

# STRESS MANAGEMENT

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# **STRESS PSYCHOPHYSIOLOGY**

# **MODULE 1**

# OUTLINE

- STRESS AND THE NERVOUS SYSTEM
  - A BRIEF OUTLINE OF THE NERVOUS SYSTEM
  - IMPORTANT STRUCTURES IN STRESS PHYSIOLOGY

**Hans Selye (1956) suggested that a relationship existed between the body's response and chronic stress**

# Stress and its physiology

- As a survival response → The brain reacts to stress in a sequence of biological and chemical reactions

## Stress caused by

**biological agents** – viruses

**environment** – temperature

**psychological agents** – threat to self esteem, loss of loved one resulting in loneliness, social isolation etc

# Brain and Stress

These stressors are perceived by the body and interpreted by the brain

The brain then instructs the rest of the body as to how to



respond to the stressor



adjust to it

# Brain and Stress

## Importance of knowing physiology of stress:

- Helps improve health and well being through stress management techniques
- Understanding how the techniques work

It is important to know what happens to our body during a stressful situation...



# Brain and Stress

Eg: giving a presentation in front of experts

**Physiological changes:** heart pounding, muscles tensed up, sweating, dryness of mouth

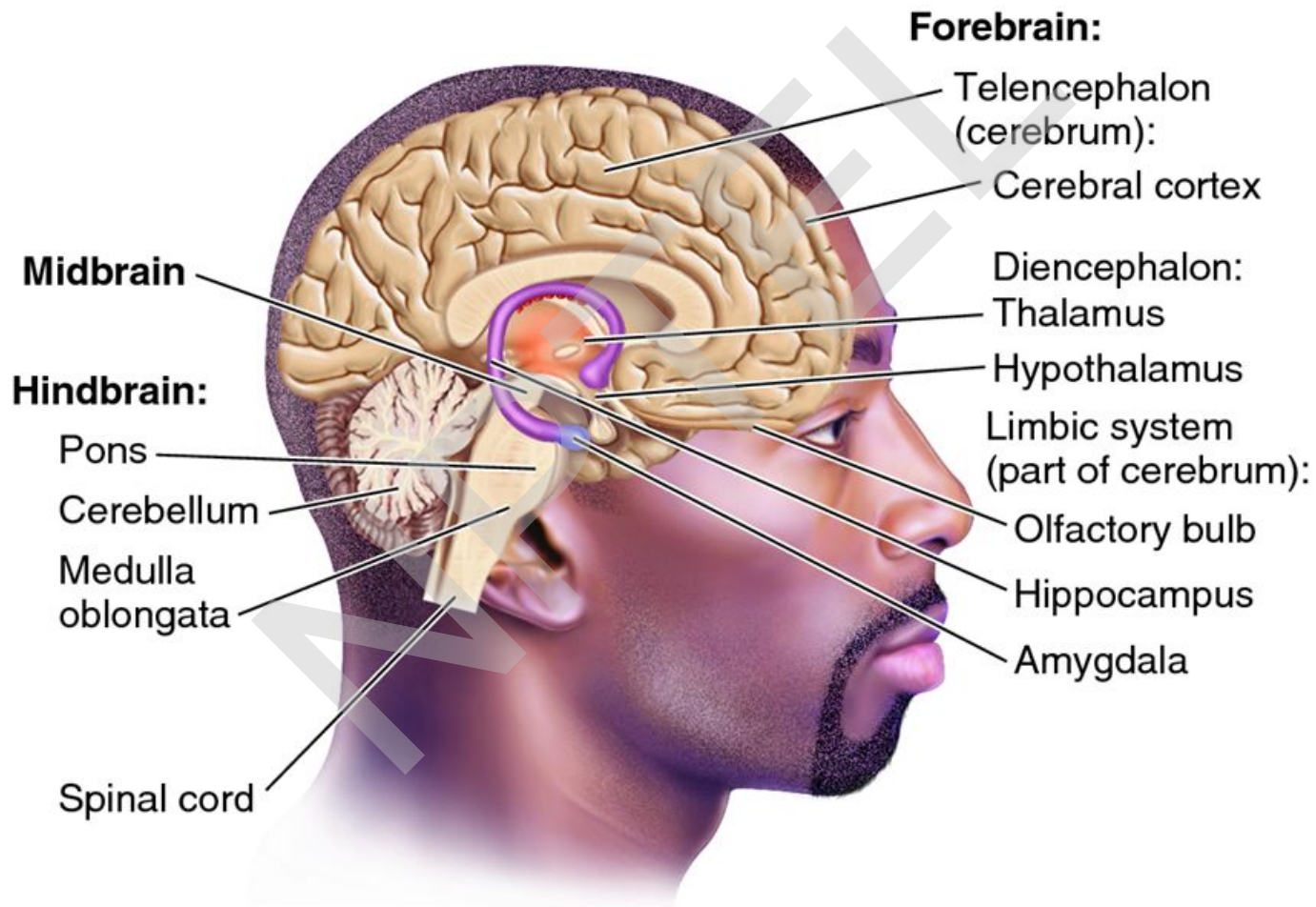
**Psychological changes:** fear and nervousness

# Physiological Systems Involved in the Stress Response

- The nervous system
- The endocrine system
- The immune system

**Optimally, interaction of these systems maintains homeostasis and wellness**

# Brain structures



# The human brain

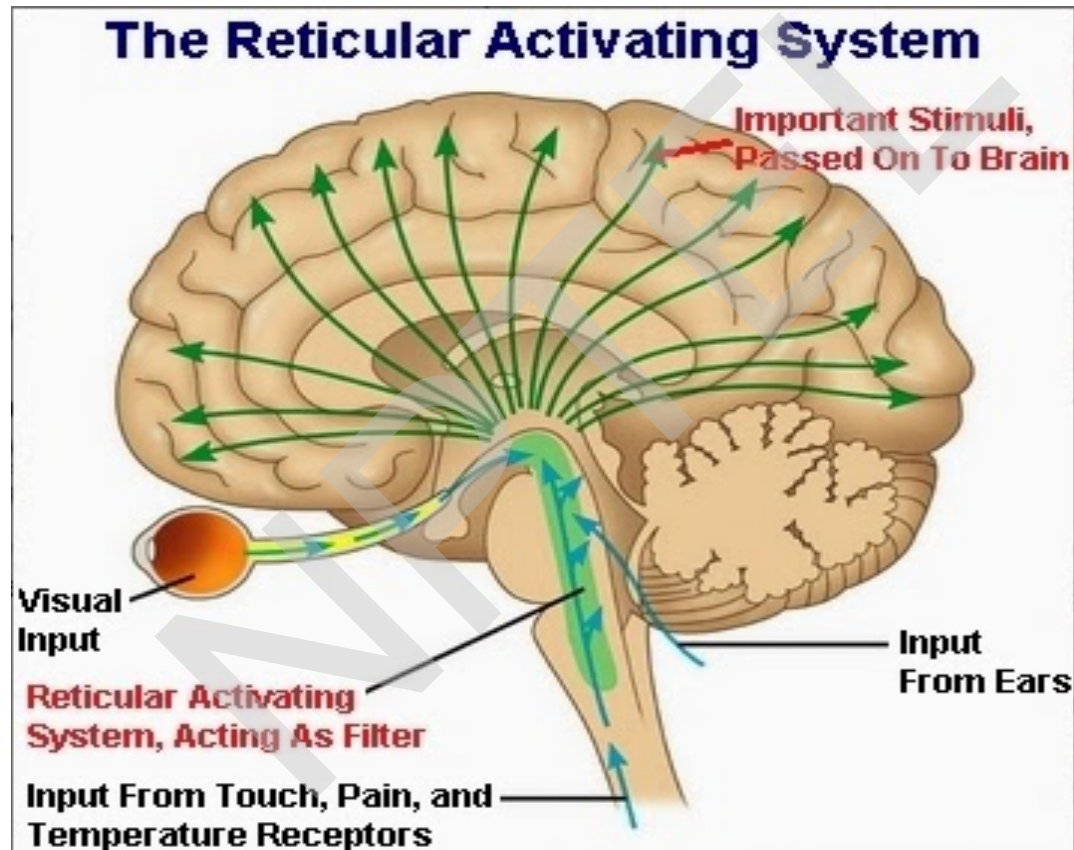
The human brain is divided into three levels:

- The Vegetative level
- The Limbic system
- The neocortical level

# THE VEGETATIVE LEVEL

- The lowest level of the brain is comprised of the:
  - **reticular formation**
  - **brain stem**

