

What Is Mental Illness?

Understanding Problems With Your Brain

Prepared By Kim B. Barrus, Ph.D., FPPR
Clinical Psychologist
Family Psychological Services, Inc.
Child, Adolescent, and Adult

5014 Chesebro Road
Agoura Hills, California
(818) 707-7366
Email: doctorbarrus@doctorbarrus.com

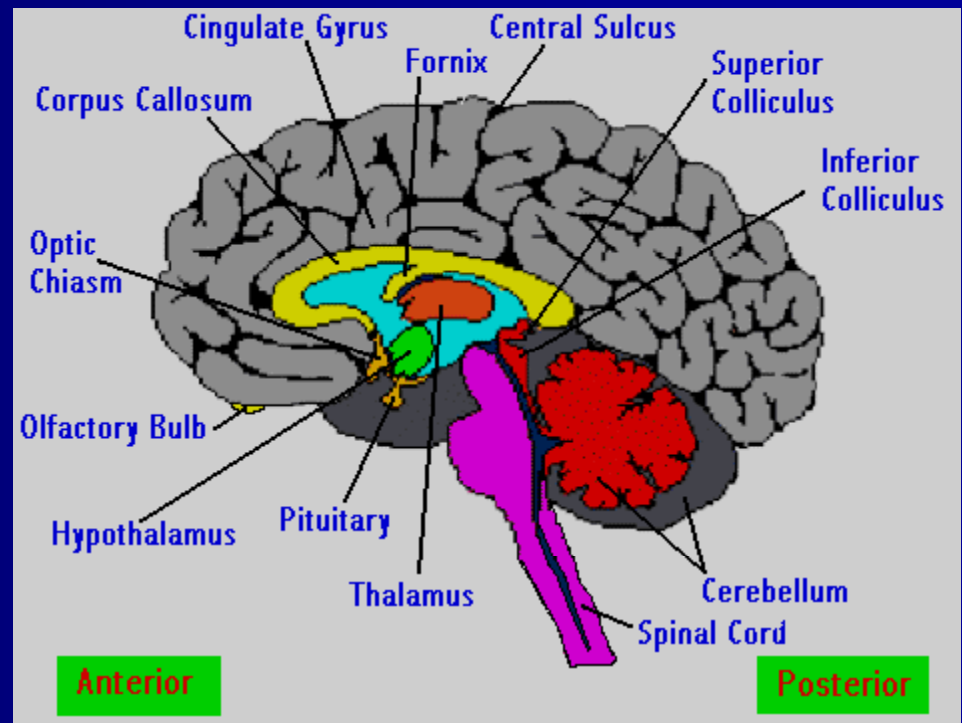
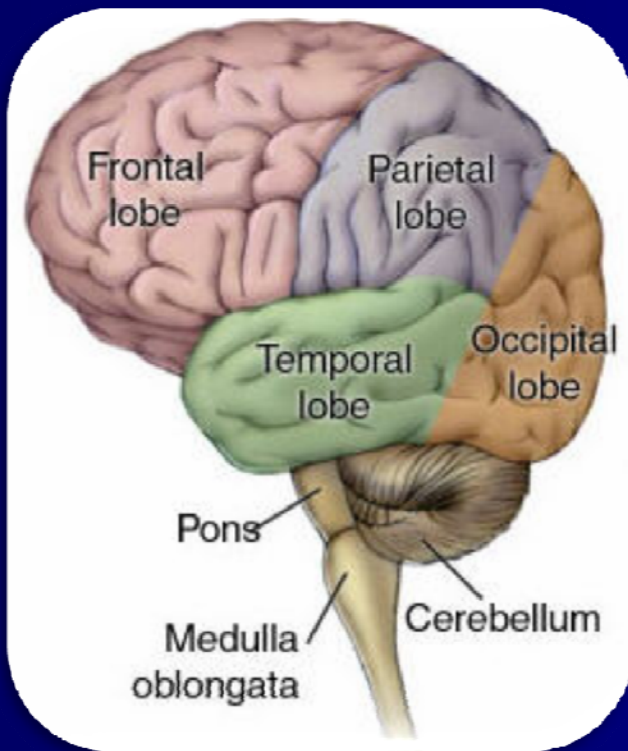
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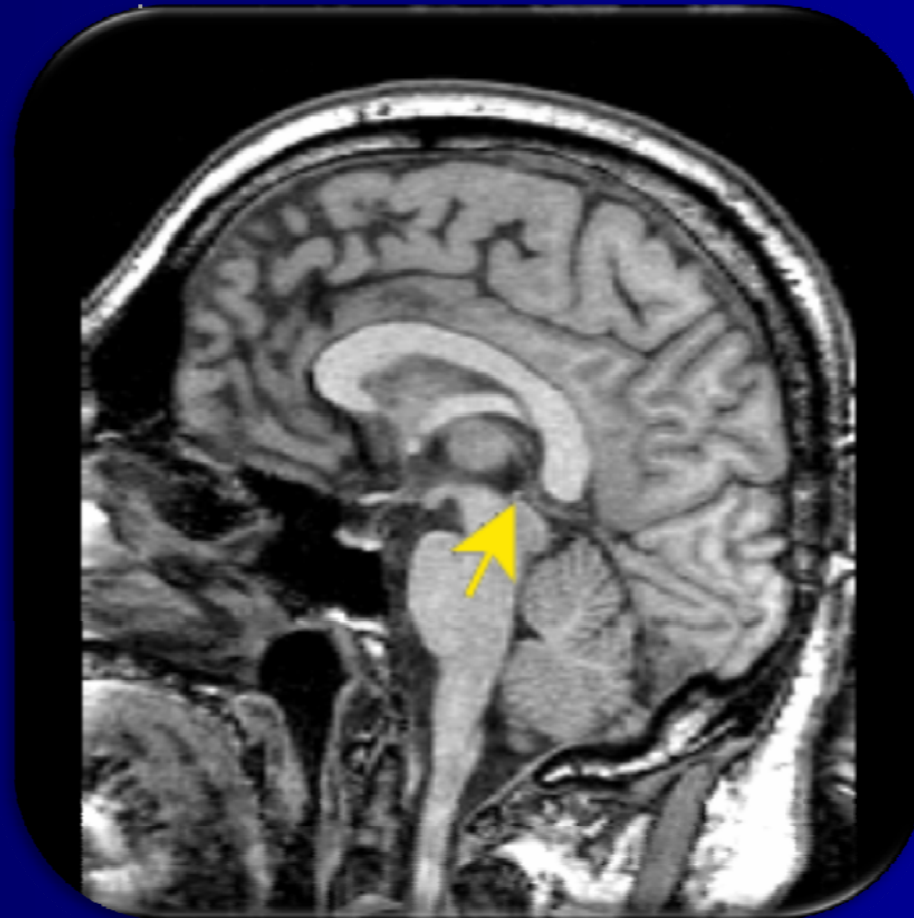
Dysfunction of One or More of the
Following Causes Mental Illness:

- **Brain Structure**
- **Brain Chemistry**
- **Brain Function**

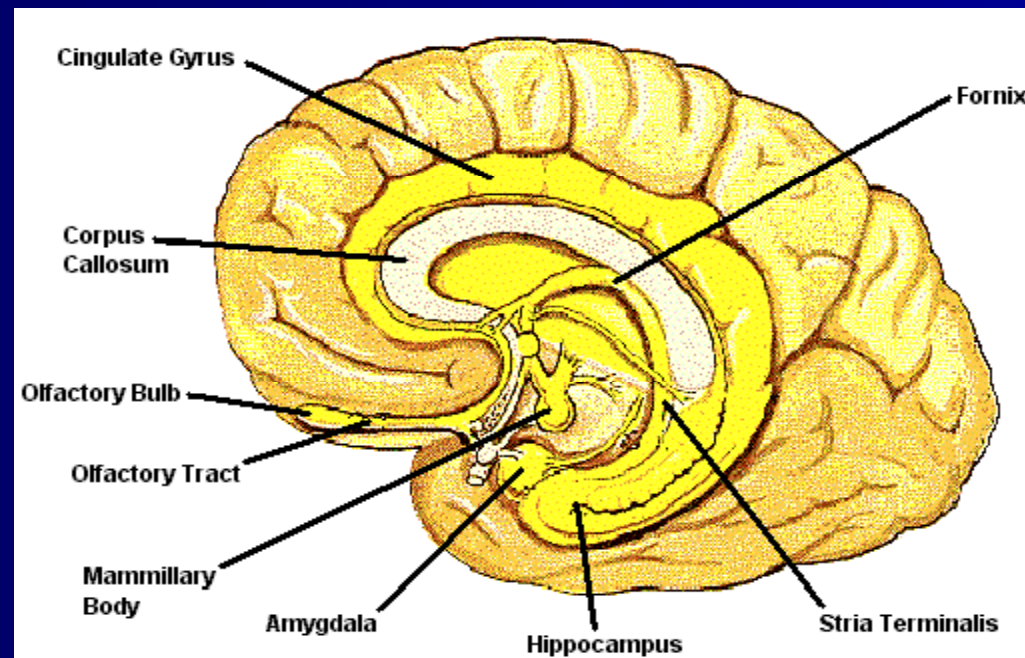
Brain Structure



Brain Structure MRI



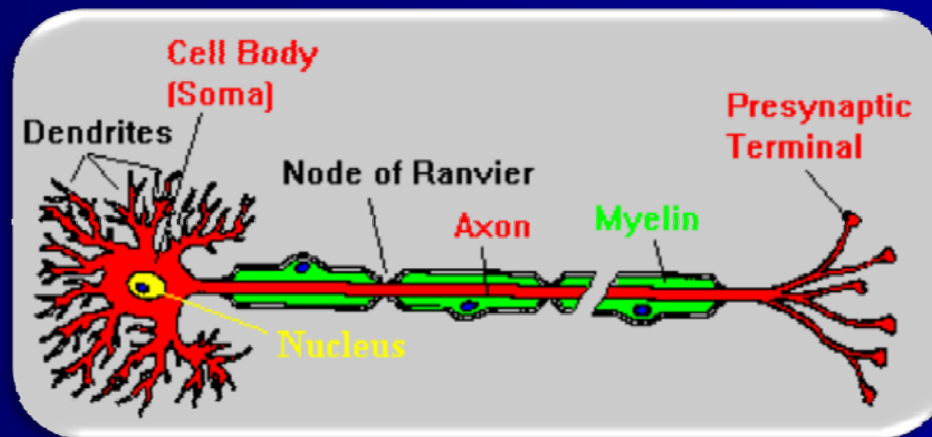
Brain Structure



The Amygdala warns you of danger. Anxiety related disorders are related to an over active Amygdala and other brain regions of the Striatum.

The Hippocampus is where long term memories are created. Problems here lead to Alzheimer's Disease

Neurons and Synapses



Neurons have specialized projections called **dendrites** and **axons**. Dendrites bring information to the cell body and axons take information away from the cell body. Information from one neuron flows to another neuron across a **synapse**. The synapse is a small gap separating neurons.

