

Bear: Neuroscience: Exploring the Brain 3e

◆ Chapter 22: Mental Illness

Slide 1

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Mental Illness and the Brain

- ◆ Human behavior
 - ✦ Product of brain activity
- ◆ Brain
 - ✦ Product of two mutually interacting factors
- ◆ DNA
 - ✦ Determines individualism

Slide 2

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Fear
 - ✦ An adaptive response to threatening situations
 - ✦ Innate and species-specific
 - ✦ Learned
- ◆ Anxiety disorders
 - ✦ Caused by inappropriate expression of fear

Slide 3

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Common Anxiety Disorders
 - ✦ Panic disorder
 - ✦ Agoraphobia
 - ✦ Obsessive-compulsive disorder
 - ✦ Generalized anxiety disorder
 - ✦ Specific phobias
 - ✦ Social phobia
 - ✦ Post-traumatic stress disorder

Slide 4

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

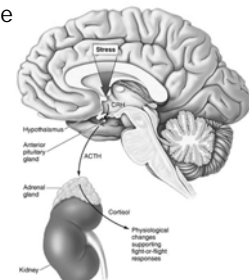
- ◆ Biological Bases of Anxiety Disorders
 - ✦ Fear evoked by threatening stimulus: Stressor
 - ✦ Manifested by stress response
 - ✦ Stimulus-response relationship strengthened (and weakened) by experience
 - ✦ Stress: Corticotropin-releasing hormone (CRH) → adrenocorticotropic hormone (ACTH) → cortisol

Slide 5

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Biological Bases of Anxiety Disorders (cont'd)
 - ✦ Stress Response



Slide 6

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Regulation of the HPA Axis by the Amygdala and Hippocampus
 - ◆ Both regulate CRH neurons
 - ◆ Amygdala projects to bed nucleus of the stria terminalis, which activates the HPA axis
 - ◆ Hippocampus deactivates the HPA axis
 - ◆ Glucocorticoid receptors
 - ◆ Feedback loop
 - ◆ Push-pull style regulation

Slide 7

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Treatments for Anxiety Disorders
 - ◆ Psychotherapy
 - ◆ Anxiolytic Medications
 - ◆ Role of GABA
 - ◆ Benzodiazepines
 - ◆ Serotonin-selective reuptake inhibitors (SSRIs)
 - ◆ Drug target: CRH receptors

Slide 8

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ A Description of Affective Disorders
 - ◆ “Mood” Disorders
 - ◆ Major Depression
 - ◆ Depression
 - ◆ Dysthymia
 - ◆ Bipolar Disorder
 - ◆ Manic-depressive disorder
 - ◆ Mania
 - ◆ Hypomania

Slide 9

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Biological Bases of Affective Disorders
 - ◆ The Monoamine Hypothesis
 - ◆ Problems with diffuse modulatory systems
 - ◆ Reserpine
 - ◆ Monoamine Oxidase (MAO)
 - ◆ Imipramine
 - ◆ Monoamine hypothesis of mood disorders

Slide 10

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Biological Bases of Affective Disorders (cont'd)
 - ◆ The Diathesis-Stress Hypothesis
 - ◆ Genetic and nongenetic
 - ◆ Diathesis
 - ◆ HPA system
 - ◆ Impact of CRH
 - ◆ HPA function
 - ◆ Glucocorticoid receptor
 - ◆ Tactile stimulation process
 - ◆ Factors of mood and anxiety disorders

Slide 11

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

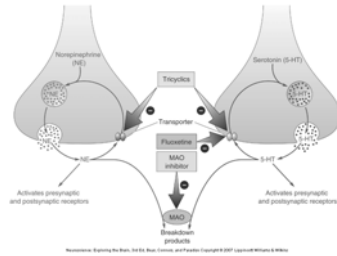
- ◆ Treatments for Affective Disorders
 - ◆ Electroconvulsive Therapy (ECT): Localized electrical stimulation
 - ◆ Advantage of ECT: Quick relief
 - ◆ Adverse effect of ECT: Prior memories, storage of new information
 - ◆ Structures involved: Temporal lobe
 - ◆ Psychotherapy: Help patients overcome negative views

Slide 12

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Treatments for Affective Disorders (cont'd)
 - ✦ Antidepressants

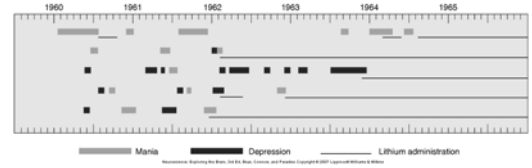


Slide 13

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Anxiety Disorders

- ◆ Treatments for Affective Disorders
 - ✦ Lithium



Slide 14

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Schizophrenia

- ◆ A Description of Schizophrenia
 - ✦ Severe mental disorder
 - ✦ Symptoms of schizophrenia: Loss of contact with reality
 - ✦ Three types of schizophrenia
 - ✦ Paranoid schizophrenia
 - ✦ Disorganized schizophrenia
 - ✦ Catatonic schizophrenia

Slide 15

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Schizophrenia

- ◆ Biological Bases of Schizophrenia
 - ✦ Genes and the Environment
 - ✦ Schizophrenia: A genetic disorder
 - ✦ Schizophrenia and the ventricle to-brain-size ratio
 - ✦ Other structural observation of the brains of schizophrenics
 - ✦ The Dopamine Hypothesis: Psychotic episodes in schizophrenia triggered by activation of dopamine receptors
 - ✦ Neuroleptic drugs

Slide 16

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Schizophrenia

- ◆ Biological Bases of Schizophrenia (cont'd)
 - ✦ The Glutamate Hypothesis
 - ✦ Behavioral effects of phencyclidine (PCP)
 - ✦ Introduced in 1950s as an anesthetic
 - ✦ Inhibits NMDA receptors
 - ✦ Glutamate: Fast excitatory neurotransmitter in the brain, two important receptor subtypes, AMPA and NMDA

Slide 17

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Schizophrenia

- ◆ Treatments for Schizophrenia
 - ✦ Consists of drug therapy combined with psychosocial support
 - ✦ Conventional neuroleptics, such as chlorpromazine and haloperidol, act at D2 receptors
 - ✦ Reduce the positive symptoms of schizophrenia
 - ✦ Also have numerous side effects
 - ✦ NMDA receptor

Slide 18

Neuroscience: Exploring the Brain, 3rd Ed. Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins

Concluding Remarks

- ◆ Impact of neuroscience on psychiatry
- ◆ Mental illness
- ◆ Chemical synaptic transmission is affected by drugs
- ◆ Genes and environment play an important role
- ◆ Environmental stresses may contribute to schizophrenia
- ◆ Appropriate sensory stimulation in early childhood

Slide 19

Neuroscience: Exploring the Brain, 3rd Ed., Bear, Connors, and Paradiso Copyright © 2007 Lippincott Williams & Wilkins