Artists as the first neurologists

"Of all the colours, the most pleasing are the ones which constitute opponents."

-- Leonardo Da Vinci.

BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART

Scheme Specific Unique No :
CCRT/SF -3/172/2015

BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART
Scheme Specific Unique No :
CCRT/SF -3/172/2015

ART FORMS AND ITS IMPACT ON NEUROSCIENCE -*Application of Cognitive Dynamics through art in Alzheimer's and dementia patients*

FINAL REPORT

PREFACE

In this study, I have explained the intersection between art and neuroscience from the perspective of an artist. I have compiled several scientific studies on the effects of art on the brain and human behavior and cognitive development.

When I got a chance to work with Dr. M M Alex on his research of preventing dementia through art forms it gave me numerous opportunities to interact with neuroscientists and commissioned art projects about the brain and the nervous system. The various analyses I have undertaken with neuroscientists and psychophysicists have proved illuminating and rewarding from my artistic perspective. In doing so I have gained an enormous amount of insight into the way the visual system operates & how the brain functions.

As I began my journey into this absolutely fascinating subject I assumed that this correlation between art and neuroscience was formed quite recently. Only to discover that over the past decade there have been substantial interdisciplinary activity

"(Journal of Consciousness Studies, 1999, 2000, 2004; Zeki, 1999; Livingstone, 2002; Solso, 2003; Martindale, 2006. According to Zeki (1999, p. 2): "…most painters are also neurologists." Cavanagh (2005), another eminent vision researcher, talked of "the artist as a neuroscientist."

When my skills as a grandmaster of the ancient healing technique, Reiki and my experience as an artist united with Dr. Alex's research I knew it was worthwhile to study the relationship between philosophy & psychology of the human mind toward "externalist" models of perception and cognition.

Through this study, I learned that art stimulates the 5 senses and this realization changed my perception towards art. I started looking into the power of images and the colors in it and it's psychological and behavioral effects while creating it and also by observing it.

The artistic phenomenon that was emerging from the collaboration between art and neuroscience has already been used in the ancient Vedic age for the wellness of humans. This has been continued as a time-tested therapy.

I undertook this fellowship after the demise of Dr. M.M Alex to compile the various researches on the Synaptic Connections: Art & the Brain, This is only a fragment of an artistic phenomenon, much of which is perhaps yet to be developed.

This research would have not been possible without the support, guidance, and encouragement of a number of people.

Firstly, I thank Dr.M.M Alex, my mentor, not only for the opportunity to pursue this research but also for his endless patience and guidance throughout the development of this project. I cherish greatly all the moments of joy and hopelessness that we shared in the past years. He has influenced my life tremendously.

I also thank Dr. Deepa (ENT Specialist), Dr. C Senthil Nathan(Ophthalmologist), Dr. K. Sankara Subramanian (Neurologist) and Dr. C Kumar Babu (psychiatrist) to understand the five senses and its neurological connection with the body and mind.

I would like to express my gratitude to my dear family, for discovering my passion for art and for setting me on the path the led me here. And I thank all my friends for their support and encouragement through the course of this study.

BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART
Scheme Specific Unique No :
CCRT/SF -3/172/2015

ART FORMS AND ITS IMPACT ON NEUROSCIENCE -*Application of Cognitive Dynamics through art in Alzheimer's and dementia patients*

FIRST REPORT
UNDERSTANDING BRAIN AND FIVE SENSES

<u>The powerful impact of art therapy on the lives of people</u>

Art is a uniquely human activity associated fundamentally with symbolic and abstract cognition. Its practice in human societies throughout the world, coupled with seeming non-functionality lead to the theory that the localized brain regions and pathways theory links art to multiple neural regions.

We know art stimulates the senses and this realization is a dawn of a new age in the study of art. *The Power of Images* and the colors in it and its psychological and behavioral effects, while creating it and also by observing it.

Color has an effect on memory. We live in a world of color and images and most important trigger of memory. If color can increase arousal, and arousal can increase memory, then it is possible that study of intersection between art and neuroscience from the perspective of a practicing artist.

UNDERSTANDING OUR BRAIN

The Brain:
How does it work?

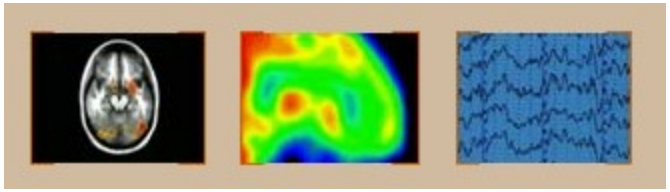
Facts about the Brain

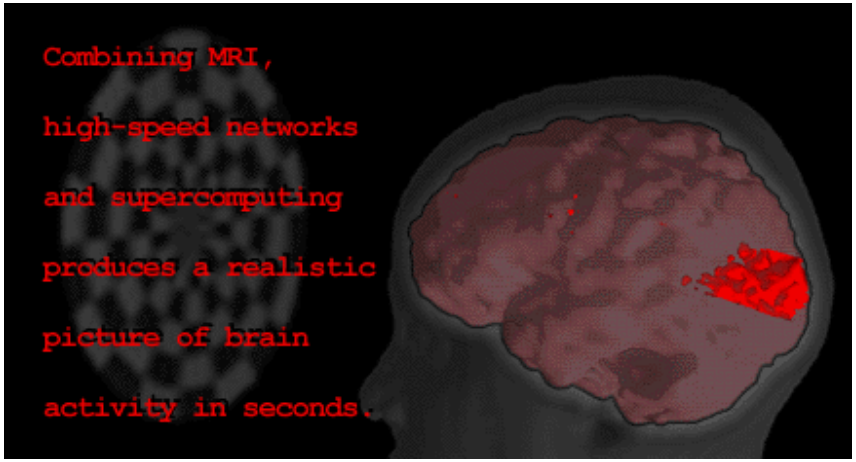
- Weighs approximately 3 pounds
  - Mostly water - 78%
  - Fat - 10%
  - Protein - 8%
- Soft enough to cut with a butter knife
- Grapefruit-sized organ
- Outside of the brain
  - Convolutions or folds
  - Wrinkles are part of the cerebral cortex
  - Folds allow maximum surface area

The Nervous System

- Makes up critical portion of the nervous system
- Nerve cells connected by nearly 1 million miles of nerve fibers
- Has the largest area of uncommitted cortex of any species giving humans flexibility for learning.
- Brain consumes about 20% of the body's energy .
- The Brain uses about 1/5 of the body's oxygen.
- The Brain gets about 8 gallons of blood each hour (supplying nutrients like glucose, protein, trace elements, and oxygen).
- Brain needs 8-12 glasses of water a day for optimal functioning.

