocrine system (hormonal).

2-Immunological system.

Metabolic response(reaction of body)to injury

Mediators of Metabolic Response

Neuro-endocrine response

characterized by

Actively secreting pituitary and elevated counter regulating hormones which are **cortisol**, **glucagon**, and **adrenalin** with decrease in the **level of insulin**

Metabolic response(reaction of body)to injury

Mediators of Metabolic Response

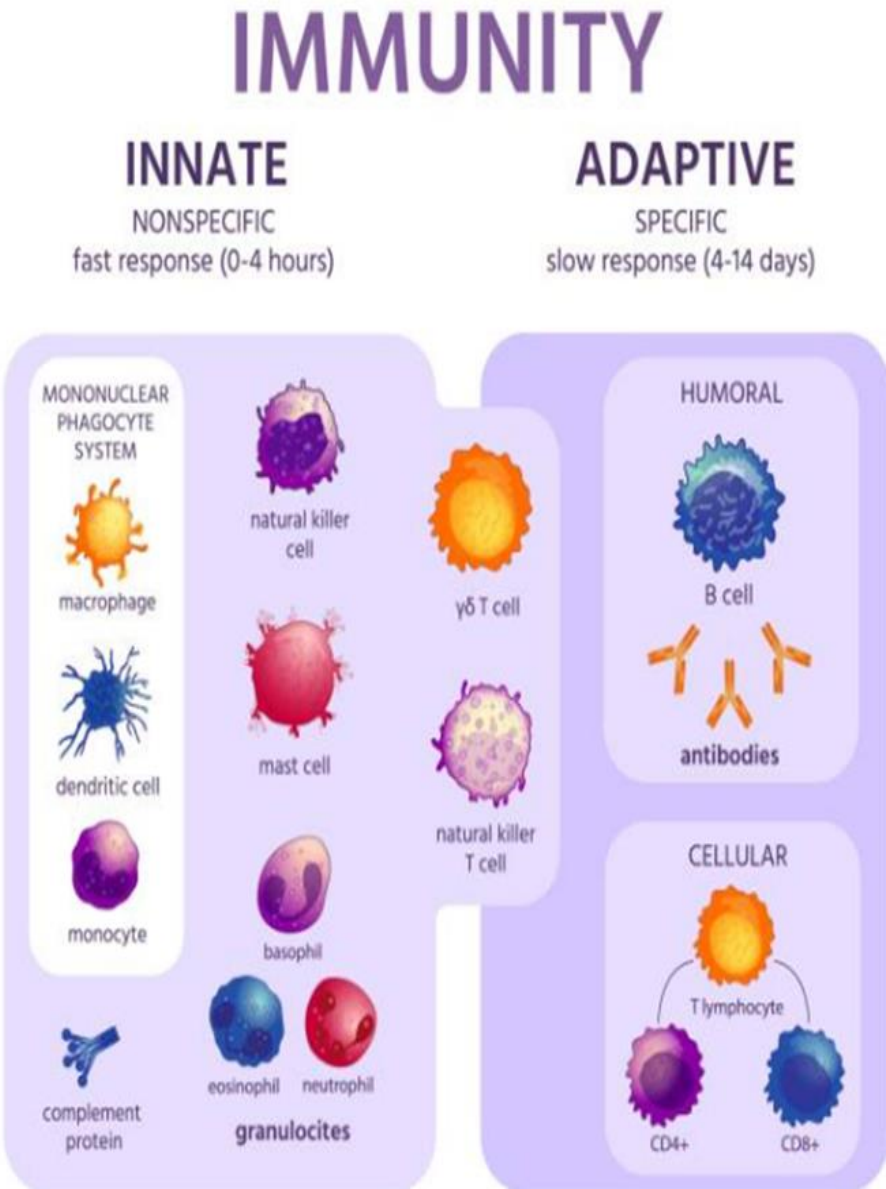
2.Immunological response

Is an interaction between:

1-Innet immune response(macrophage).

2-Adaptive immune response (B and T cells)

3-Cytokines release.



Metabolic response(reaction of body)to injury

Mediators of Metabolic Response

Immunological response

Systemic inflammatory response syndrome (SIRS):

Is an inflammatory reaction affecting the whole body and is an exaggerated defense response to harmful stimuli.

Is due to overstimulation of the inflammatory response.

Metabolic response(reaction of body)to injury

Mediators of Metabolic Response

Immunological response

Systemic inflammatory response syndrome (SIRS):

A combination of two or more of the followings:

1-Body temperature >38 C^0 or <36 C^0.

2-Pulse rate >90 beats/min.

3-Respiratory rate >20 breaths/min. or Pco_2 <32 mm.Hg.

4-WBC count < 4000 mm^3 or >12000/mm^3.

Sepsis : SIRS with presence of source of infection.

Metabolic response(reaction of body)to injury

Criteria (Characteristics)

The response is proportional to the severity of injury (the more sever the injury; the greater the response in metabolic and immunological changes).