# The Reticular Activating System



# THE VEGETATIVE LEVEL

## RETICULAR ACTIVATING SYSTEM and stress physiology

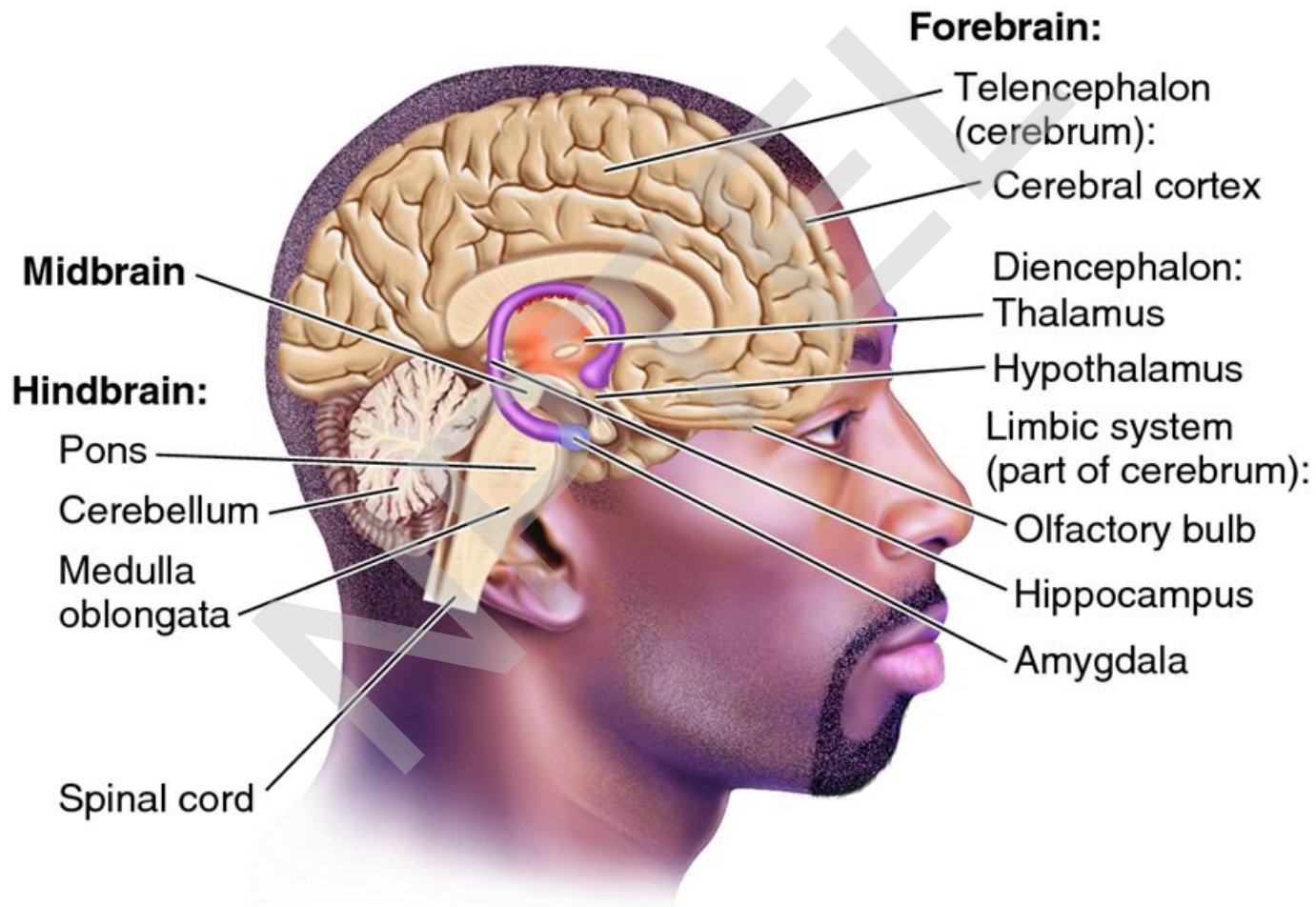
- **Reticular Activating System (RAS):** A network of nerves that connects the mind and the body  
**It is the part of the brain where the world outside, and thoughts and feelings from inside meet**
- **When functioning normally, it provides the neural connections that are needed for the processing and learning of information and the ability to pay attention to the correct task**

# RAS AND STRESS PHYSIOLOGY

- If **the RAS doesn't excite** the neurons of the cortex as much as it ought to, then an **under aroused cortex** results in such effects as difficulty in **learning, poor memory, and little self-control**
- If **RAS is too excited and arouses the cortex too much**, stressful responses such as being easily **startled, Hyper-vigilance, restlessness, and hyperactivity** occur



# Brain structures



# The vegetative level

## The brain stem

- The brain stem: (pons, medulla oblongata, and mesencephalon)
- Involuntary functions of the human body

# The vegetative level

**Medulla Oblongata:** regulates heartbeat, respiration, and other such basic physiological processes

**Pons:** regulates the sleep cycle

**Mesencephalon:** It is associated with vision, hearing, motor control, sleep/wake, arousal (alertness), and temperature regulation

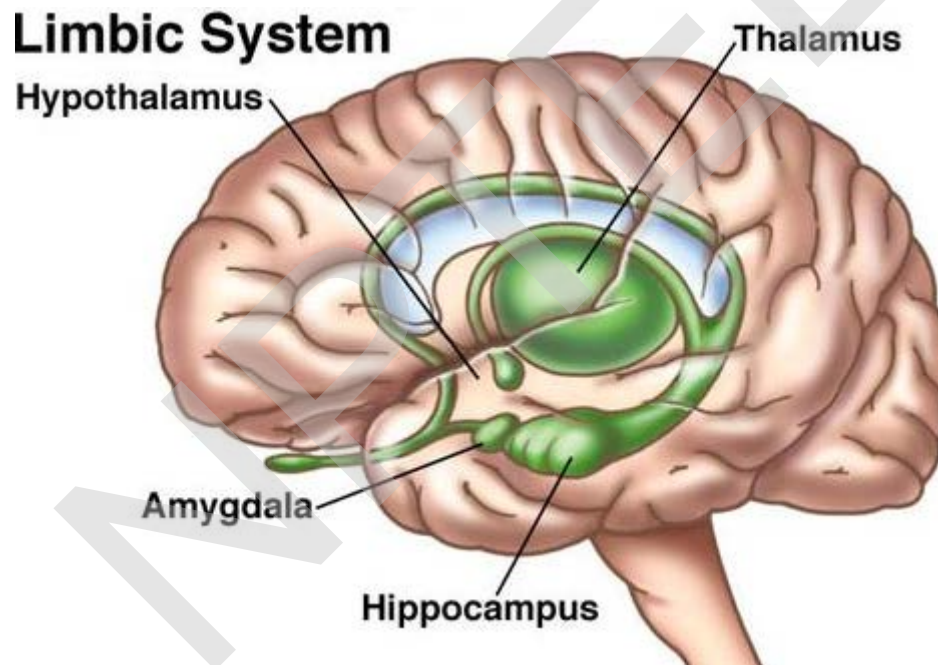
**This part of the brain is responsible for various physiological processes necessary to stay alive**

# The limbic system – emotional response

- The limbic system is the emotional control center and comprised of the:
- Thalamus – relay centre of the brain
- Hypothalamus – maintains homeostatis and regulates discharge of hormones during stress
- Amygdala – two almond-shaped masses of neurons on either side of the thalamus at the lower end of the hippocampus, emotions – stress, anger
- Hippocampus – (at curved back of amygdala) – LTM
- Pituitary gland – master gland – releases stress hormones

**These T-H-P work in unison to maintain a level of homeostasis**

# LIMBIC SYSTEM



**The limbic system – produces emotions like fear, anxiety, and joy in response to physical and psychological signals**

# THE NEO CORTICAL LEVEL

- Involved in higher order functions like sensory perception, generation of motor commands, conscious thought, language
- Sensory information is processed as threatening or non threatening after cognition
  - Lazarus theory of Cognitive Appraisal
- The neo cortex can also control more primitive areas of the brain

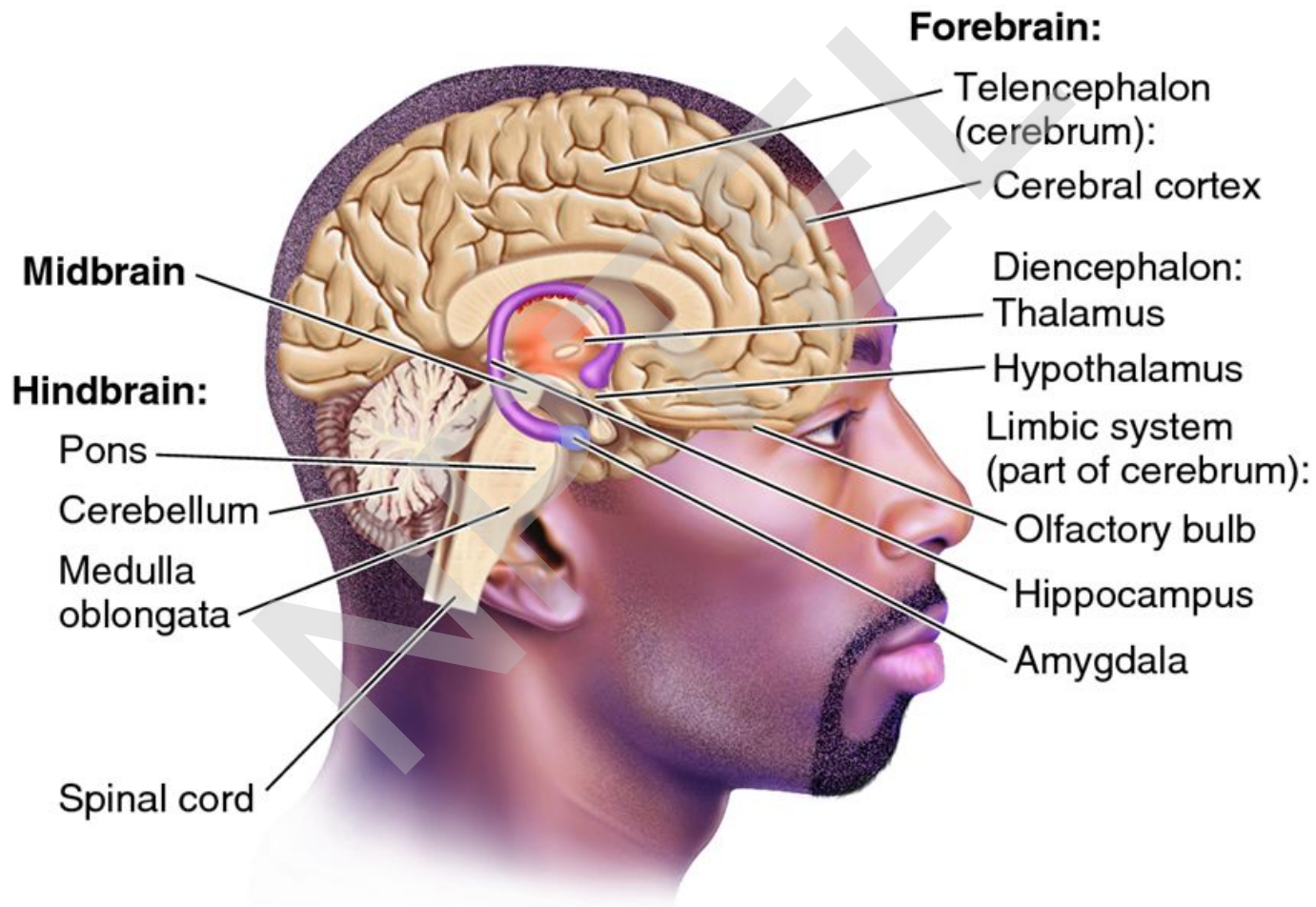
When the diencephalon recognizes fear, the neo cortex can use judgment to recognize the stimulus as nonthreatening and override the fear