Neuroscience

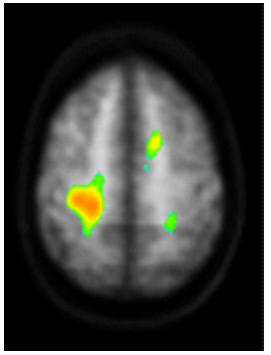


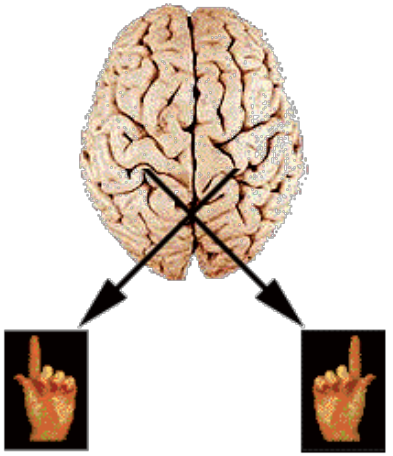


- Technology paved the way for understanding how bring works.
- Enabled researchers to understand and see inside the brain.
- Brain scanners developed - Brain Imaging Technology
  - Magnetic Resonance Imaging (MRI)
  - Positron Emission Tomography (PET) – Radioactive glucose used to determine activity in different parts of the brain
  - Electroencephalography (EEG) – Electrodes give us readings about electrical output of the brain

Two Cerebral Hemispheres Left and Right

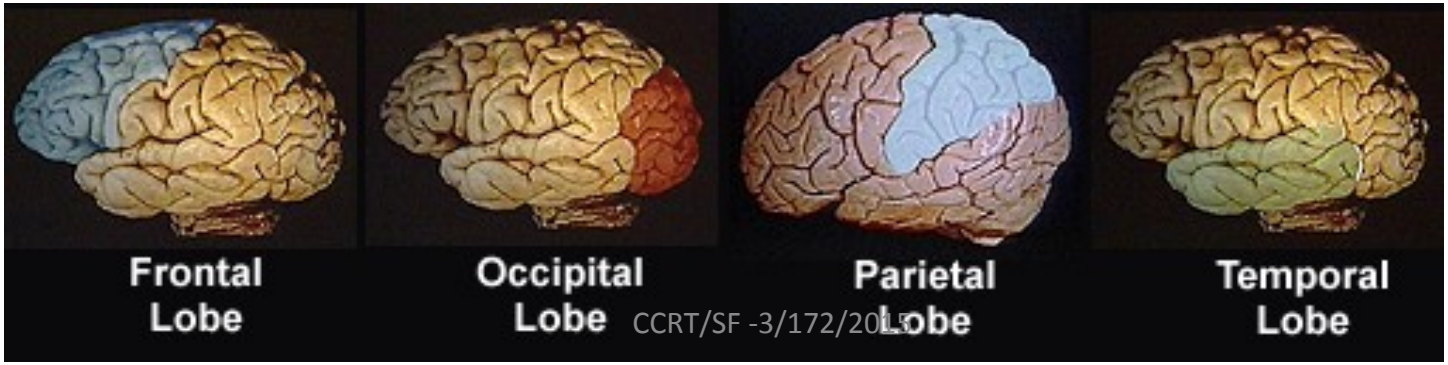
- Left Hemisphere
  - Processes things more in parts and sequentially
  - Musicians process music in left hemisphere
- Right Hemisphere
  - Music and Arts have been considered right-brain "frills" but trained musicians use more left-brain and novice musicians use more right.
  - Higher-level mathematicians, problem solvers, and chess players actually have more right-brained activity, but beginners use more left brain.



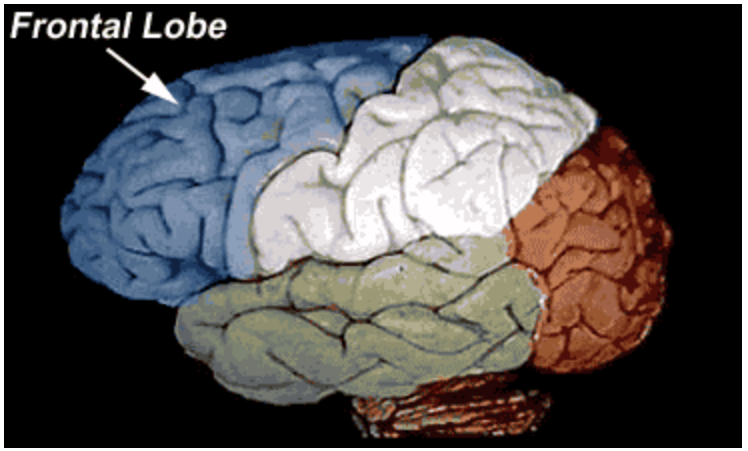


Left and Right Hemispheres

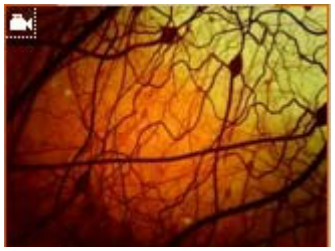
- Bundles of Nerve Fibers
  - Connect the left and right hemispheres
  - Allow each side of the brain to exchange information more freely
- New research shows that early concept of left brain/right brain is outdated



The Lobes



- **Frontal Lobe**
  - Area around your forehead
  - Involved in purposeful acts like judgment, creativity, problem solving, and planning.
- **Parietal Lobe**
  - Top back area of the brain
  - Processes higher sensory and language functions
- **Temporal Lobe**
  - Left and right side above and around the ears
  - Primarily responsible for hearing, memory, meaning, and language.
  - Some overlap in functions of the lobes.
- **Occipital Lobe**
  - Back of the brain
  - Primarily responsible for vision

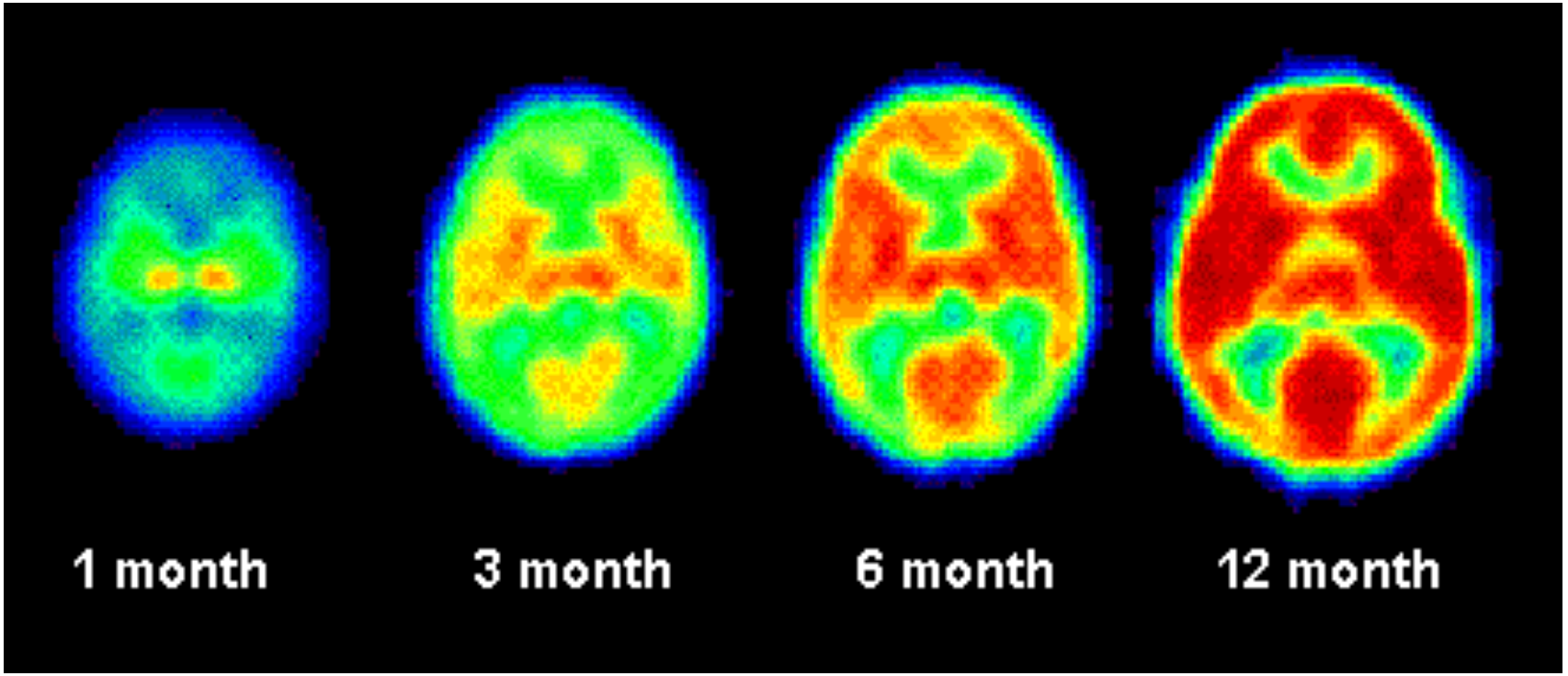


Learning Changes the Brain

- Some kind of stimulus to the brain starts the learning process.
- The stimulus is sorted and processed at several levels.
- Results in formation of memory.
- Either doing something we already know how to do - or we are doing something new.
- Stimulation is doing something new - lighting up the brain scan.
- Once a task is learned, the brain lights up less.

