



# Psychopharmacology

## Part 1

Presented by Demetra Antimisiaris, PharmD, CGP, FASCP  
Associate Professor  
Department of Family Medicine and Geriatrics  
Associate, U of L Department of Neurology



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### WHAT IS PSYCHOPHARMACOLOGY?

**Definition**

1. The study of drugs that effect the brain.
  - Therapeutic Purposes
  - Non-Therapeutic Use
    - Short tem abuse (intoxication)
    - Long term effects on neurotransmission
      - Particularly within rewards circuits

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### TODAY

Time	Topics
10:30-12 noon	<ul style="list-style-type: none"> <li>➢ Fear and Anxiety Circuits</li> <li>➢ Connections between substance abuse and anxiety</li> <li>➢ Self Medication</li> </ul>
1:15-2:45 pm	<ul style="list-style-type: none"> <li>➢ Mesolimbic Reward Circuits</li> <li>➢ Substance Abuse Disorders</li> <li>➢ Depressants</li> <li>➢ Stimulants</li> </ul>
3:00-4:45 pm	<ul style="list-style-type: none"> <li>➢ Pain Medications</li> <li>➢ Polypharmacy</li> <li>➢ Cannabis</li> <li>➢ Hallucinogens</li> <li>➢ Steroids</li> </ul>