# The role of the Diencephalon

Diencephalon is made up of the **thalamus** and **hypothalamus**

- **Thalamus:** relays sensory impulses from other parts of the nervous system to the cerebral cortex
- **Hypothalamus:** lies under the thalamus  
important in stress reactivity  
Activates the **Autonomic Nervous System**

# Brain structures





# The Autonomic Nervous System (ANS)

- The ANS regulates visceral activities and vital organs

## Functions:

- respiration
- temperature regulation
- digestion
- circulation

# Sympathetic Nervous System

- fight-or-flight response
- This physical arousal is stimulated through the release of hormones
  - epinephrine (adrenaline)
  - norepinephrine (noradrenaline)

# Parasympathetic Nervous System

- Maintains homeostasis - acetylcholine
- energy conservation and relaxation

# What happens when we encounter a stressor?

- In the presence of a stressor, the different sense organs and bodily parts (eyes, nose, muscles, etc.) acknowledges the stressor and passes a message to the brain
- These messages pass through the Reticular Activating System to the limbic system and the thalamus
- The emotion evolves in the limbic system and the thalamus send it to the appropriate centres

During stress -

- The hypothalamus activates the endocrine system and the autonomic nervous system

# To Summarize...

**A BRIEF OUTLINE OF THE NERVOUS SYSTEM**

**AN OVERVIEW OF STRESS PHYSIOLOGY**

**NEXT SESSION: ENDOCRINE SYSTEM AND HPA AXIS**

**THANK YOU**

# STRESS MANAGEMENT

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# **STRESS PSYCHOPHYSIOLOGY**



# **MODULE 2**

# OUTLINE

- STRESS AND THE HYPOTHALAMIC PITUITARY ADRENAL AXIS

# Physiological Systems Involved in the Stress Response

- The nervous system
- The endocrine system
- The immune system

**How does the nervous system and the endocrine system function during a stressful situation ?**

# The Endocrine System

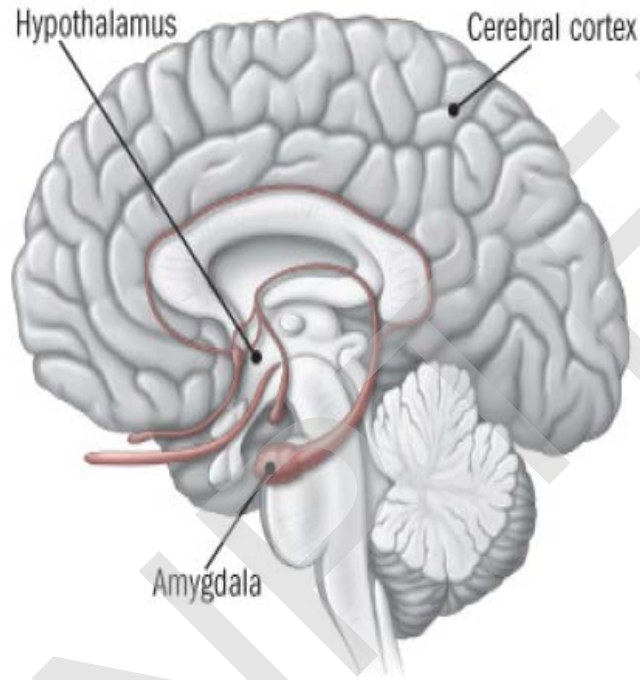
- Consists of a series of hormonal glands located throughout the body which regulate metabolic functions that require endurance rather than speed
- The endocrine system is a network of four components:
  - **glands, hormones, circulation, and target organs**

# The Endocrine System...

- The glands most closely involved with the stress response are the:
  - pituitary
  - thyroid
  - adrenal

# Initiation of the stress response in the brain

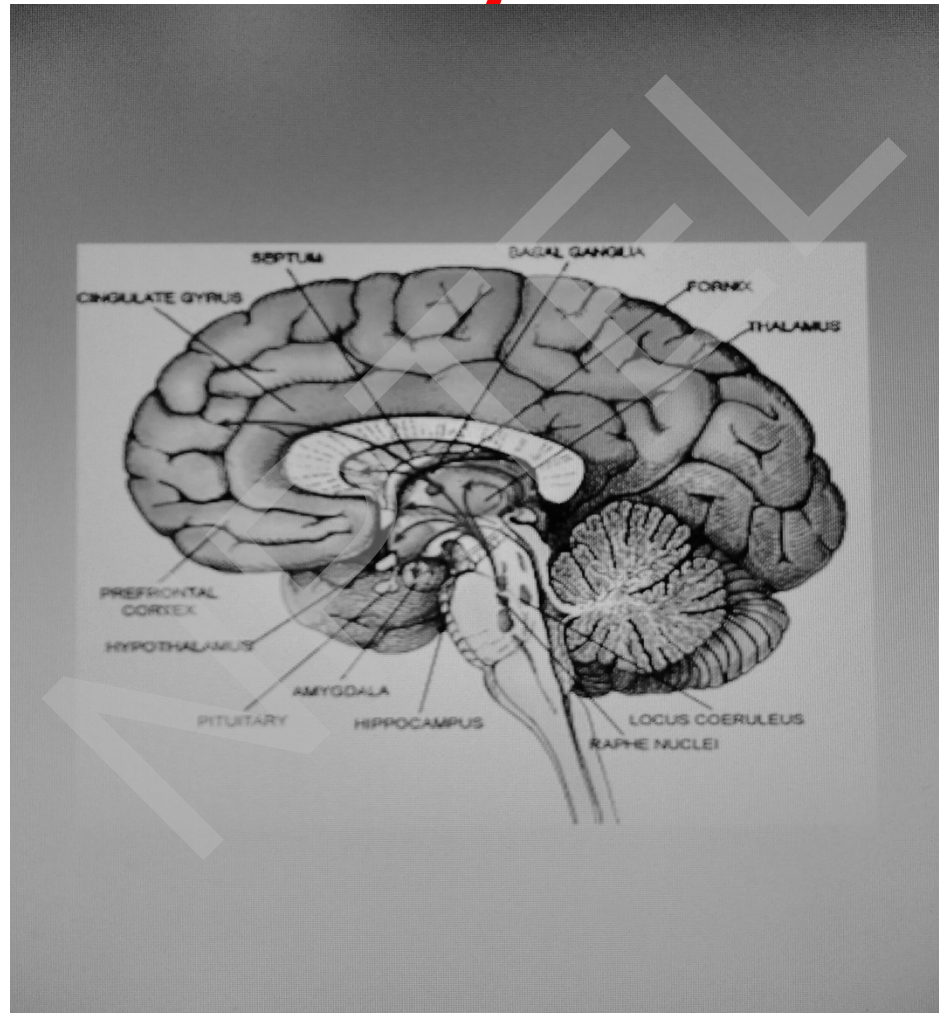
## Command center



The sense organs send information to **amygdala** which interprets images and sounds and sends a distress signal to the **hypothalamus**

The hypothalamus communicates with the rest of the body so that the person can immediately respond to the stressor

# The Amygdala Hypothalamus and the Pituitary Gland



# TRIGGERING THE HPA AXIS

- The Hypothalamic Pituitary Adrenal Axis or HPA axis – best known for its role in body's natural reaction to stress

**HPA axis includes a group of hormone secreting glands from the NERVOUS and ENDOCRINE SYSTEM**

- This network consists of the Hypothalamus, the Pituitary gland and the Adrenal glands