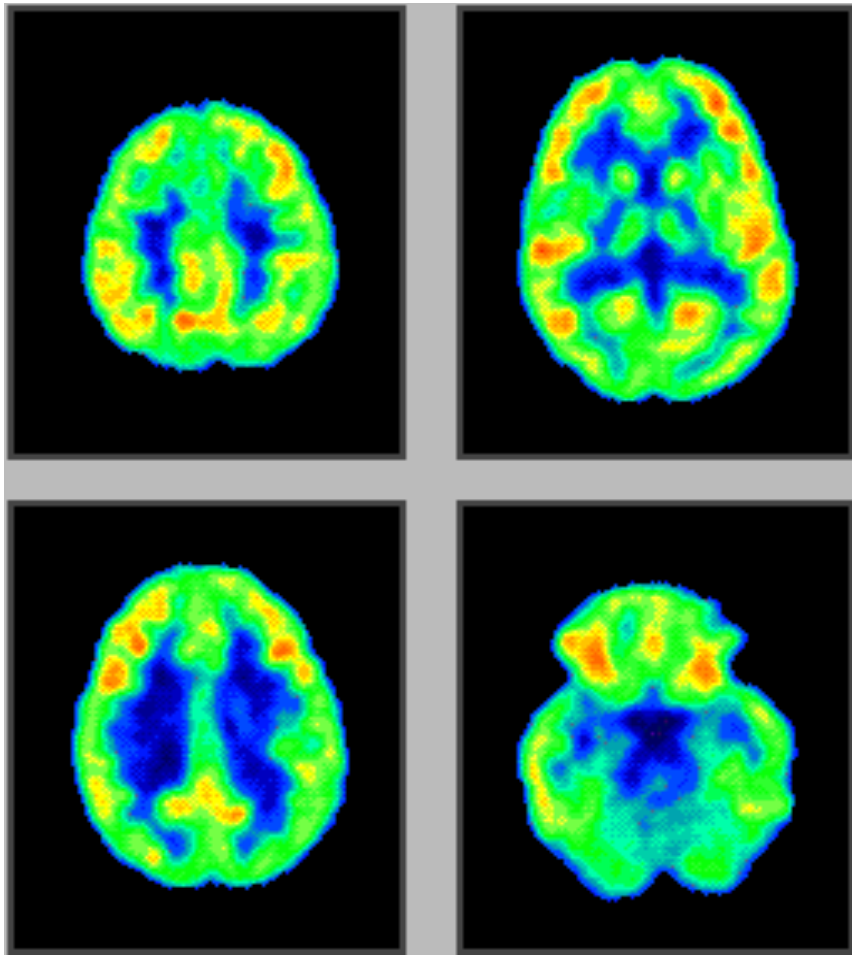
Brain Activity by Age

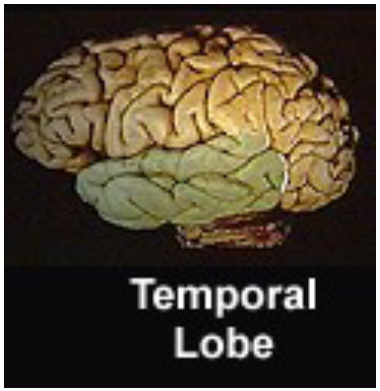
Stages of Development Through Sensory Experiences in the First Year



The Resting Brain

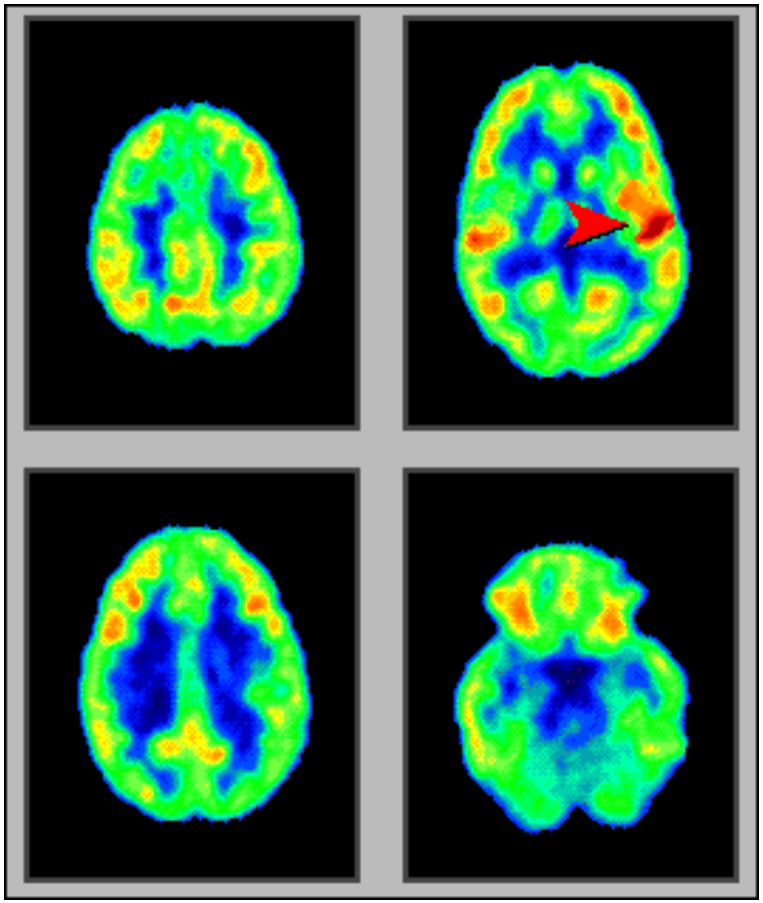
- PET Scans Show Brain Function
- Four Different Slices of the Same Brain
- Mapping of Cerebral Function
- Resting Brain Shows No “hotspots”