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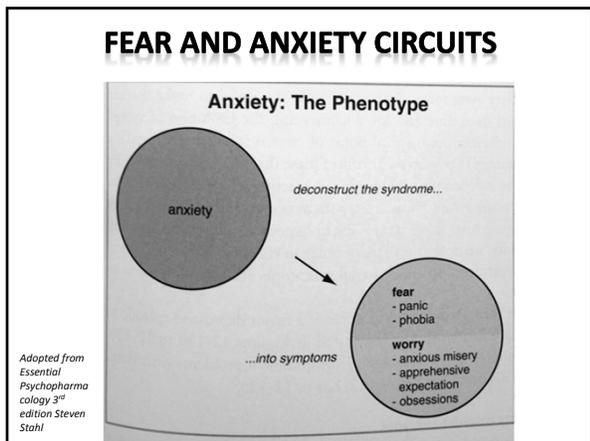
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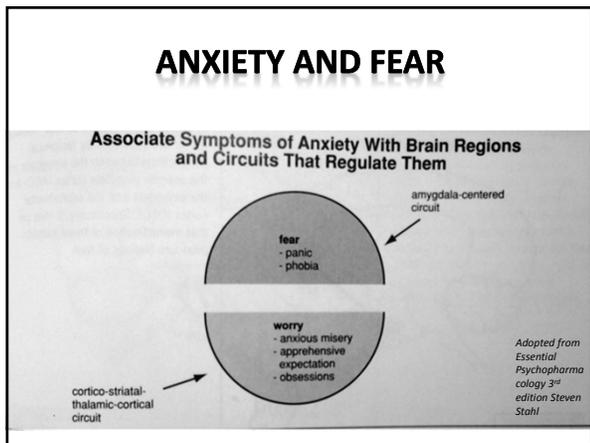
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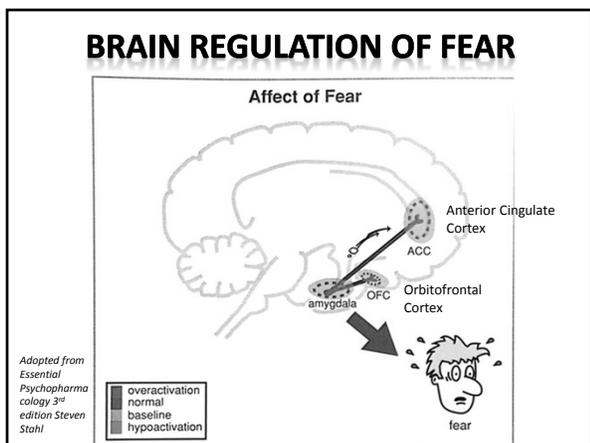
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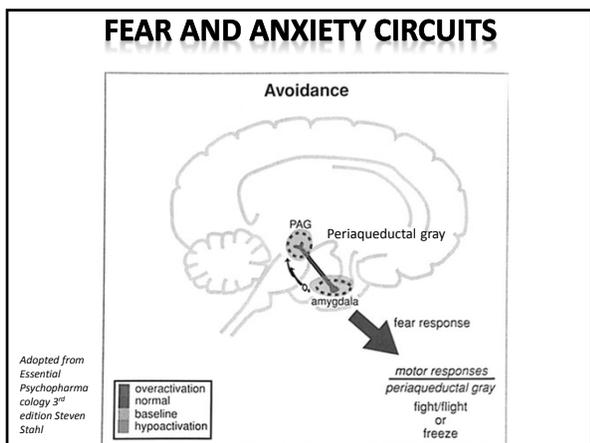
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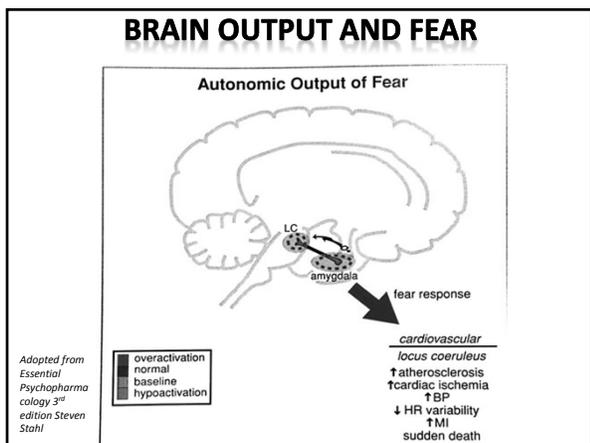
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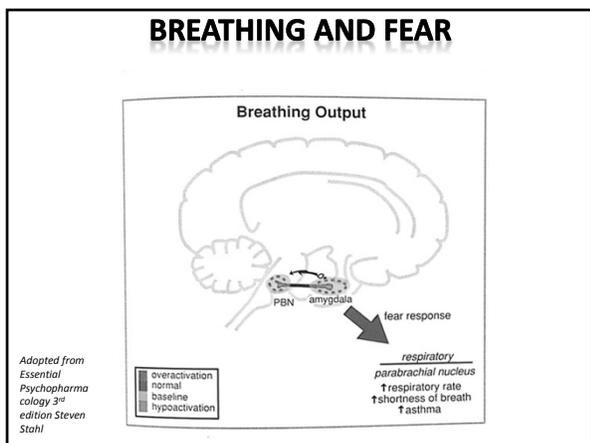
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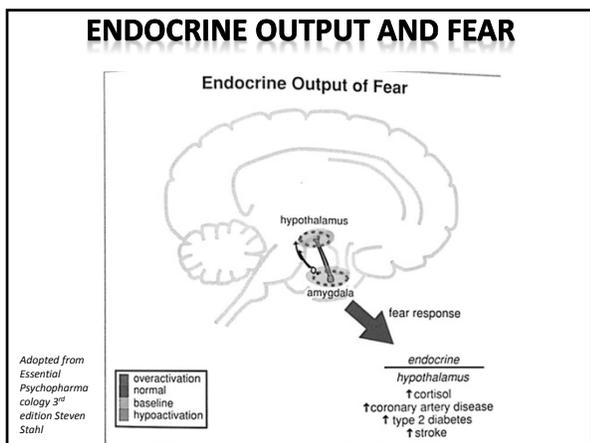
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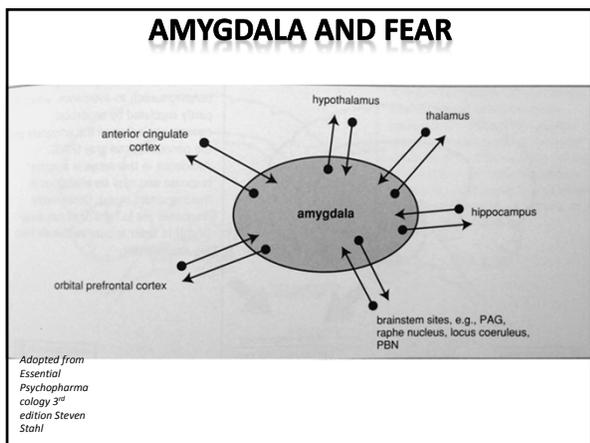
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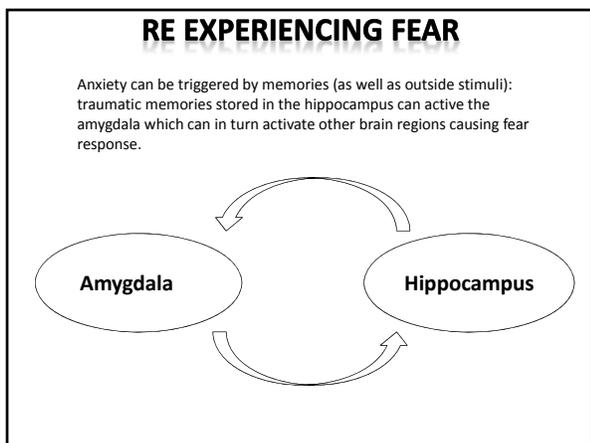
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## IS FEARFULNESS GENETIC?