# HYPOTHALAMUS

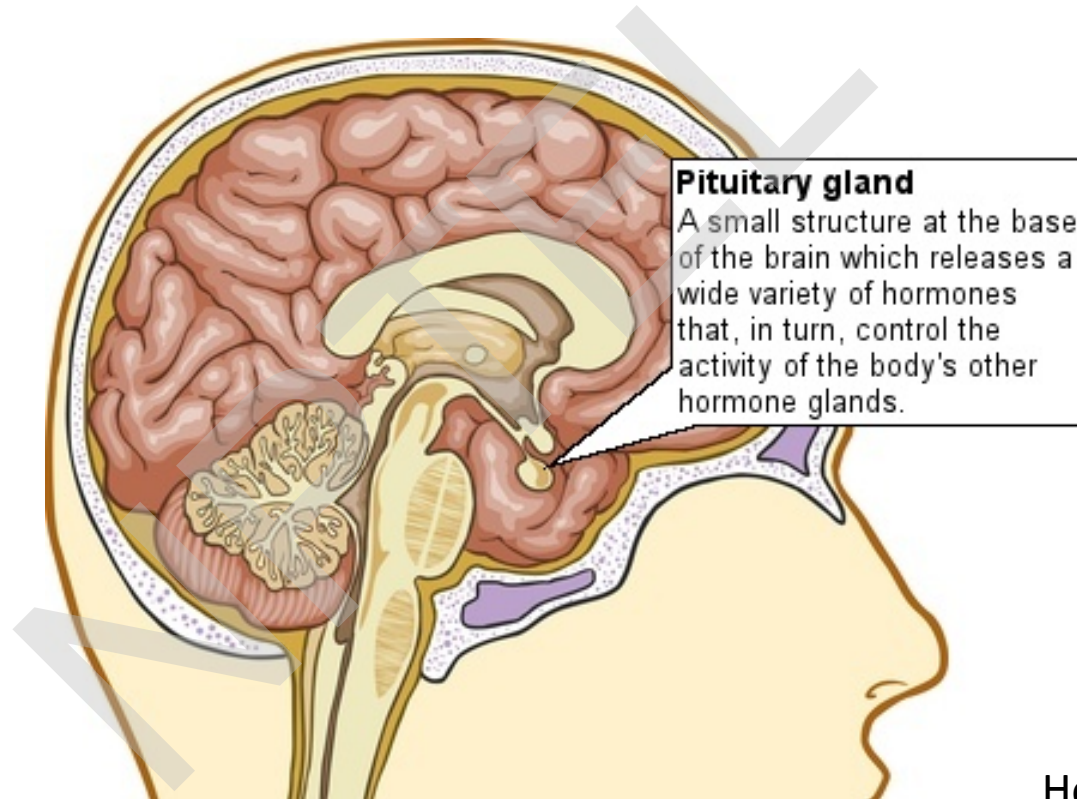
The **Hypothalamus** is a small structure situated **below the Thalamus** and **above the Brain Stem**

**(Hypo – under; In humans it is the size of an almond)**

- It links the nervous system to the Endocrine system via the Pituitary gland
- It controls the release of hormones from the Pituitary Gland – a hormone secreting gland just below the Hypothalamus
- The hypothalamus is like a command centre
- It communicates with the rest of the body through the **AUTONOMIC NERVOUS SYSTEM → SYMPATHETIC NERVOUS SYSTEM**

# THE PITUITARY GLAND

The Pituitary gland (master gland) is a pea sized structure located below the Hypothalamus



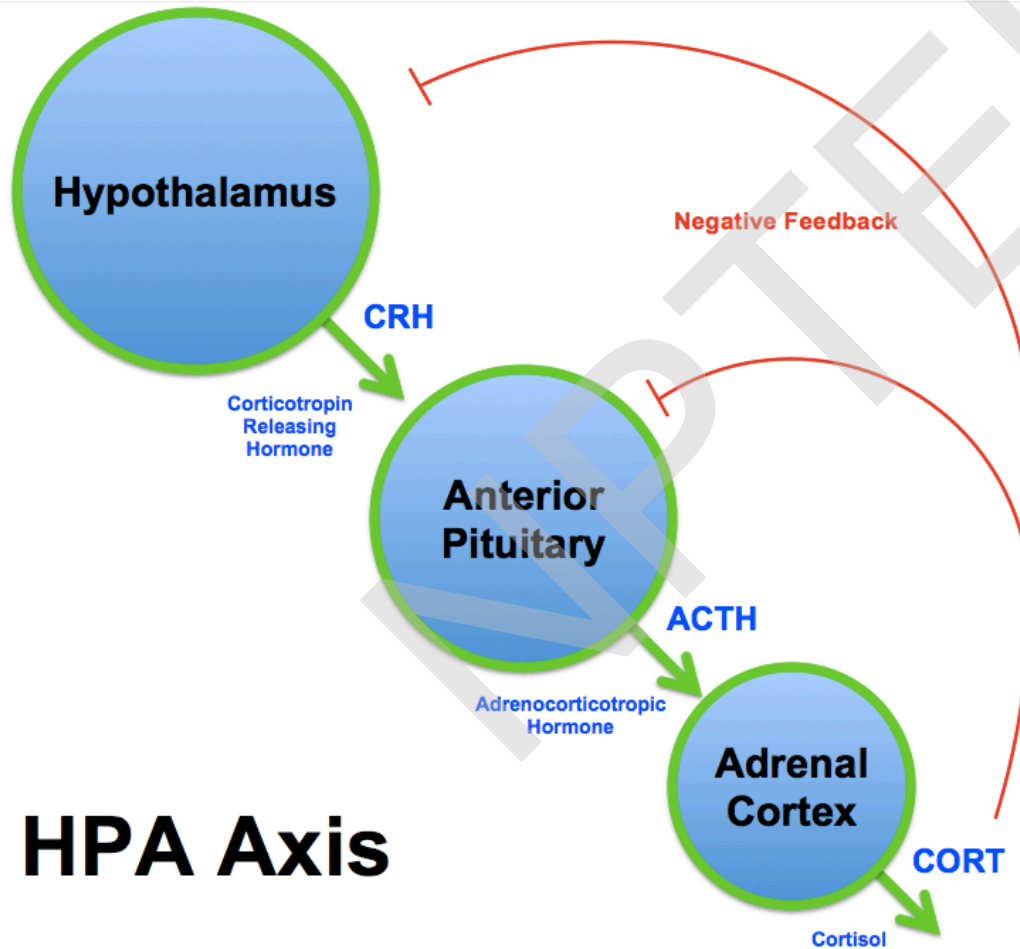
Headway.org.uk

During stress it releases Adrenocorticotrophic Hormone (ACTH) which stimulates the adrenal stress hormone, cortisol

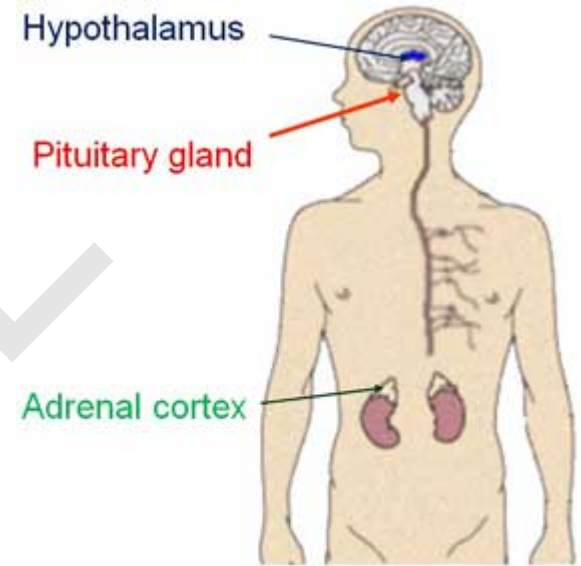
# ADRENAL GLAND

- The **adrenal gland** is located at the top of each kidney; therefore each person has two Adrenal glands. It is divided into 2 parts:
- **The Adrenal cortex:** mineralocorticoids, glucocorticoids, gonadocorticoids
- **Adrenal Medulla:** epinephrine, norepinephrine

# TRIGGERING THE HPA AXIS



**HPA Axis**



# TRIGGERING THE HPA AXIS

**When one experiences a stressful event:**

- the hypothalamus releases a hormone called the Corticotrophin Hormone (CRH)
- CRH signals the Pituitary Gland to secrete the Adreno Cortico Tropic Hormone (ACTH) into the blood stream
- ACTH travels down to the Adrenal glands where it prompts the release of Glucocorticoids from the Adrenal Cortex
- One of these Glucocorticoids is Cortisol which plays an important role in stress response
- With increased cortisol level → Epinephrine and Norepinephrine (hormones) secreted from Adrenal Medulla

# HPA axis...

- As epinephrine circulates through the body, it brings on a number of physiological changes:
  - The heart beats faster than normal
  - pushing blood to the muscles, heart, and other vital organs
  - Pulse rate and blood pressure go up
  - The person undergoing these changes also starts to breathe more rapidly
  - Small airways in the lungs open wide - the lungs can take in as much oxygen as possible with each breath. Extra oxygen is sent to the brain, increasing alertness
  - Thus, Sight, hearing, and other senses become sharper

- The release of cortisol causes a number of changes that help the body to deal with stress

Eg: Helps body mobilise energy like glucose so that body has enough energy to cope with prolonged stress

- In general, when the threat passes, cortisol levels fall

The parasympathetic nervous system — the "brake" — then dampens the stress response

# HPA axis...

## Negative Feedback Mechanism

cortisol level in blood - high → receptors in  
Hypothalamus → shutting down of the stress response



# Efficiency of the Sympathetic activation

- All of these changes happen so quickly that people aren't aware of them
- Efficient - amygdala and hypothalamus activated before the brain's visual centres process what is happening

# OVERSTRESSED?

- Many people are unable to find a way to put the brakes on stress
- Chronic low-level stress keeps the HPA axis activated