The Synapse

Image 1

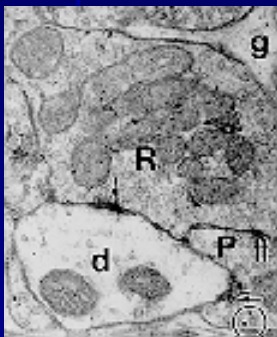
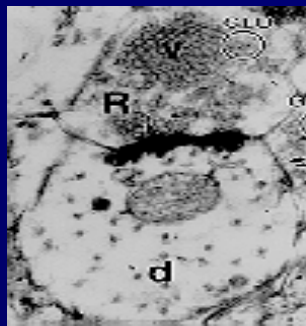


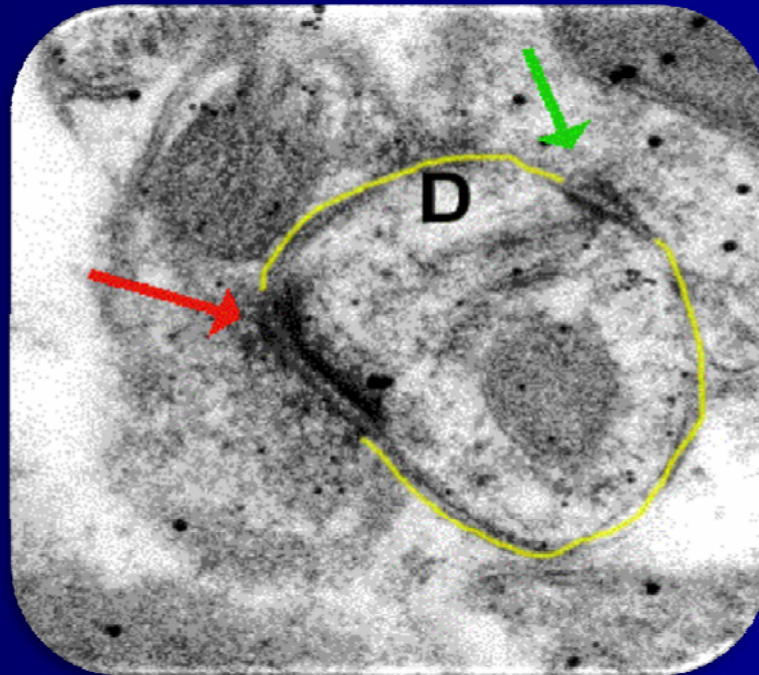
Image 2



Using the electron microscope, Dr. Pati Irish in the Department of Neurological Surgery at the University of Washington has taken these pictures of synapses. The "d" represents a dendrite and the "R" represents an axon terminal. If you look closely, you can even see some round synaptic vesicles that contain neurotransmitters. The fuzzy black areas represent the actual synapse between terminal and dendrite. The larger oval objects (there are two in the dendrite of image 1 and one in the dendrite of image 2 are "mitochondria").

The applet code for the magnification of these photos was written by Dr. Paul Kenyon in the Department of Psychology, University of Plymouth, Devon, UK

Photographs using the electron microscope have shown that synapses can be either asymmetrical (**red arrow**) or symmetrical (**green arrow**). In the figure on the left, notice that the red arrow is pointing to a synapse that has one dark band and one lighter band. The green arrow is pointing to a synapse that has two dark bands. Asymmetrical synapses are thought to be excitatory synapses and symmetrical synapses are thought to be inhibitory synapses. The **yellow line** outlines the dendrite (D).



Healthy Brain Function Requirements

- Calcium, Potassium, Chloride, Sodium, Synaptic neurotransmitters, DNA, RNA and Protein, are all needed for our brain cells to function.
- Brain Cells (neurons) send message using Calcium Potassium, Chloride and Sodium to generate an electrical pulse with a message encoded (a thought or feeling)
- Neurotransmitters, axons, dendrites carry the message from cell to cell across synapses.
- Cells interpret and encode messages using genetic material (messenger RNA) and protein and other cell organelles.
- Cell function is fuel by good nutrition and exercise that sends glucose and oxygen in the blood stream to our brain.

WE CALL ALL THIS CELL ACTIVITY "THINKING" AND "FEELING"



Photo by Marvin Bartel
Goshen.edu

All This Affects How a Person

- **Thinks**
- **Feels**
- **Perceives**
- **Gets Along in the World**
- **Behaves**

Brain Problems

When the processes of thinking and feeling get messed up we call this mental illness but a more accurate description is brain malfunction or problems.

Brain problems Are Caused By Many Things

- Genetic Abnormalities**
- Head Trauma**
- Pre and Post Natal Development Problems**
- Traumatic Personal Experiences**
- Prolonged Mental Stress from work, family, combat**
- Medical Problems**
- Drug Misuse**
- Alcohol**

What is a brain problem?

- A brain problem is a biological illness affecting our brains and often other aspects of our health.

Types of Brain Problems

Diseases of the Brain

Mood Disorders

- **Depression**
- **Bipolar Illness**

**Major depression
causes people to feel
hopeless, exhausted,
and useless.**

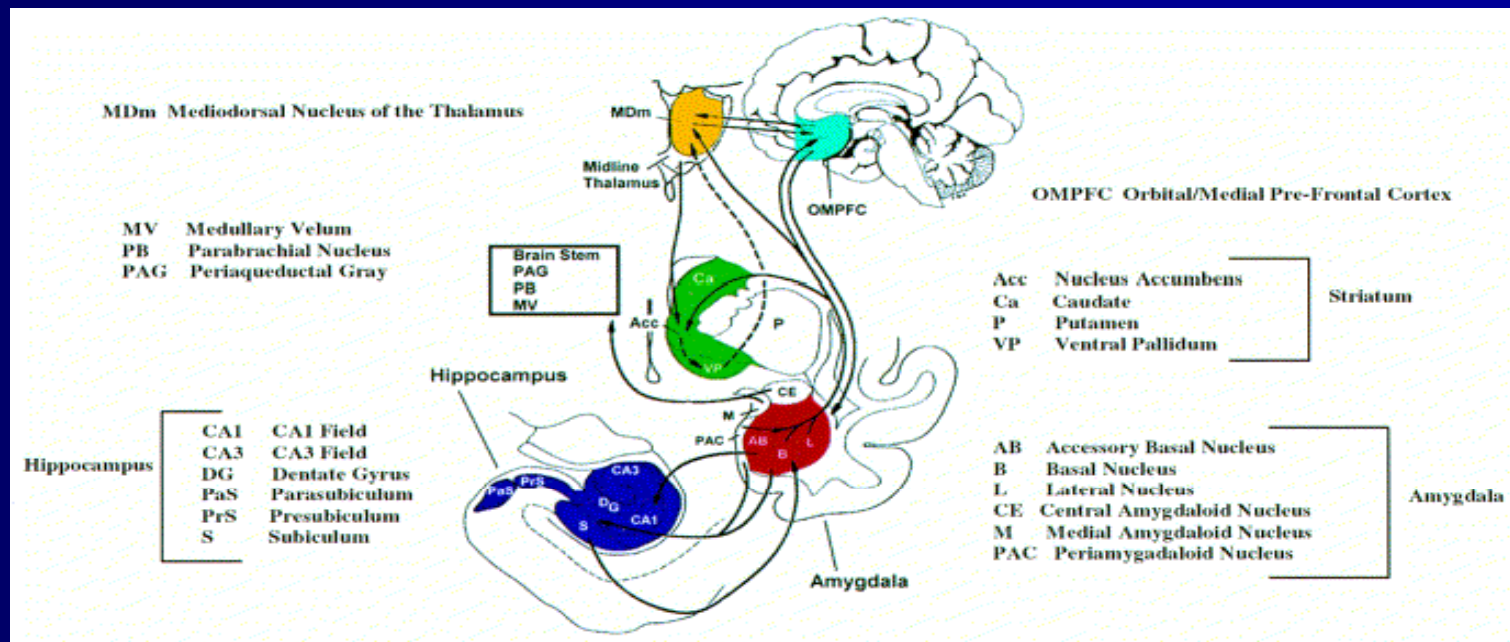
More than changes in mood, major depression can cause problems with:

- Sleep**
- Appetite**
- Self-esteem**
- Daily activities**
- Energy**
- Physical health.**

Depression can be caused by social and emotional factors relating often to stress or loss as well as genetic factors.

Copyright © 2000 Society of Biological Psychiatry. Published by Elsevier Science Inc. **Dysfunction in neural circuits involved in the pathophysiology of mood disorders**

Brain changes associated with early-onset major depression have been reported in the hippocampus, amygdala, caudate nucleus, putamen, and frontal cortex, structures that are extensively interconnected. They comprise a neuroanatomic circuit that has been termed the limbic–cortical–striatal–pallidal–thalamic tract.



Of these structures, volume loss in the hippocampus is the only consistently observed change to persist past the resolution of the depression. Possible mechanisms for tissue loss include neuronal loss through exposure to repeated episodes of hypercortisolemia; glial cell loss, resulting in increased vulnerability to glutamate neurotoxicity; stress-induced reduction in neurotrophic factors; and stress-induced reduction in neurogenesis. Many depressed patients, particularly those with late-onset depression, have comorbid physical illnesses producing a high rate of hyperintensities in deep white matter and subcortical gray matter and brain damage to key structures involved in the modulation of emotion. Combining MRI studies with functional studies has the potential to localize abnormalities in blood flow, metabolism, and neurotransmitter receptors and provide a better integrated model of depression.

Manic depressive disorder (bipolar disorder) causes swings from deep depression to abnormal elation or "highs" and / or rage.

- **Hyperactivity,**
- **Scattered ideas,**
- **Easy distraction,**
- **Irritability**
- **Rage**
- **Recklessness**

**Also occur in bipolar disorder
during manic episodes**

Other symptoms may include:

- Grandiosity,
- Racing Thoughts,
- Decreased need for sleep,
- Agitation,
- Often there is self-medicating using marijuana and alcohol which leads to addiction.
- There is also a family history of Bipolar Disorder in the family (often associated with alcoholism and drug addiction).

Anxiety disorders come in many forms and may be experienced differently in each person.

However, their common factor is a feeling of constant terror, dread or worry beyond one's normal reactions to danger

Phobias

Phobias are irrational fears of objects or situations (high places, snakes, outdoors) that cannot be overcome with reasonable explanations or actions.

Social Phobias

Social phobias cause people to dread being watched or humiliated while doing something of a social nature, such as eating a meal or giving a speech, due to expectation of negative evaluation.

Some people with social phobias, fear and avoid any contact with others.

Agoraphobia

People with agoraphobia often have panic attacks and fear being in situations in which they cannot get help or escape.

**Often, this paralyzing fear
causes its sufferers to remain
isolated in their homes**

Panic Disorder

involves sudden, unexpected attacks of intense terror.

Symptoms include:

shortness of breath,
heart palpitations,
chest pain,
choking,
trembling and
faintness.

Panic attacks can occur at any time, without apparent cause; distinguishing them from the natural reaction to real danger.

Generalized anxiety disorder causes more constant and unrealistic worry about everything.

Irrational, unrealistic worry about things such as personal health, family's physical safety or financial security may continue, in spite of attempts to convince the sufferer that all is well.

People with generalized anxiety disorder feel

Anxious

Sleepless

Irritable and

Physically stressed

More often than not, to a level that interferes with daily functioning.

OCD

OCD causes its sufferers to act out repetitive, ritualistic behaviors based on persistent and involuntary thoughts.

The brain is stuck on thoughts
and this paralyzes actions

This often due to a lack or proper
functioning of serotonin activated
neurons
(brain cells)

Compulsions

Continual hand washing, stove or lock checking, and counting to a certain number are examples of compulsions.