- SERT1 genotype
- SERT S genotype
  - Serotonin Transporter gene (s type)
  - Amygdala over reacts to fearful situations
  - Determines how well you respond to stress
  - Vulnerability or resilience of fear

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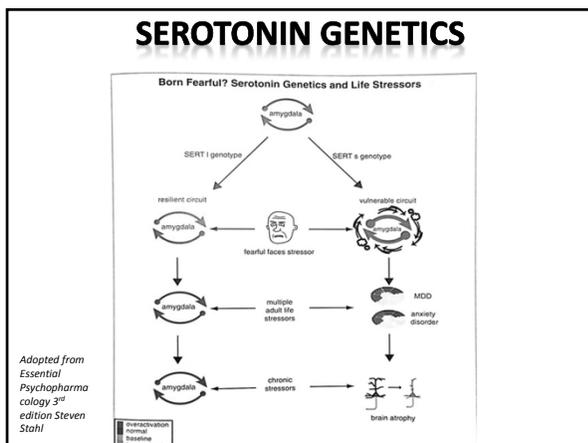
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## SEROTONIN GENETICS




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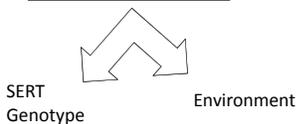
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## SENSITIZATION TO STRESS

### Stress Diathesis Hypothesis of Psychiatric Disorders



All stress in childhood may not be bad. In animal models, exposure to mild stress in infancy can render an animal less reactive to stress later in life than animals not exposed to stress in infancy.

Mild stress may actually desensitize circuits to subsequent stress and produce a type of experience based resilience.