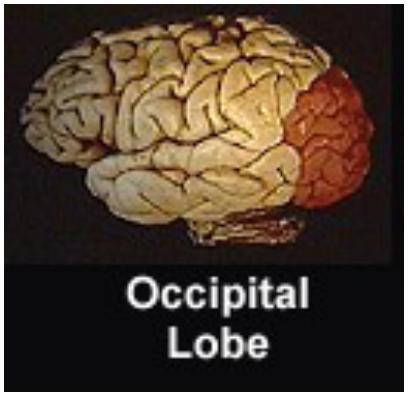




Auditory Activity

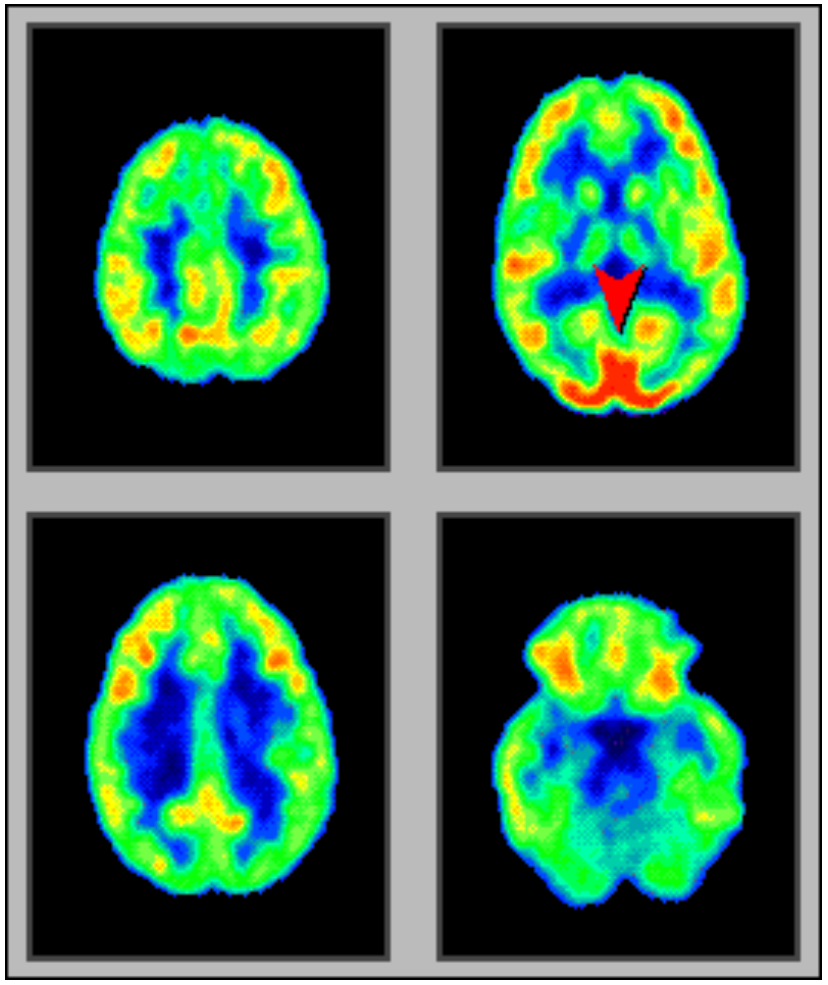
- Subject listened to some music.
- Increased activity in the PET image containing the auditory cortex.
- Nonverbal stimuli (music) predominantly activates the nondominant (right) hemisphere.
- Simultaneous stimulation with language and music would cause a more bilateral activation of the auditory cortex.

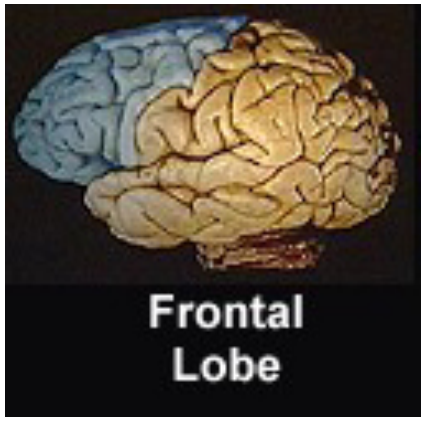




Visual Activity

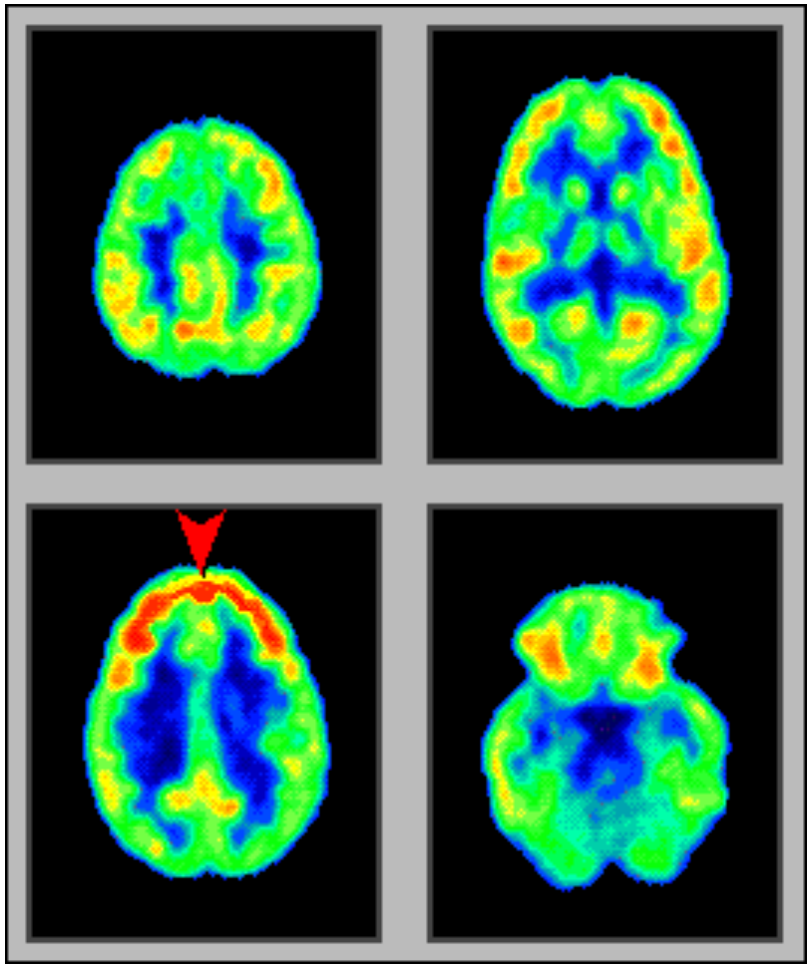
- Subject exposed to visual stimulation consisting of both pattern and color.
- Increased activity in the stimulated brain PET image (arrowhead).
- Region of increased activity corresponds to the primary visual cortex.