# To Summarize

- The different structures in HPA axis
- How HPA axis works
- Next session: Stress and illness and effect of stress on Immune system

# STRESS MANAGEMENT

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# **STRESS PSYCHOPHYSIOLOGY**

# MODULE 3

# OUTLINE

- STRESS AND THE IMMUNE SYSTEM
  - WHAT IS THE IMMUNE SYSTEM
  - HOW DOES STRESS EFFECT THE IMMUNE SYSTEM
  - WHAT ARE THE MANAGEMENT STRATEGIES

**Stressed out? Lonely or depressed?**  
**“Don't be surprised if you come down with something”**

**Psychologists in the field of  
"psychoneuroimmunology" have shown that state of  
mind affects one's state of health**



# Physiological Systems Involved in the Stress Response

- The nervous system
- The endocrine system
- The immune system

**How does the immune system function during a stressful situation ?**

# What do we mean by the immune system

- The immune system is the body's form of defense
- The immune system is a collection of billions of cells that travel through the bloodstream. They move in and out of tissues and organs, defending the body against foreign bodies (antigens), such as bacteria, viruses and other micro organisms
- The immune system is comprised of organs, tissues, cells and cell products that all work together to fight harmful substances like the pathogens that cause infection and disease
- The white blood cells (leukocytes), which are the main fighter cells of the immune system are made up of three classes: **lymphocytes**, **monocytes**, and **granulocytes**

# The cells

- The main types of immune cells are white blood cells. There are two types of white blood cells – **lymphocytes and phagocytes**

There are two types of **lymphocytes**:

- **B cells**- produce antibodies which are released into the fluid surrounding the body's cells to destroy the invading viruses and bacteria
- **T cells** - if the invader gets inside a cell, the T cells lock on to the infected cell, multiply and destroy it

Think about your last bad day. How did you feel? Were you a little more tired than usual? Did you feel unusually fatigued? The chances are you probably did

## Why does this happen?

- No one really knows for sure why the immune system acts weak when one thinks it should function strongly
- The evolutionary perspective: the immune system is suppressed during periods of stress to serve as a protective function in the evolution of our species
  - The belief is that it helps prevent people from developing autoimmune diseases

Carson, Butcher, & Mineka, 2002

# How does stress effect immune system?

- When we're stressed, the immune system's ability to fight off antigens is reduced. That is why we are more susceptible to infections
- The stress hormone corticosteroid can suppress the effectiveness of the immune system (e.g. lowers the number of lymphocytes)
- Stress can also have an indirect effect on the immune system as a person may use unhealthy behavioral coping strategies to reduce their stress, such as drinking and smoking
- Stress is linked to: headaches; infectious illness (e.g. 'flu); cardiovascular disease; diabetes, asthma and gastric ulcers

# HISTORY OF RESEARCH IN STRESS AND IMMUNE SYSTEM

- In the early 1980s, psychologist Janice Kiecolt-Glaser, and immunologist Ronald Glaser, of the Ohio State University College of Medicine, were intrigued by animal studies that linked stress and infection. From 1982 through 1992, they studied medical students
- Among other things, they found that the students' immunity went down every year under the simple stress of the three-day exam period
- Test takers had **fewer natural killer cells**, which **fight tumors and viral infections**
- They almost **stopped producing immunity-boosting gamma interferon** and infection-fighting T-cells responded only weakly to test-tube stimulation

- Think about yourself during a stressful situation
- Hospital visits at IIT Kharagpur

- Suzanne Segerstrom and Gregory Miller(2004) – found that:  
For stress of any significant duration - from a few days to a few months or years, as happens in real life - all aspects of immunity went downhill
- Thus long-term or chronic stress, through too much wear and tear, can ravage the immune system → Hans Selye (1956) and the G-A-S



# Endocrine system and immune system

- Brain sends defense signals to Endocrine system
  - ↳ releases hormones for emergency situations
  - depresses immunity

# STRESS AND ALLOSTATIC LOAD

- The primary hormonal mediators of the stress response, glucocorticoids and catecholamines, have both protective and damaging effects on the body

In the short run: they are essential for adaptation, maintenance of homeostasis, and survival (Allostasis)

over longer time intervals: they exact a cost (Allostatic load) that can accelerate disease processes

*Allostasis and Allostatic load centre around the brain as interpreter and responder to environmental challenges and as a target of those challenges*

While homeostatic changes (such as ANS response to acute threat) may be adaptive, maintaining an allostatic state in the long term causes physiological wear and tear, leading to pathology

LeMoal, 2007

The *allostatic load model* aims to explain why biological changes designed to *protect* the organism can also be *harmful*

Sterling and Eyer, 1988

# Allostasis and homeostasis

- Adrenal glands promote Allostasis (protective mechanism) together with other catecholamines by helping to move immune cells ('trafficking') to organs and tissues where they're needed to fight infection. But chronic over-activity of these same mediators can produce immunosuppressive effects McEwan and Seeman, 1999

**Allostatic load takes the form of chemical imbalances as well as perturbations in the diurnal rhythm in:**

- anxiety disorders
- *depressive illness*
- *hostile and aggressive states*
- *substance abuse*
- *post-traumatic stress disorder (PTSD)*

# In chronic stress... the protein status

- Chronic stress lower amounts of a protein that is critical to signaling other immune cells

# Effect of stress on immune system

- Stress has a direct, negative effect on the immune system:
  1. It creates chronic inflammatory conditions
  2. It lowers the immunity healthy individuals

# TRIGGERING THE HPA AXIS

**When one experiences a stressful event:**

- the hypothalamus releases a hormone called the Corticotrophin Hormone (CRH)
- CRH signals the Pituitary Gland to secrete the Adreno Cortico Tropic Hormone (ACTH) into the blood stream
- ACTH travels down to the Adrenal glands where it prompts the release of Glucocorticoids from the Adrenal Cortex
- One of these Glucocorticoids is Cortisol which plays an important role in stress response
- With increased cortisol level → Epinephrine and Norepinephrine (hormones) secreted from Adrenal Medulla

# Cortisol and immune system:

- Cortisol levels go too low or too high - lead to regular infections, chronic inflammation, autoimmune diseases or allergies

**Maintaining a balanced level of cortisol is an important part of staying healthy**

- One of cortisol's many functions is to reduce inflammation
  - **When your body encounters a pathogen (bacteria virus or microorganism that can cause disease), the immune system responds by quickly attacking it**

**This causes inflammation** (it means the immune system is working)

In those with healthy immune and endocrine systems, cortisol works to moderate the inflammation caused by an immune system response, but it does not completely eliminate it

# Cortisol and immune system:

- Cortisol levels can become imbalanced during the different stages of **adrenal fatigue**

Cortisol levels largely depend on which stage of the condition you have reached

In the early stages of Adrenal Fatigue, cortisol levels are likely to be elevated, along with epinephrine and norepinephrine.

In the later stages of Adrenal Fatigue, cortisol levels will be much, much lower

Neither result is beneficial for your immune system



# Elevated cortisol

- Adrenal Fatigue → HPA axis produces stress hormones
- Cortisol level is high - suppresses the immune system and reduces inflammation
- **Why does the body do this?**

- **A suppressed immune system leaves us vulnerable to disease**
- Individuals in chronic long term stress tend to suffer disproportionately from cold and flu viruses, as well as bacterial infections

# Looking at Cushing's syndrome

- This condition is sometimes known as hyper-cortisolism and is recognized through excessively high levels of cortisol

“Cushing's syndrome, with its elevated cortisol levels, certainly suppresses the immune system. Patients with Cushing's syndrome are at risk for many unique and unusual infectious diseases”

Cushing's Support and Research Foundation

# Lowered cortisol

## (One of cortisol's many functions is to reduce inflammation)

- When body encounters a pathogen (bacteria virus or microorganism that can cause disease), the immune system responds by quickly attacking it)
- When Cortisol falls too far below the optimal level then you are completely removing the safety valve that prevents your immune system from over-reacting to threats
- During the later stages of Adrenal Fatigue the adrenal glands become tired, depleted and unable to produce the hormones that your body needs
- Cortisol levels begin to fall rapidly and the Adrenal Fatigue sufferer quickly switches from having too much cortisol to having very little indeed

# Lowered cortisol

- This means that the regulating anti-inflammatory effect of cortisol is absent. Without sufficient cortisol, there is nothing to prevent severe, chronic inflammation. In effect, the immune system is running out of control.
- **Low cortisol leads to increased production of pro-inflammatory cytokines, which lead to an over-activation of the immune system and inflammation**
- The result is increased susceptibility to developing inflammatory diseases, including autoimmune diseases, mood disorders, malignancy, chronic fatigue syndrome, chronic pain syndromes, obesity, glucose dys-regulation and fibromyalgia (widespread muscle pain and tenderness)

# An interesting study...

Pressman and Cohen, 2005 in a study of first year college students found that social isolation and feelings of loneliness each independently weakened first-year students' immunity

- The students got flu shots at the Carnegie Mellon University health center, described their social networks, and kept track of their day-to-day feelings using a handheld computer (a new technique called "momentary ecological awareness"). They also provided saliva samples for measuring levels of the stress hormone cortisol

## Findings:

Small networks and loneliness each independently weakened immunity to a core vaccine component.