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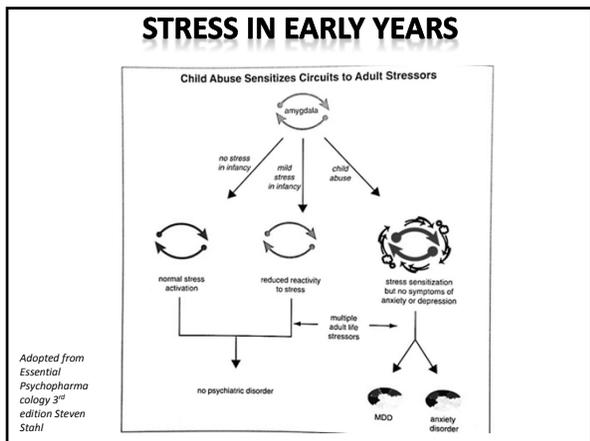
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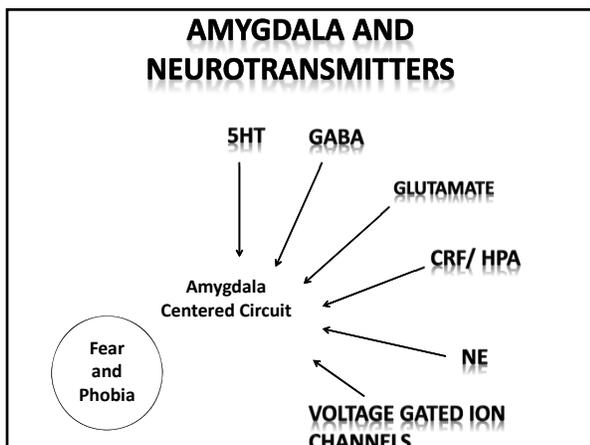
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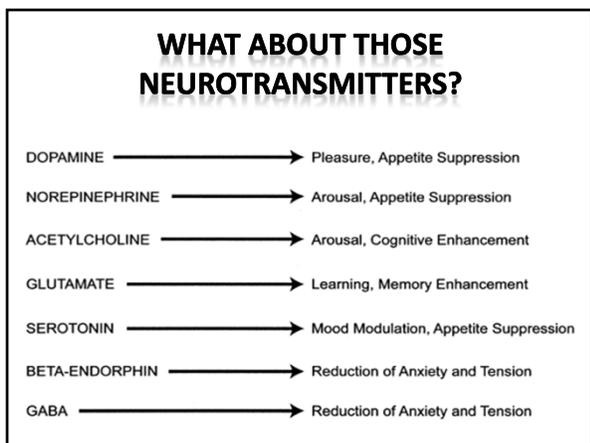
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## SEROTONIN & DOPAMINE



Technically, the only two things  
you enjoy

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### WHAT ABOUT CRF/HPA?

- CRF is Corticotrophin releasing factor
- HPA stands for Hypothalamic-Pituitary-Adrenal Axis.
- Regulation of “steroids” or glucocorticoids to react to stress
  - Cortisol
  - Dopamine
  - Epinephrine
  - Norepinephrine

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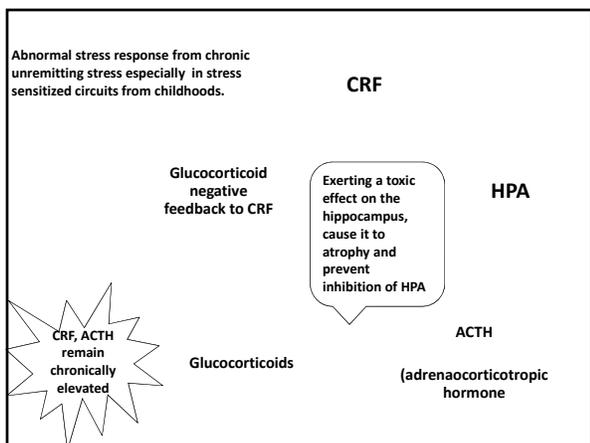
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## ANXIETY AND SUBSTANCE ABUSE

- Substance Abuse
  - Self medicating
    - Initially, a way to alleviate unpleasant symptoms of unmanageable stress.
    - Reward circuitry can overpower the use of substances and turn it into the abuse of substances.
      - Potent behavior reinforcing properties of some psychoactive drugs sustain the need and ability of drug to ameliorate underlying psychosocial symptoms.
      - \*we will discuss this topic next
  - Comorbid psychiatric disorders
    - 78 % of men and 86% of women also have at least one other psychiatric disorder.

*Piazza PV, Le Moal M. "The Role of Stress in Drug Self-Administration" Trends in Pharmacological Sciences 19 (1998): 67-74.*

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## END PART 1

- Questions?
- Comments?
- Connect the Dots?
  - How do substances of abuse act on circuits of fear and stress?

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## CHALLENGE QUESTION:

- Ethanol, the second most widely used psychoactive drug in the world, is used as a sedative and intoxicant.
  - Name a neurotransmitter that EtOH effects to alleviate the effects of stress and anxiety?
    - A potent inhibitor of glutamate receptors (NMDA subtype receptor inhibitor) which disrupts glutamatergic neurotransmission.
    - Glutamate system is excitatory.

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