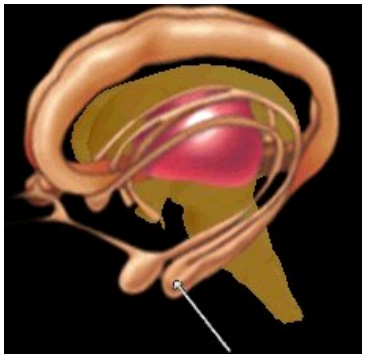




Thinking Activity

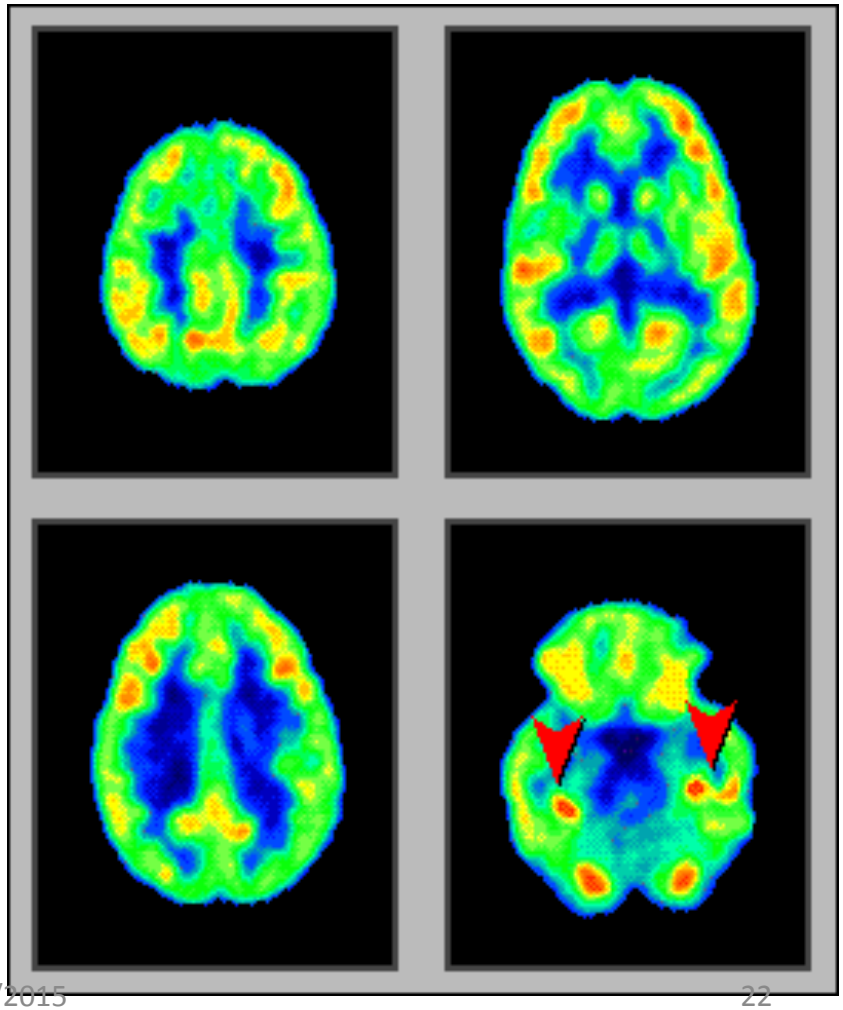
- Increased activity in the stimulated brain PET image (arrowhead).
- Region of increased activity corresponds to the frontal cortex.



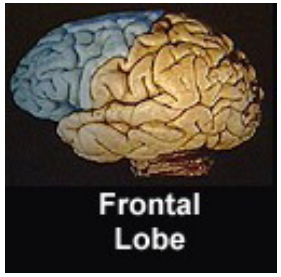


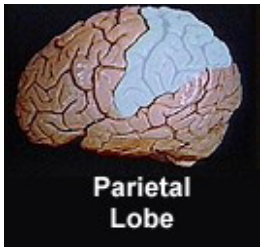
Memory Activity

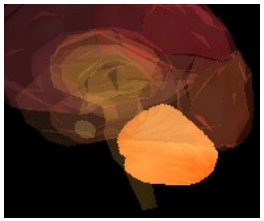
- Subject required to remember an image for later recall.
- Increased activity in the stimulated brain PET image (arrowhead) is the hippocampal formation.
- Region of the brain implicated in learning and memory.
- Hypocampus integrates sensory information along with amygdala



Motor or Kinesthetic Activity

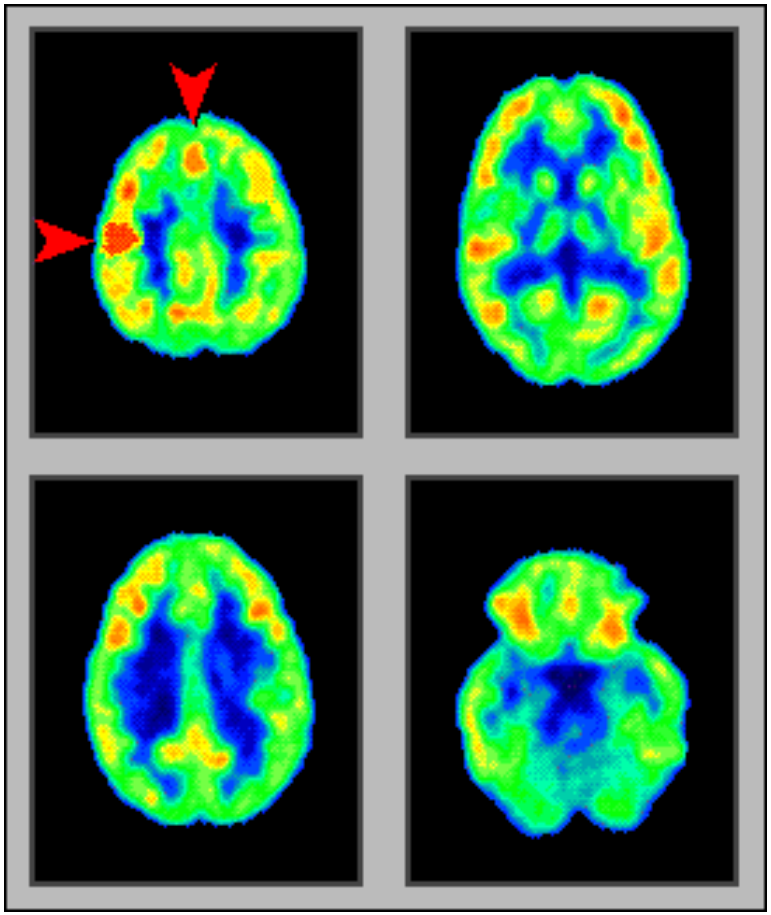




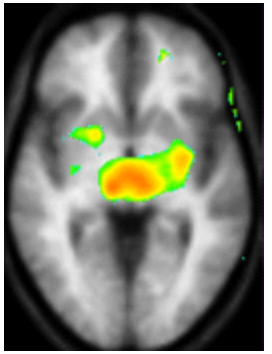


Cerebellum

- Motor stimulation of the brain
- Subject to hop up and down on his right foot.
- Motor task of a movement of the right foot caused:
  - Cortical metabolic activation of the left motor strip (horizontal arrowhead)
  - Caused supplementary motor cortex (vertical arrow, top).



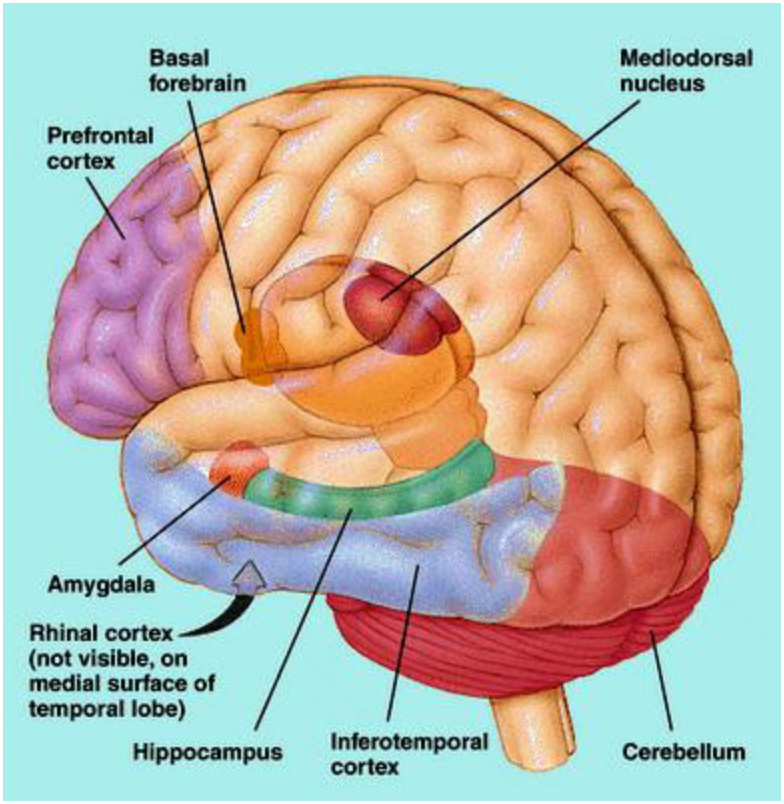
Thalamus



- The thalamus is often thought of as the individual consciousness - the "You"
- Narrow bands across the top middle of the brain
  - Sensory Cortex - Monitors skin receptors
  - Motor Cortex - Needed for Movement
- Cerebellum
  - Latin for "the little brain"
  - Back lower area of the brain
  - Responsible for balance, posture, motor movement, and some areas of cognition
  - Thought to include the essential long-term memory traces for motor learning.