Immune response was most weakened by the combination of loneliness and small social networks, an obvious health stress facing shy new students who have yet to build their friendship circles

# An interesting study...

These findings extend what we know about how stress management and interpersonal relationships can benefit day-to-day health, doing everything from helping us combat the common cold to speeding healing after surgery

The research is in synch with anecdotal reports of how people get sick in stressful times, but understanding exactly *how* psychology affects biology helps scientists to recommend the best ways we can build up immunity

# How to deal with the immune system

- Finally, the newest findings on social stress underscore the value of good friends; even just a few close friends can help someone feel connected and stay strong
- Social ties may indirectly strengthen immunity because friends - at least health-minded friends -- can encourage good health behaviors such as eating, sleeping and exercising well
- Good friends also help to buffer the stress of negative events



# How to deal with the immune system

- Because the effects of stress are cumulative, even ordinary, day-to-day activities can eventually lead to more serious health issues. So it's important to be aware of the simple daily stress in our lives

# How to deal with the immune system

Some of the mind-body therapies that help reverse that are:

- **Relaxation exercises:**
- **Positive thinking:**
- **Behaviour Modification techniques:**
- **Social support:**

# To remember....

- The immune system is not an isolated entity from the psychosocial state of an individual
- A person experiences many stressors throughout a day and lifetime.
- These stressors are affecting the ability of the immune system to function at the highest possible level. Many important studies have shown that there is a correlation between these stressors and a person's health
- A person's psychological state is also a prominent factor in health

**Thank you**

# STRESS MANAGEMENT

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# **STRESS PSYCHOPHYSIOLOGY**

# MODULE 4

# OUTLINE

- HEALTH RISK ASSOCIATED WITH CHRONIC STRESS
  - EFFECT OF STRESS ON THE VARIOUS SYSTEMS OF THE BODY
    - ILLNESSES RELATED TO STRESS



**Stress is commonly assumed to play a role in the etiology, exacerbation, and maintenance of several health problems**

Chronic stress may cause disease,  
either because of

*Changes in your body*

or

*Overeating, smoking and other bad  
habits people use to cope with stress*

(APA,2013)

# Stress and the Musculoskeletal System

**Muscle tension, muscle atrophy → stress-related musculoskeletal conditions**

- **response to the injury → suffer from chronic pain**

**Relaxation techniques have been shown to effectively reduce muscle tension, decrease the incidence of certain stress-related disorders, such as headache, and increase a sense of well-being**

# Stress and the Musculoskeletal System

- When the body is stressed, muscles tense up
- Chronic stress → muscles guarded
- Triggering stress-related disorders

•

# HEADACHES

- **Migraine Headaches**

- result of a constriction and dilation of the carotid arteries of one side of the head

The carotid arteries are major blood vessels in the neck that supply blood to the brain, neck, and face

- predominant thought on the cause of migraine focuses on emotional stress and tension
- People often have migraines during times of increased emotional or physical stress

**Relaxation techniques have been found successful in the prevention and treatment of migraine**

# HEADACHES

- **Tension Headaches**
  - Dull pain, tightness, or pressure around your forehead or the back of your head and neck
  - Caused by muscle tension accompanying stress

**Relaxation techniques have been found successful in Tension Headaches**

# Cardiovascular System

The heart and blood vessels that provide nourishment and oxygen to the organs of the body

- Their activity coordinated in the body's response to stress
- Acute stress — short-term stress - an increase in heart rate and stronger contractions of the heart muscle, with the stress hormones — adrenaline, noradrenaline and cortisol — acting as messengers for these effects
- Fight or Flight Response - The blood vessels that direct blood to the large muscles and the heart dilate, thereby increasing the amount of blood pumped to these parts of the body elevating blood pressure
- Chronic stress, contribute to long-term problems for heart and blood vessels
- The consistent and ongoing increase in heart rate, and the elevated levels of stress hormones and of blood pressure → increases risk for hypertension, heart attack or stroke

# Stress and Hypertension

- Approximately 90 percent of hypertension is termed essential hypertension and has no known cause
- Stress does not directly cause hypertension, but can have an effect on its development
- Emotional stress is generally regarded as a major factor in the etiology of hypertension
- Stress management has also been employed to control high blood pressure



# Hypertension

## High Blood pressure

- A diagnosis of hypertension may be made when one or both readings are high
  - Systolic (the pressure as the heart pumps blood around the body) is over 140 mmHg
  - diastolic (pressure as the heart relaxes and refills with blood) is over 90 mmHg

# Blood Pressure Ranges

(American Heart Association)

## Normal blood pressure

- below 120 systolic and below 80 diastolic

## Pre-hypertension

- 120-139 systolic or 80-89 diastolic

## Stage 1 high blood pressure (hypertension)

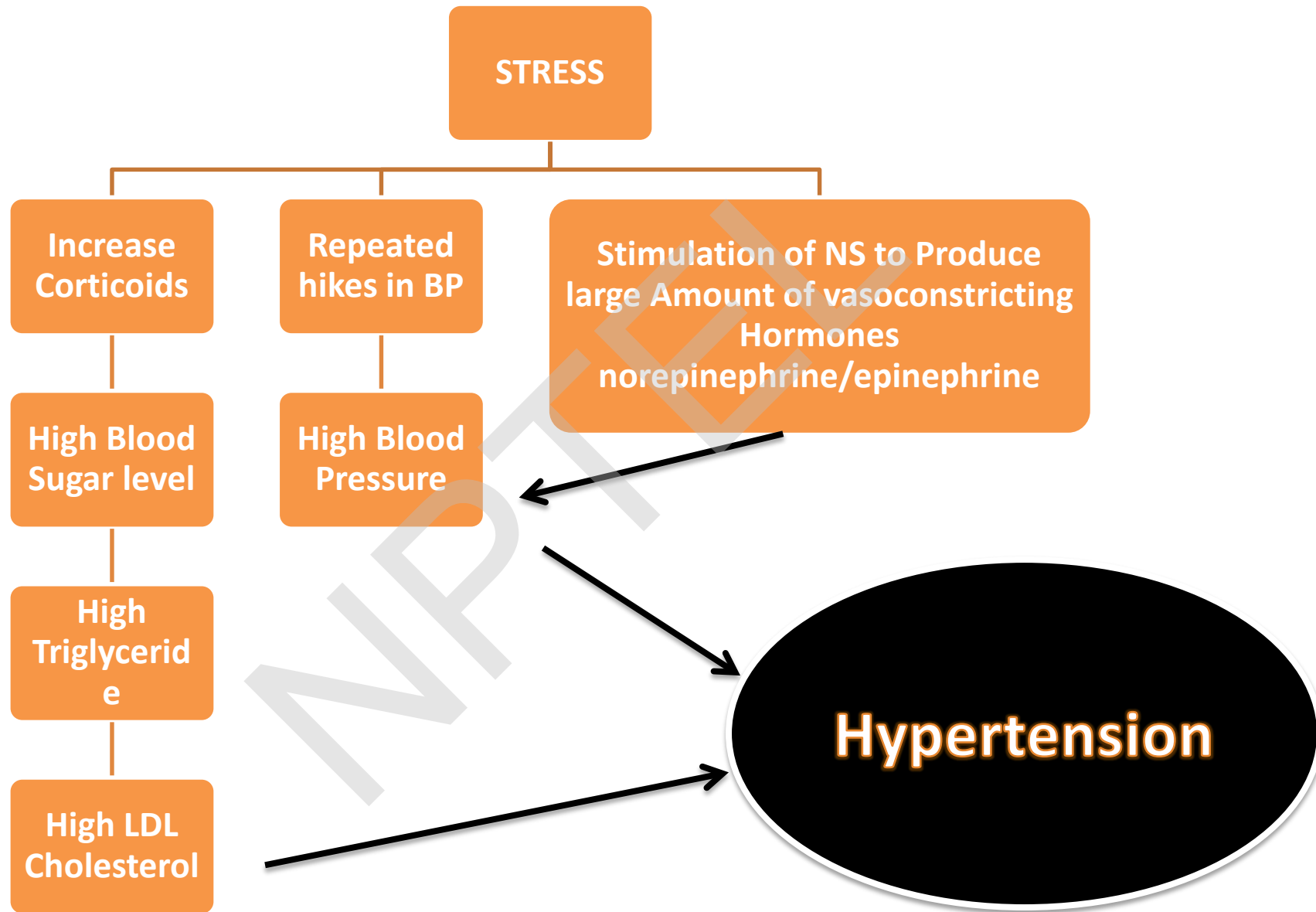
- 140-159 systolic or 90-99 diastolic

## Stage 2 high blood pressure (hypertension)

- 160 or higher systolic or 100 or higher diastolic

## Hypertensive crisis (a medical emergency)

- above 180 systolic or above 110 diastolic



# STRESS and CORONARY HEART DISEASE

- Increased serum cholesterol
- Accelerated heart rate
- Increased blood pressure
- Increased blood volume
- Smoking ,Overeating, lack of exercise
- High production of **plasma homocysteine**  
(**amino acid-building block of protein**)  
(Anger and Hostility increases homocysteine level)

**Sudden emotional stress can be trigger for serious cardiac problems, including *heart attacks***

# **Coronary Heart Disease**

**Stressed-out, type A personality has a  
higher risk of high blood  
pressure and heart problems**

# Main Characteristics of Type A Behavior

## A sense of time urgency and hostility

***Time urgency*** - This is the feeling that there is not enough time to do all the things that we believe should be done or that we wish to do

***Competitiveness*** - Belittles achievements of others in efforts to feel superior. Perceives other group members as adversaries