Obsessions

Unrealistic thoughts of hurting one's child or pet, jumping from a car, or swearing in public are examples of obsessions

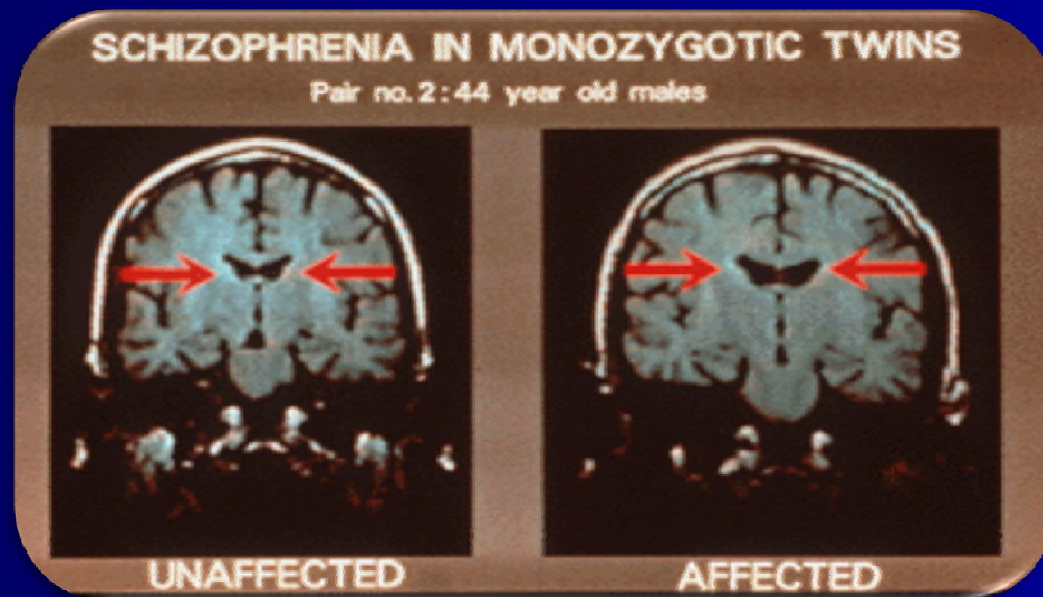
OCD

Often, people with this disorder are aware that their thoughts and behaviors are irrational, but feel powerless to stop them

Schizophrenia

- **Schizophrenia defines a group of disorders that cause distorted thought and perception.**

Schizophrenia



These individuals typically have enlarged lateral ventricles due to shrinkage of thalamus and surrounding mid-brain structures. The thalamus is the brain's “traffic controller” or information relay station.

MRI of Schizophrenia Brain Disease

This image is of 28-year-old identical twins, one with schizophrenia and the other well. It therefore clearly illustrates two points: (1) schizophrenia is a brain disease with measurable structural and functional abnormalities in the brain; and (2) it is not a purely genetic disease, and other biological factors play a role in its etiology.

SCHIZOPHRENIA IN IDENTICAL TWINS

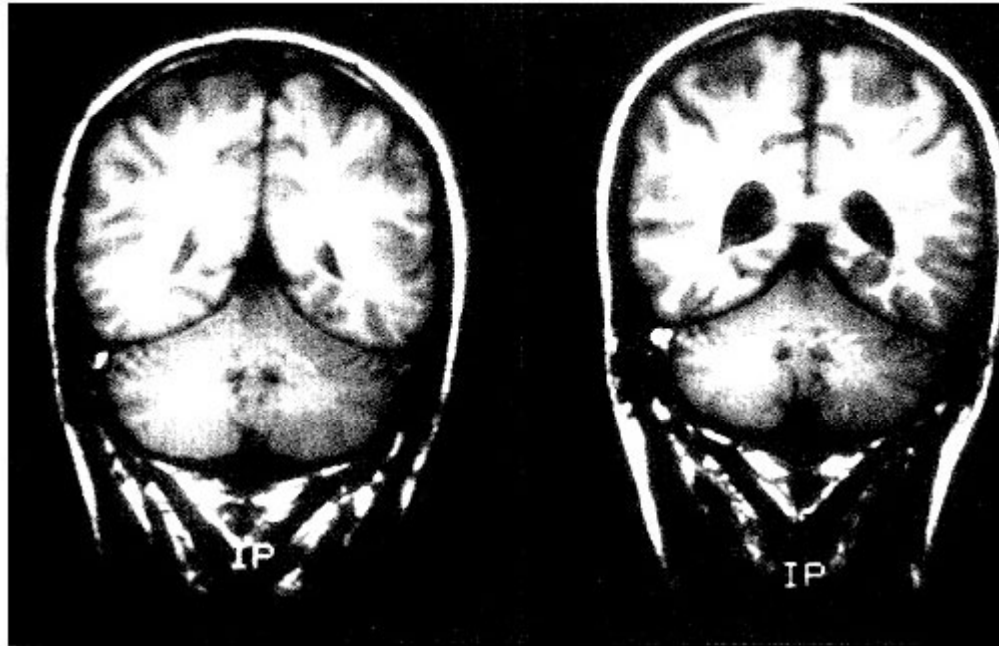
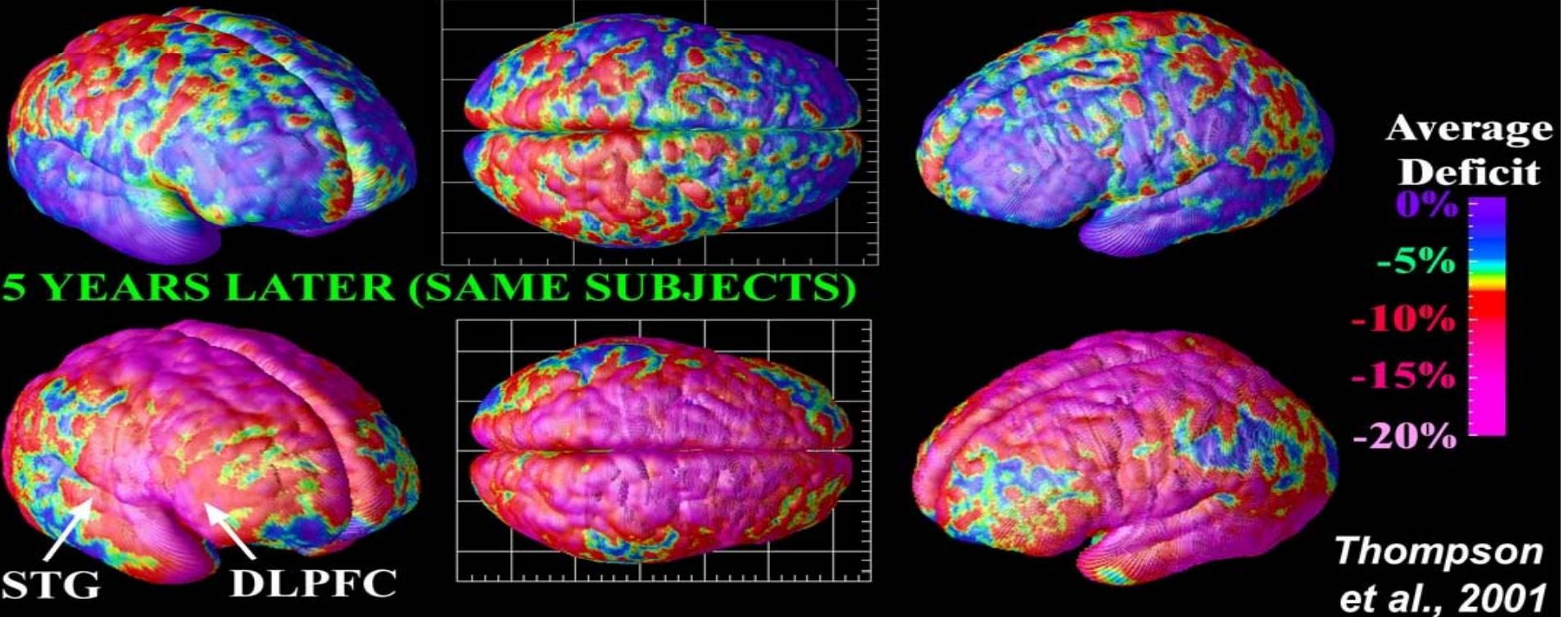