The Limbic System
Emotional Center

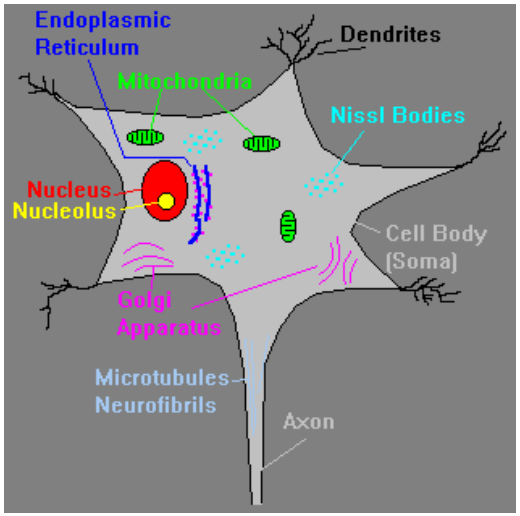
- **Amygdala** controls major affective activities like friendship, love and affection, on the expression of mood and, mainly, on fear, rage and aggression.
- **Hippocampus** is particularly involved with memory phenomena, specially with the formation of long-term memory.
- **Thalamus** makes connections
- **Hypothalamus - symptomatic manifestations and expression of emotions**
- **Brain Stem – emotional reflex reactions**



Two Kinds of Brain Cells

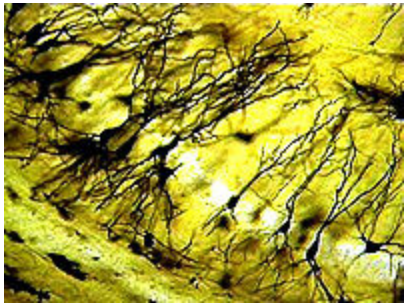
- Glia - (Greek word meaning glue)
  - 90% of the brain cells
  - Less known about glia cells
  - No cell body
  - Remove dead brain cells and give structural support
- Neurons (Greek word meaning bowstring)
  - 100 billion neurons in human brain
  - Neurons essential to performing the brain's work
  - Consist of a compact cell body, dendrites, and axons

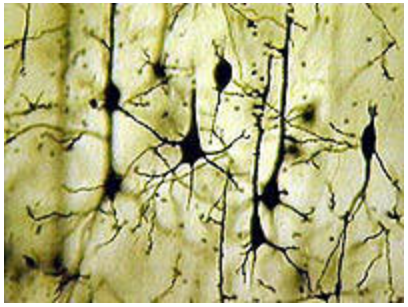
Neurons



- Neurons (brain cells) make connections between different parts of the brain.
- Information is carried inside a neuron by electrical pulses and transmitted across the synaptic gap from one neuron to another by chemicals called neurotransmitters.
- Learning is a critical function of neurons.