***Resentment*** - Harbors feelings of ill will toward others

***Deterministic worldview*** - Believes self to be a pawn of the environment, rather than active determiner of fate

# CHARACTERISTICS OF TYPE A PERSONALITY

***Short-term perspective*** - Deals with problems from the view of immediate consequences

***Impatience*** - Belief that success has been due to the ability to get things done faster than others, and fear of ceasing to do things faster and faster

***Perfectionism*** - Believes, "I can do it best so I will do it." Unable to delegate authority

***Punctuality*** - Always on time

***Tendency to be critical*** - Ruminates over a past mistake

# STROKE

- Stroke is a lack of oxygen in the brain resulting from a blockage or rupture of one of the arteries that supply it
- Depending on the exact location of the brain tissue dying from this lack of oxygen and the amount of time oxygen was denied, paralysis, speech impairment, motor-function impairment, or death may result
- Chronic stress is one of the risk factors for stroke



# Gastrointestinal System

## Esophagus

- When stressed → eating more or different foods increased use of alcohol or tobacco, can result in heartburn or acid reflux
- Stress or exhaustion can also increase the severity of heartburn pain

## Stomach

- When stressed → brain becomes more alert to sensations in your stomach Your stomach can react with "butterflies" or even nausea or pain
- Vomitting → if the stress is severe
- if the stress becomes chronic → developing ulcers or severe stomach pain even without ulcers

## Bowel

- Stress can affect digestion, and what nutrients intestines absorb
- It can also affect how fast food moves through your body leading to diarrhea or constipation

# GASTROINTESTINAL PROBLEMS

## Ulcers

- Stress leads to the production of excessive amounts of hydrochloric acid in the stomach

Lindemann reported 33 out of 41 ulcer patients “developed their disease in close relationship to the loss of an important person”

- Stress is also a common factor in Irritable bowel syndrome

# IRRITABLE BOWEL SYNDROME

IBS is a common disorder that affects the large intestine (colon)

The signs and symptoms of irritable bowel syndrome can vary widely from person to person and often resemble those of other diseases.

Among the most common are:

- Abdominal pain or cramping
- A bloated feeling
- Gas
- Diarrhea or constipation — sometimes alternating bouts of constipation and diarrhea
- Mucus in the stool

For most people, IBS is a chronic condition, although there will likely be times when the signs and symptoms are worse and times when they improve or even disappear completely

# Stress and IBS

- Most people with IBS find that their signs and symptoms are worse or more frequent during periods of increased stress, such as final examinations or the first weeks on a new job  
But while stress may aggravate symptoms, it doesn't cause them

# Respiratory System

- Stress can make breathing harder
- For people with asthma or a lung disease such as emphysema, getting the oxygen you need to breathe easier can be difficult
- Studies show that an acute stress — such as the death of a loved one — can actually trigger asthma attacks, in which the airway between the nose and the lungs constricts
- In addition, stress can cause the rapid breathing — or hyperventilation — that can bring on a [panic attack](#) in someone prone to panic attacks

Working with a psychologist to develop [relaxation and breathing strategies](#) can help

# Endocrine System

When the body is stressed, the hypothalamus signals the autonomic nervous system and the pituitary gland and the process is started to produce epinephrine and cortisol, sometimes called the "stress hormones."

## Liver

- When cortisol and epinephrine are released, the liver produces more glucose, a blood sugar that would give you the energy for "fight or flight" in an emergency. For most the body is able to reabsorb the blood sugar if the energy is not used. **People vulnerable to Type 2 diabetes — the extra blood sugar can lead to diabetes**

In Type I diabetes → very less secretion or no secretion of insulin, and the patient must have daily insulin injections

In the Type II → increased resistance to insulin places an increased demand on the insulin-secretory capacity of the system in individuals who cannot release sufficient insulin to meet these demands

# DIABETES

Stress can worsen diabetes in two ways:

- Increases the likelihood of maladaptive behaviors, such as unhealthy eating and excessive drinking
- Stress seems to raise the glucose levels of people with type 2 diabetes directly

Who's vulnerable? Obese and genetic disposition inclined to diabetes

**Studies show that if you learn how to manage stress, you can control your blood sugar level**

# OBESITY

- Excess fat in the belly seems to pose greater health risks than fat on the legs or hips -- and unfortunately, that's just where people with high stress seem to store it
- Higher levels of the hormone cortisol increase the amount of fat that's deposited in the abdomen



# CANCER

Chronic stress increases rates of cancer development and growth

## **Long-term exposure of stress hormones causes:**

- DNA damage and impaired immune function
- increase inflammation through the production of inflammatory proteins (cytokines) → impair immune function and promote cancer growth
  - Reduce the ability of abnormal cells to undergo apoptosis (cell death) and DNA repair
- Promote tumor cell growth

# STRESS AS RESPONSE TO ILLNESS

- In addition to the effects that stress may have in the etiology or development of various physical illnesses, the illnesses themselves, and their associated treatments, also constitute stressors the individual must confront

## Stressors Associated with Medical Illness and Treatment

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- Threats to life and fears of dying
- Threats to bodily integrity and comfort (from the illness, the diagnostic procedures, or the medical treatment itself)
  - Bodily injury or disability
  - Permanent physical changes
  - Physical pain, discomfort, and other negative symptoms of illness or treatment
  - Incapacitation
- Threats to one's self-concept and future plans
  - Necessity to alter one's self-image or belief systems
  - Uncertainty about the course of the illness and about one's future
  - Endangering of life goals and values
  - Loss of autonomy and control
- Threats to one's emotional equilibrium, that is, the necessity to deal with feelings of anxiety, anger, and other emotions that come about as a result of other stressors described
- Threats to the fulfillment of customary social roles and activities
  - Separation from family, friends, and other social supports
  - Loss of important social roles
  - Necessity to depend on others
- Threats involving the need to adjust to a new physical or social environment
  - Adjustment to the hospital setting
  - Problems in understanding medical terminology and customs
  - Necessity for decision making in stressful and unfamiliar situations

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*Note.* From "Coping with the Stress of Illness" by F. Cohen and R. S. Lazarus in *Health Psychology: A Handbook* (p. 229) edited by G. C. Stone, F. Cohen, and N. E. Adler. Copyright 1979 by Jossey-Bass, Inc.

# STRESSORS INDIRECTLY INFLUENCING HEALTH OUTCOME

- Stressors can also have an indirect effect on health outcome. That is, exposure to a major life event or events may be associated with the occurrence of some type of accident that affects health status
- **Cooper and Leuchtag (1982) - stress of a family move on children's burn accidents**
  - A period at 2 to 5 months after the move, was identified as critical, when the child is particularly vulnerable to burn accidents
  - These findings were concordant with subjective reports of stress:
    - 66% of the movers, in contrast to 34% of the non-movers,
    - indicated that they felt the family had been under greater stress than usual over the year before the burn accidents

# Is it possible to encounter stress and remain healthy?

- **Kobasa *et al.* (1979)** based their investigation on the anecdotal observation that certain individuals, regardless of exposure to stress, somehow manage not to succumb to stress disorders
- **Kobasa *et al.* (1979)** studied two groups of managers from a large public utility in a major metropolitan area. Two groups of subjects were identified as either high in stress but low in illness or high in stress and high in illness

# The results...

- high stress/high illness → more alienated from self
- High stress/low illness → less nihilistic than high stress/high illness subjects

indicating a belief that one can control events in one's environment

- High stress/low illness → more interested in novel experience, more oriented toward achievement displayed greater endurance
- High stress/low illness subjects → perceived less threat in personal, financial, and interpersonal areas than high stress/high illness subjects

# To summarise...

- HEALTH RISK ASSOCIATED WITH CHRONIC STRESS
  - EFFECT OF STRESS ON THE VARIOUS SYSTEMS OF THE BODY
    - ILLNESSES RELATED TO STRESS

NOTEL



# Stress and Psychiatric Disorders

- Stress → Associated with negative events
- Positive events and experiences may be stressful as well
- Meaninglessness in life or lack of goal

# Stress and Psychiatric Disorders

- Stress is anything that challenges a person, requiring some kind of adaptation
- Serious stressful events include losing a loved one, getting fired from a job, being a victim of crime, or having conflicts with close people
- Stress in the environment can worsen biological vulnerability, worsen symptoms and cause relapses

# **DIFFERENCES BETWEEN STRESS AND ANXIETY**

**Everyone expresses stress and anxiety at one time or another**

**The difference between them is that**

**Stress is response to a threat**

**Anxiety is a reaction to the stress**

# Anxiety Disorders

## Generalized Anxiety Disorders

- If the anxiety is manifested as uncontrollable and excessive anxiety and worry about events or activities  
(e.g., finances or school performance)
- Typically the worry is combined with somatic symptoms or other anxiety symptoms such as restlessness, fatigue, irritability, muscle tension, and concentration and sleep difficulties

# Anxiety Disorders

- **Panic Attack**

-Feelings of terror that strike suddenly and repeatedly with no warning.

**Symptoms:**

- "Racing" heart, Feeling weak, faint, or dizzy chest pain
- Tingling or numbness in the hands and fingers
- Sense of terror, or impending doom or death
- Feeling sweaty or having chills
- Breathing difficulties
- Feeling a loss of control

# Anxiety Disorders

- **Obsessive-Compulsive Disorder**

- *Obsessions* are persistent thoughts, impulses, or images
- *Compulsions* are repetitive behaviors such as hand washing and checking or mental activities such as praying or silently repeating words.
- The essential features of OCD are recurrent, uncontrollable that are performed with the ostensible purpose of reducing anxiety.