Photo courtesy of Drs. E. Fuller Torrey and Daniel Weinberger.

MRI scans of 28-year-old male identical twins showing the enlarged brain ventricles in the twin with schizophrenia (right) compared to his well brother (left).

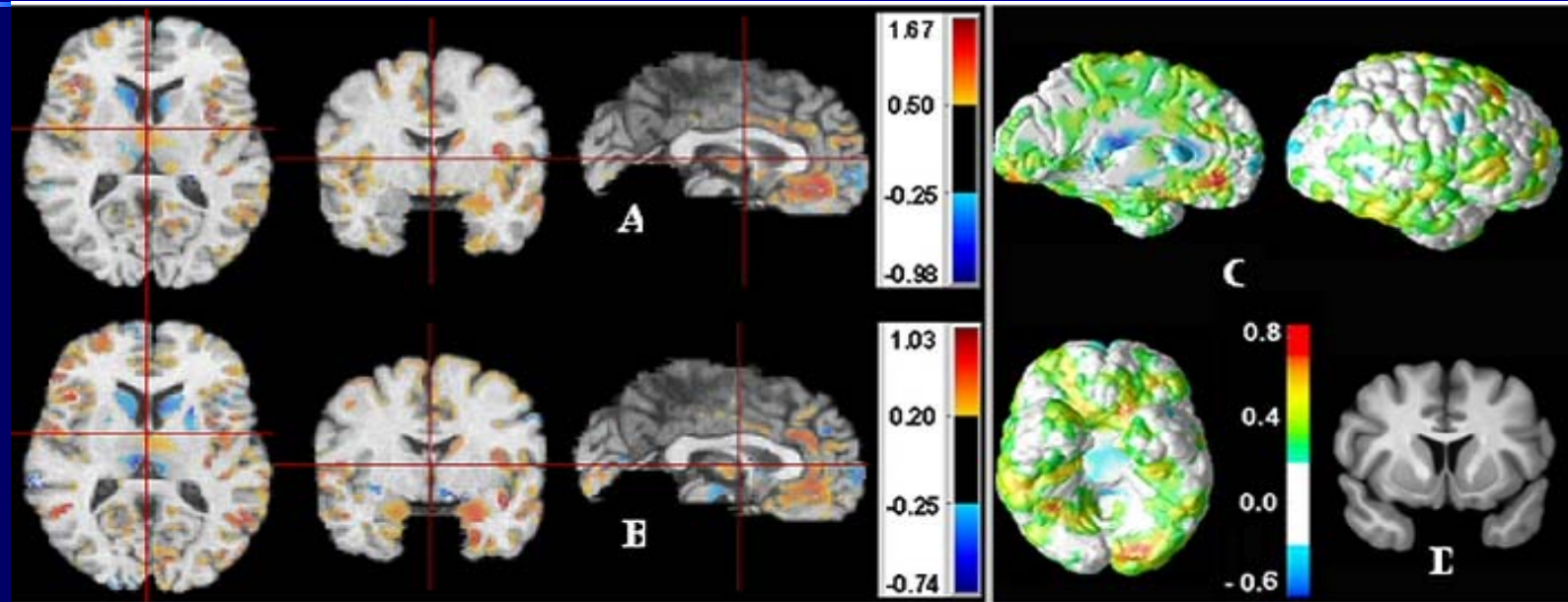
Early and Late Gray Matter Deficits in Schizophrenia

EARLIEST DEFICIT



Mapping Brain Changes in Schizophrenia. Derived from high-resolution magnetic resonance images (MRI scans), the above images were created after repeatedly scanning 12 schizophrenia subjects over five years, and comparing them with matched 12 healthy controls, scanned at the same ages and intervals. Severe loss of gray matter is indicated by red and pink colors, while stable regions are in blue. STG denotes the superior temporal gyrus, and DLPFC denotes the dorsolateral prefrontal cortex. (Reprinted with permission from Thompson PM et al., *Proceedings of the National Academy of Sciences of the USA*, 98[20]:11650-11655)

Effect Size Maps



Effect size maps (schizophrenia patients vs. healthy controls), for females (A) and males (B), displayed in neurological convention. (C) Effect size maps for males and females combined projected on the outer cortical surface. (D) Average of the 148 images after they were spatially normalized via elastic warping to the template.

Image Courtesy: Christos Davatzikos, PhD, University of Pennsylvania School of Medicine; [Archives of General Psychiatry](#)

Schizophrenia

- Thoughts seem scrambled
- Or suddenly jump from one subject to an unrelated subject.

Schizophrenia

- Perception can be distorted beyond reality, causing sufferers to hear or see things that are not there

Schizophrenia

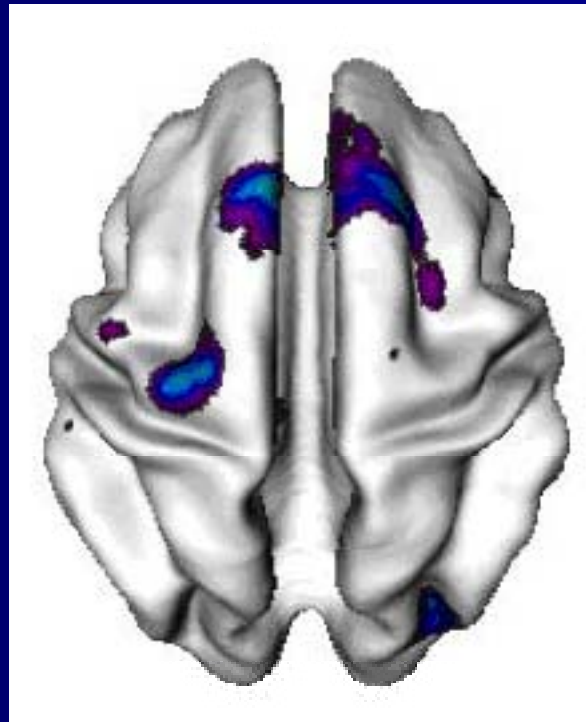
- People with schizophrenia commonly feel heightened self-awareness or paranoia.
- Often they suffer low self-esteem and even withdraw into seclusion

Attention Deficit Disorder, ADHD

- Fidgets
- Restless
- Bored easily as kids, burn out as adults
- Argumentative
- On the move
- Day dreams
- Off task more than on
- Poor self regulation in all areas of life
- Begins at age 4-6 lasts a life time
- 85% of incarcerated criminals have ADHD or ADHD / LD (Amen. Firestorms of the Brain. 1999)

Brain regions (blue, purple) where children with ADHD have a thinner cortex are part of circuitry that controls attention and motor activity. Front of the brain is at top in this image, constructed from MRI scan data.

Source: NIMH Child Psychiatry Branch



WHAT TO DO.

- Become familiar with some of the general signs (what doctors and others notice) and symptoms (what the patient experiences)

People who suffer from brain problems may display one or more of the following behaviors:

- **Talk of suicide or threats to others**
- **Prolonged feelings of intense tension or anxiety**
- **Sudden changes in eating and/or sleeping habits**
- **Atypical thoughts and speech**
- **Sudden changes in mood and behavior**
- **Withdrawal from friends and family**
- **Loss of interest in favorite activities**
- **Physical symptoms, including pains of various sorts**

Myths

- People with “mental illnesses” can just pull themselves together.
- People with mental illnesses are violent
- Mental illness means being locked up for life
- Drugs don't cause mental illness.
- Keep it a secret
- Nothing works

Living with Brain Problems.

- **Brain problems are a common affliction.**
- **Nationally, three to five percent of all children under 18 have a severe brain problems.**
- **It is estimated that more than 15 million Americans suffer from depression.**
- **Anxiety afflicts about 30 million people, and millions more suffer from obsessive-compulsive disorder, panic attacks and phobias**

How Family and Friends Can Help.

- **Provide Emotional support. This is a confusing time for the patient and family**
- **Plan ahead for crisis. Extra medication. Dosages**
- **Phone numbers of doctors**
- **Seek help yourself. Support Groups.**
- **Educate yourself about the illness**

Diagnosis

- Seek good professional help
- Get several opinions and psychological evaluations
- Use technology – imaging – when possible
- Medication consultation
- Neuropsychological testing
- Read and learn from many valid sources (Do not read blogs and unprofessional commentaries)

Treatment: In General

- **Careful Medication Management and compliance**
- **Counseling to learn and cope**
- **Support Groups – you are not alone**
- **Education – read, attend professional seminars, learn all you can.**
- **Insight. Know the triggers and patterns (as patient or family member)**
- **Get out of denial ASAP. Do not listen or participate in gossip – remember thoughts create feelings – gossip may make your illness worse.**
- **Learn how to prevent relapse**
- **Always guard against suicide risk and substance abuse**

Treatment:

Attention Deficit Disorder

- Diet: Low Carb, High Protein, Exercise
- Get a good mentor. Someone who is ADHD and older and successful or a good therapist to teach how to adjust and cope year to year.
- Medication management a must & compliance.
- Tutors for academics, classroom strategies, social skills.
- Rule out learning disabilities and bipolar disease. These can appear to be ADHD/ADD but do not respond to stimulants and can be made worse. Careful diagnosis and psychological testing are a must before medication is started.
- Structured environment and schedule

Treatment:

Depression, Anxiety, OCD, PTSD

- **Careful Professional Medication Management :**
 - Tell your doctor of all medications you are taking before starting a new one or a supplement.
 - Medications Include: serotonergic medications such as Effexor (venlafaxine), Prozac (fluoxetine), Paxil (paroxetine), Zoloft (sertraline), Anafranil (clomipramine), Desyrel (trazodone), Serzone (nefazodone), Celexa (citalopram), Remeron (mirtazapine) and Luvox (fluvoxamine), Buspar
 - Supplements: St. John's Wart , Tyrosine with B Complex, SAME.
 - For acute anxiety sometimes a benzodiazapine
 - For sleep complications – trazadone, ambien .