# Acute Stress-Reaction

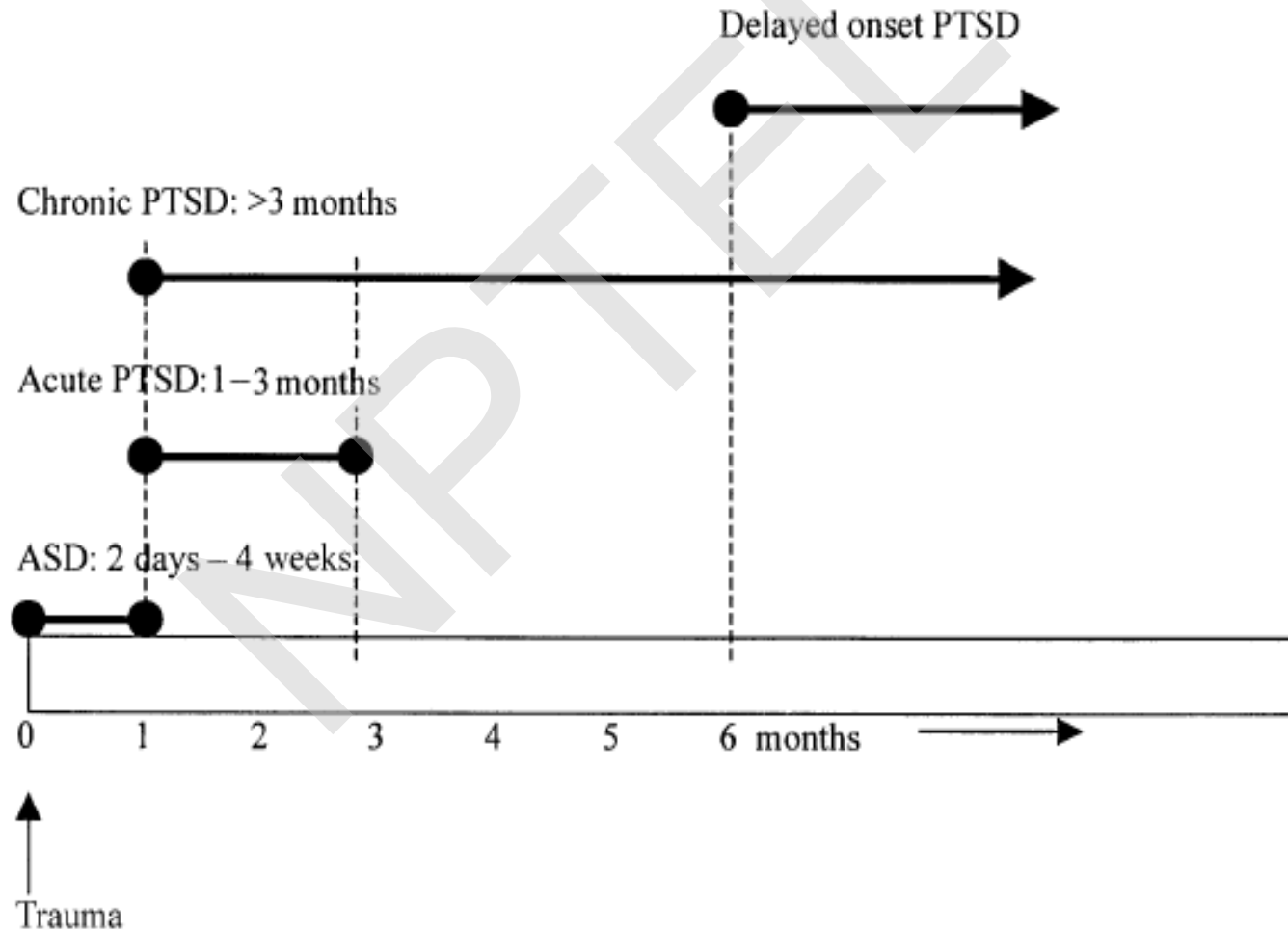
- A mental condition that can occur following exposure to extreme stress or trauma
- Symptoms must last for *at least 2 days up to 4 weeks*.
  - **Intrusive symptoms**
  - **Avoidance**
  - **Hyperarousal**

# POST-TRAUMATIC STRESS DISORDER

- The symptoms last for a period of at least a month following the traumatic event
- **Acute** - symptom duration of 3 months or less) or **Chronic** (symptom duration of more than 3 months).
- The onset of PTSD can be delayed for months and even years.
- **Intrusive reexperiencing , Avoidance, Hyperarousal**



# Time line Comparing ASD and PTSD



# Depression and Stress

Depression is caused by stress or if depression itself is a form of a stressor?

- The stress exposure can cause the glucocorticoid hormone to be overly active which causes a depletion of norepinephrine levels in locus coeruleus neurons. This has an effect of slowing the attentiveness within the individual. They become emotionless and inactive (**Salzano, 2003**).
- **Perceived stress**
- **Sense of lack of control**

**If an individual experiences great anxiety because of constant thought about a stressor, their fight or flight mechanism could be in perpetual heightened response. Just thinking about the stressor could set off the elevated response. These stresses amount to a constant initiating of the response multiple times a day if the thoughts preoccupy the individual**

# Adjustment Disorder

- Development of emotional or behavioural symptoms in response to one or more identifiable psychosocial stressors.
- Chief complaint may be a nervous breakdown, inability to manage problems of life, or anxiety or depression associated with a specific stressor
- Patient's history reveals normal functioning before the onset of the stressor

# Adjustment Disorder -Types

AD with Depressed Mood

AD with Anxiety

AD with Mixed Anxiety and  
Depressed Mood

AD with Disturbance in Conduct

AD with Mixed Disturbance of  
Emotion and Conduct

AD with Unspecified

# Stress and Psychosis

- Stressful events can influence the onset and course of major psychotic disorders
- A 1977 **vulnerability – stress model** by Zubin and Spring
  - relationship exists among the level of **inherited vulnerability**, **stress** that exceeds a certain threshold, and the onset or relapse of psychotic illness

# Schizophrenia and Stress

- **Kudoh, Sakai, Ishiria, & Matsuki, (2001) :**  
**found that Schizophrenic patients have longer healing times after major surgeries**
- **Conclusions:** schizophrenic patients had a reduced ability for cytokine to fight inflammations. The reason for the findings could be explained by a schizophrenic's hypothalamus-pituitary-adrenal dysfunction

## Psychological vulnerability

Genetic diathesis  
Neurodevelopmental  
anomalies  
Neurocognitive  
impairments

## Stressors

Life events  
High expressed emotion  
Daily hassles

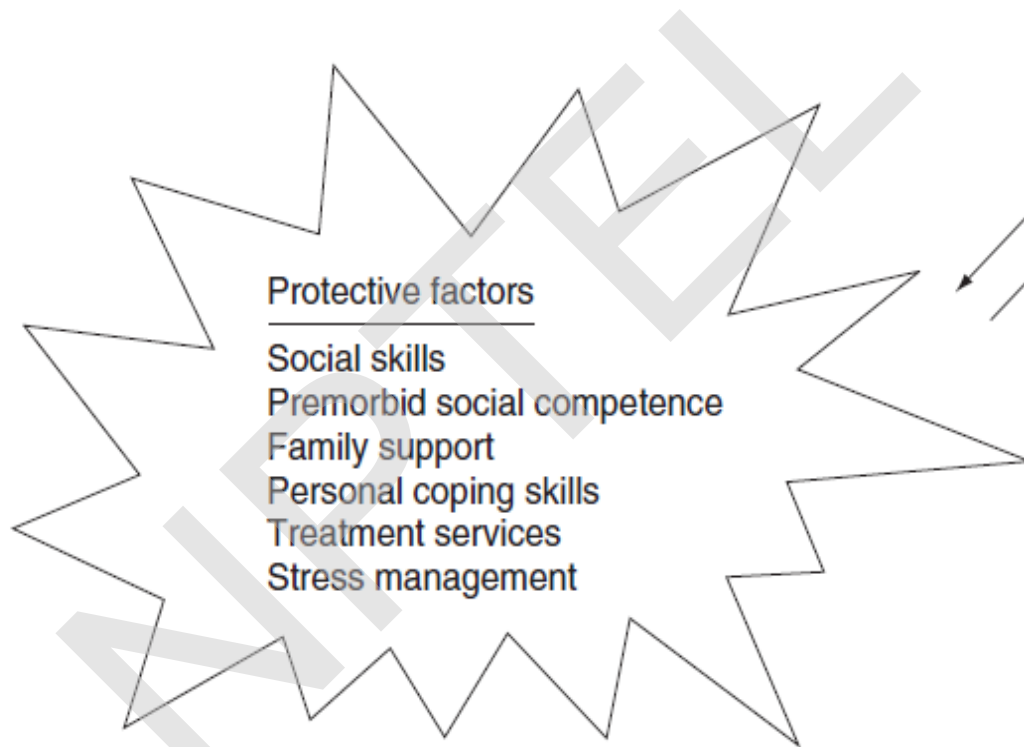
## Protective factors

Social skills  
Premorbid social competence  
Family support  
Personal coping skills  
Treatment services  
Stress management

## Dimensions of outcome

Symptomatic relapse  
and disability

Symptomatic remission  
and functional recovery



# Increasing Resiliency against Stress

- Developing effective coping skills for managing stress and persistent symptoms
- Getting involved in meaningful activities that structure one's time and reduce the stress of having nothing to do
- Building socially supportive relationships that help one manage the mental health disorder and maintain sobriety