Treatment:

Depression, Anxiety, OCD, PTSD

- **Cognitive Therapy –**
 - In this therapy patients learn that thoughts become conscious through the release of chemicals and spreading electrical transmission in the brain.
 - These biological based ideas have a real impact on how you feel. Happy thoughts are calming while negative thoughts are not and lead to tension, rapid heart beat, dizziness, anxiety, poor sleep, anger, fear, feeling tired, depressed etc.
 - Learning to train one's thoughts and correct irrational beliefs and thinking is the goal of this therapy.

Cognitive Behavioral Therapy Goals:

- We are not usually disturbed by things or events but by our perception of them; our labeling of them; and how important they are to us.
- Modifying these dynamics is very, very important and therapeutic for normal day to life.
- In fact we do this all the time, sometimes very well and sometimes not. This is where professional help may be indicated.

Treatment:

Depression Anxiety PTSD

- **EMDR – Disconnect the thought from the negative feeling. Learn how to do mental exercises that will interrupt negative and painful memories so that they are less disturbing and debilitating.**

Treatment: Bipolar I and II

- Medication Management is extremely important including regular blood chemistry and liver function tests.
- Understand the cycle and triggers that lead to relapse. Try to prevent relapse.
- Medications:
 - Very Ill: lithium plus an antipsychotic or valproate plus an antipsychotic;
 - Less Ill: monotherapy with lithium, valproate, or an atypical antipsychotic may be sufficient.
 - Which approach is taken will vary depending on such considerations as diagnosis, state of the patient, hospitalization, and whether the patient is amenable to medication.
- May be made worse by serotonergic medications such as Prozac, Paxil, Zoloft, or stimulant medications alone such as ritalin or adderall products (which are very helpful for ADHD / ADD)
- Family support groups and individual counseling for caretakers and spouse.
- Structured environment and schedule.

Treatment: Bipolar I & II

- **Cognitive Therapy**
- **Education**
- **Family Focused counseling**
- **Marriage Counseling**
- **Self-management insight training**
- **Daily living skills for job, school, family**
- **Rule out border-line personality disorders**

Some ideas for a Healthy Brain

Prefrontal Cortex Prescriptions

1: Clear focus on how you want to live.

2: Focus on the penguins in your life, notice the behavior of others you like (Fat Freddy)

3: Have meaning, purpose, stimulation and excitement in your life to prevent shut down

4: Medications include stimulants, such as methylphenidate preparations (Ritalin LA, Concerta, Focalin) Adderall, Vyvanse, Desoxyn or Dexedrine

5: Medications include Depakote, Tegretol, Neurontin, Dilantin and other anticonvulsants

6: Medications include Norpramin, Tofranil, Wellbutrin and other antidepressants

Some ideas for a Healthy Brain

OCD Problems

- 1: Notice when you're stuck, distract yourself and come back to the problem later
- 2: Don't try to convince someone else who is stuck, take a break and come back to them later.
- 3: Write out options and solutions when you feel stuck. Act on them.
- 4: Seek the counsel of others when you feel stuck (often just talking about feeling stuck will open new options for you)
- 5: Medications include Prozac, Paxil, Zoloft, Effexor, Anafranil, Luvox, Serzone
- 6: EMDR Therapy.
- 7: Mental Exercise: “Step back” and stare at the problem / urge. Notice it. Relax, stay still. Do nothing and let it pass away, like not scratching an itch. Repeat every time this occurs. Your brain will learn not to engage and reinforce this urge or thought. If you do not bother with it it will not bother with you.

Some ideas for a Healthy Brain

Mood Problems

1: Strive for wonderful experiences. Be helpful. Be kind.

2: Improve your ability to use words

4: Sing whenever you can

5: Listen to up-lifting music several times a day.

6: Move in rhythms

7: Associate with good friends, social, humanitarian, religious organizations, or other organizations who do good.

8: Do not argue. Do not affiliate with negative, profane, irreverent, hostile, mean, or aggressive groups or individuals.

9: Be kind and forgiving to everyone. No ill will.

10: Learn how to manage anger. Learn that no one makes you angry or sad or disappointed. You choose how you feel. Anger and other strong negative emotions are feeling you choose to have not feelings others make you have.

Some ideas for a Healthy Brain

Anxiety Problems

Rx #1: Every thought matters! Eliminate negative thinking (ANTs see next slide) in your mind.

Rx #2: Surround yourself with people who provide positive bonding

Rx #3: Great smells.

Rx #4: Inspiration from your religious scripture, poems, inspirational music

Example from the New Testament: Philippians 4:8

"Finally, bretheren, whatever is true, whatever is honorable, whatever is right, whatever is pure, whatever is lovely, whatever is of good repute, if there is any excellence and if anything worthy of praise, let your mind dwell on these things."

Automatic Negative Thoughts (ANTs)

Summary of ANT Types:

- **All or nothing thinking:** thoughts are all good or all bad.
- **“Always / Never” thinking:** using words like always, never, everyone, every time.
- **Focusing on the negative:** only seeing bad in situations.
- **Fortune telling:** predicting the worst possible outcome.
- **Mind reading:** thinking you know what another person is thinking.
- **Thinking with feelings:** believing negative feelings without questioning them.
- **Guilt beatings:** should, must, ought or have to, should have,
- **“What If??”** Magical thinking.
- **Assuming** – An assumption is not a fact. A fact is only our perception of it.
- **Consider:** “Life is perceptual not factual.” We can change perceptions.
- **Labeling:** attaching negative labels.
- **Blame:** blaming someone else for your problems.

Some ideas for a Healthy Brain

Anxiety Problems (continued)

Rx #1: Understand the patterns and triggers from the past. Do an autobiography.

Rx #2: Break the patterns of the past with conscious reprogramming (self-hypnosis, affirmations, clear focus, EMDR therapy, Cognitive Behavioral Therapy)

Rx #3: Predict the best. Kill the Fortune Telling ANTs

Rx #4: Daily relaxation, meditation, EMDR therapy, YOGA, and diaphragmatic breathing

Rx #5: Remember life is perceptual.

Rx #6: Medications include Buspar, Xanax, Ativan and other antianxiety agents.

Your Brain Matters

**Sincerely,
Dr. Barrus**