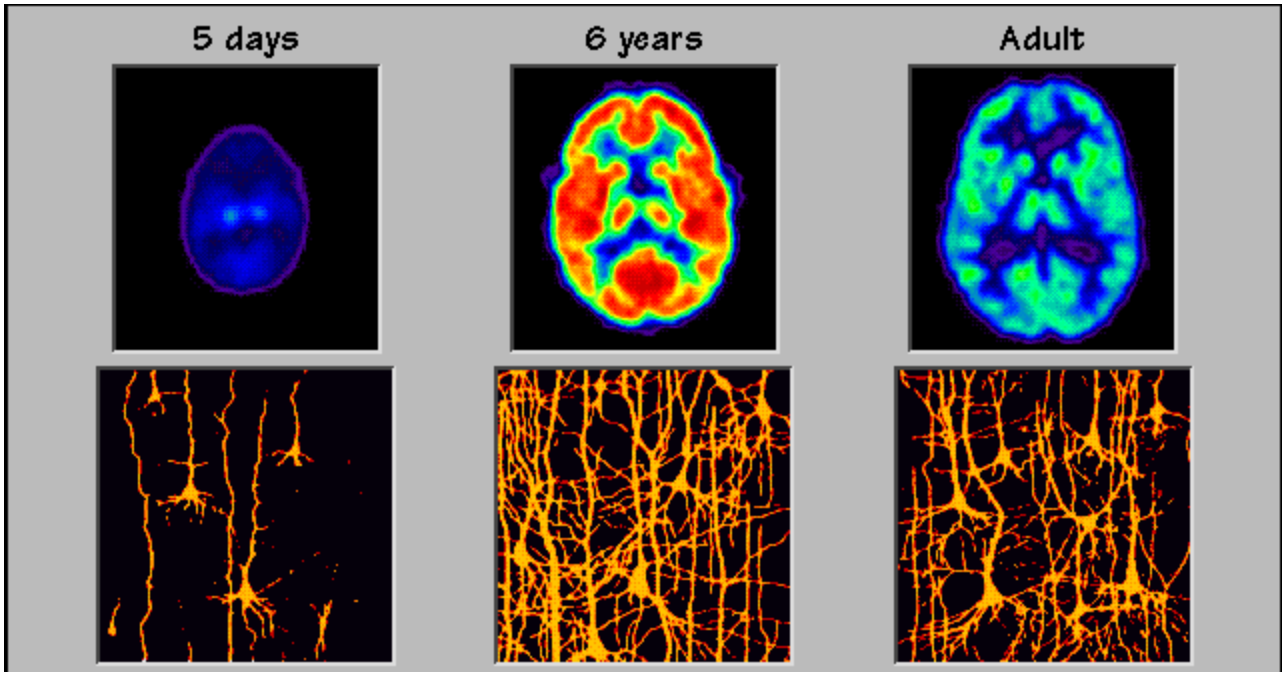
Dendrites and Axons





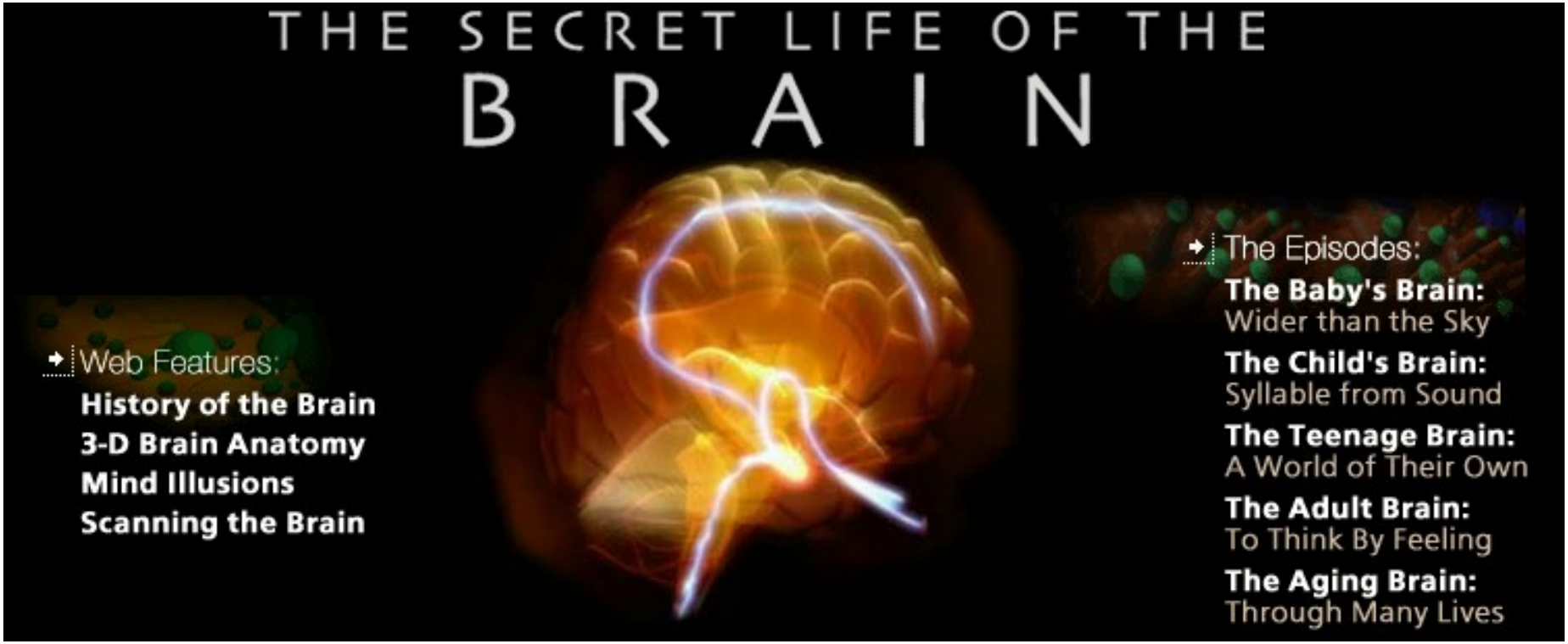
- Dendritic branching helps make connections between cells.
- As cells connect with other cells, synapses occurs.
- New synapses appear after learning.
- Repeating earlier learning makes neural pathways more efficient through myelination (fatty substances formed around axons)

Synaptic Connectivity

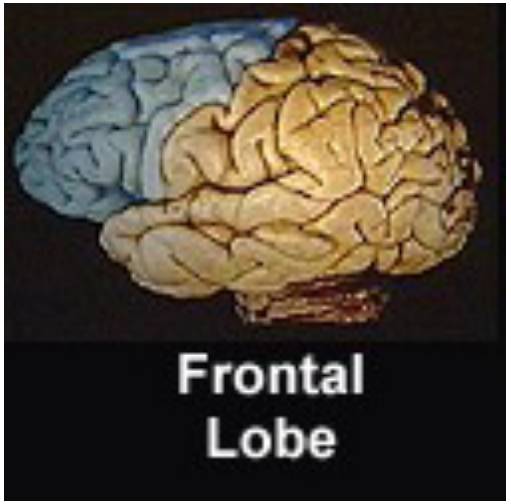


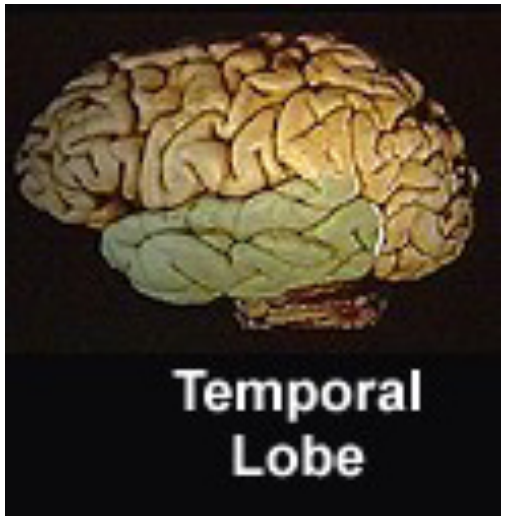
- Relative glucose metabolic rate related to complexity of the dendritic structure of cortical neurons.
- Increase in capillary density in the human frontal cortex during the same period.
- Decrease in glucose metabolic rate in the adult reflects a "pruning" of excessive neuronal connectivity and a selective stabilization of the remaining neuronal connections.

Secret Life of the Brain



Speech





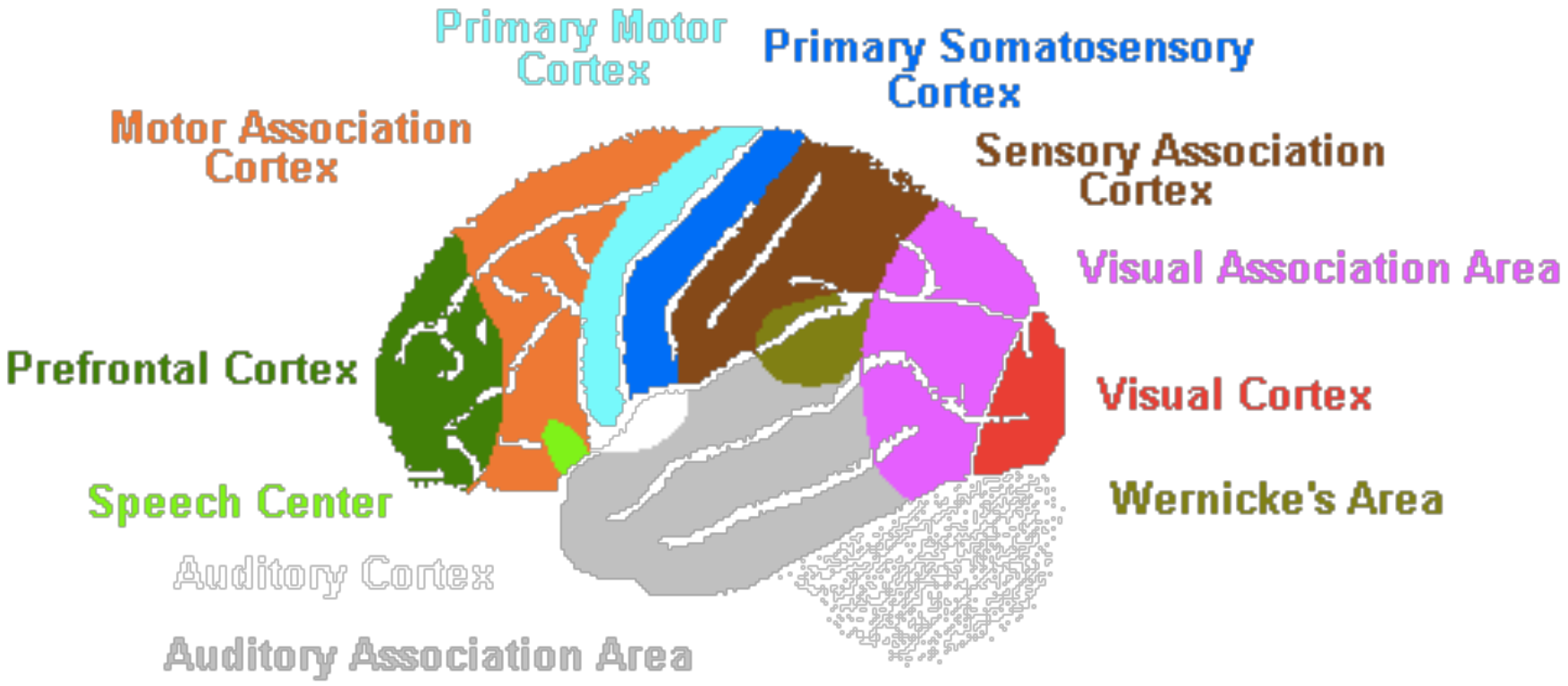
Broca's Area:

- In the left frontal lobe
- Controls production of speech sounds
- Lies close to motor areas

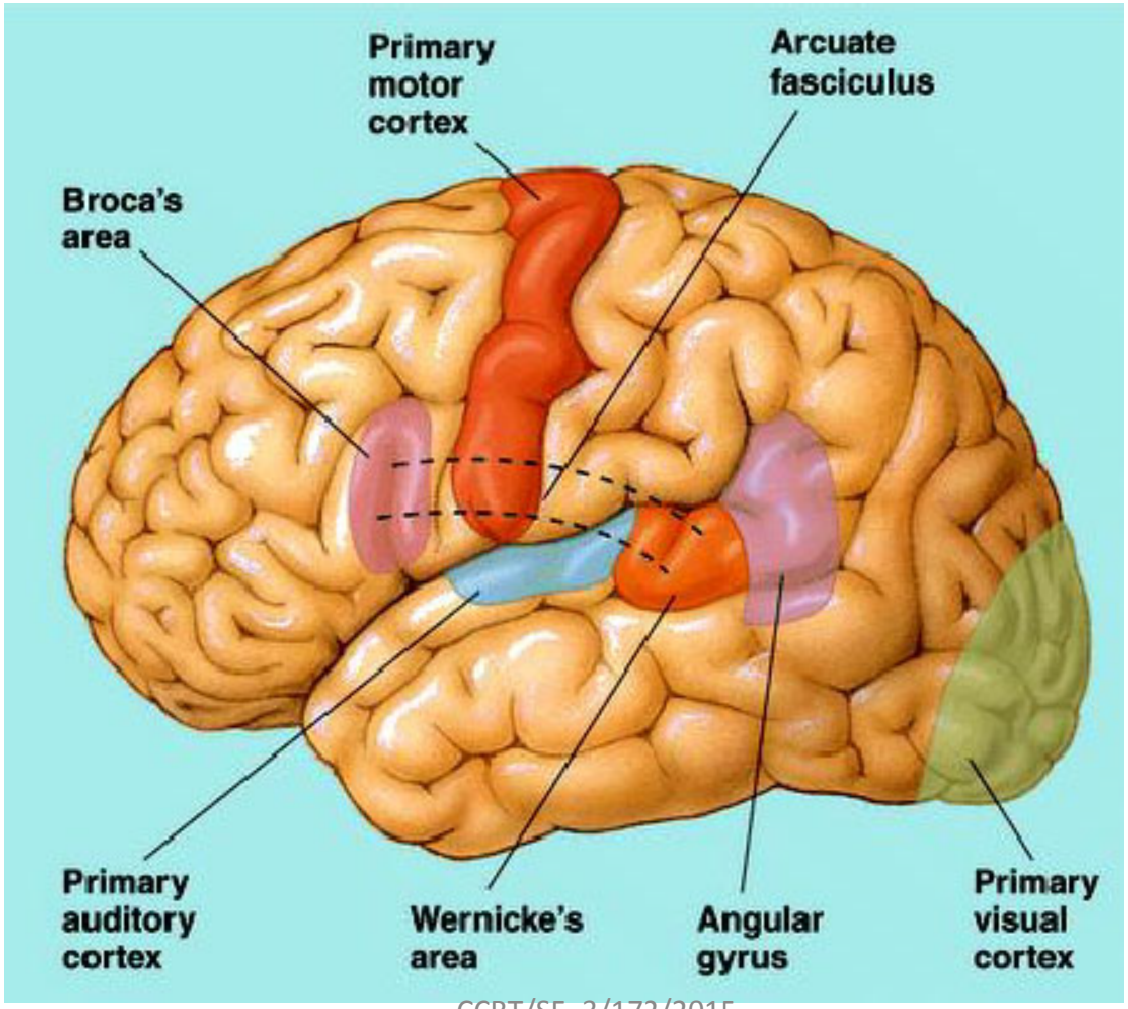
Wernicke's Area:

- Left temporal lobe
- Gets meaning from words and sentences
- Formulates ideas into speech

The Complex Brain



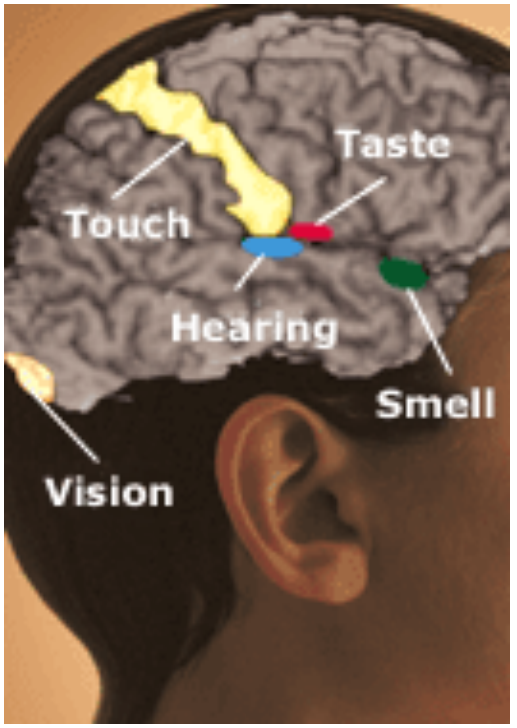
Auditory, Kinesthetic, Visual



The Five Senses

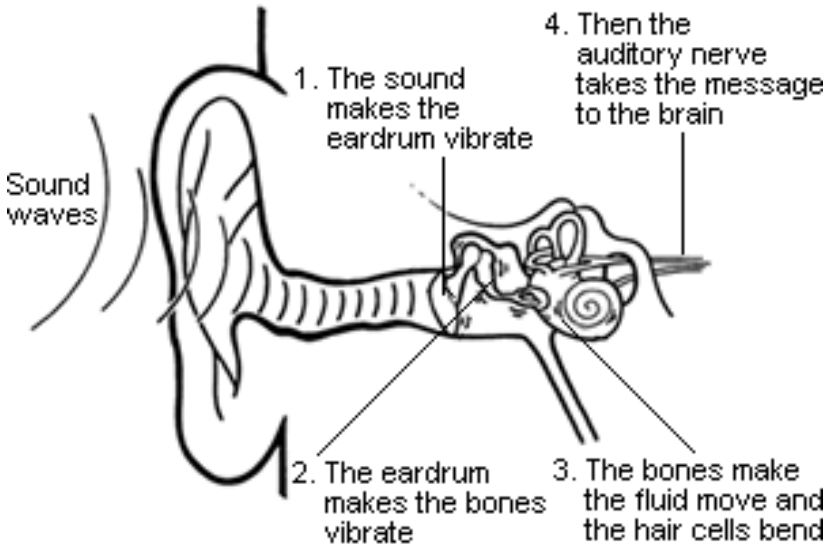
Seeing, Hearing, and Smelling the World

"Everything we know about the world comes to us through our senses. Traditionally, we were thought to have just five of them—sight, hearing, touch, smell, and taste. Scientists now recognize that we have several additional kinds of sensations, such as pain, pressure, temperature, joint position, muscle sense, and movement, but these are generally included under "touch." (The brain areas involved are called the "somatosensory" areas.)"

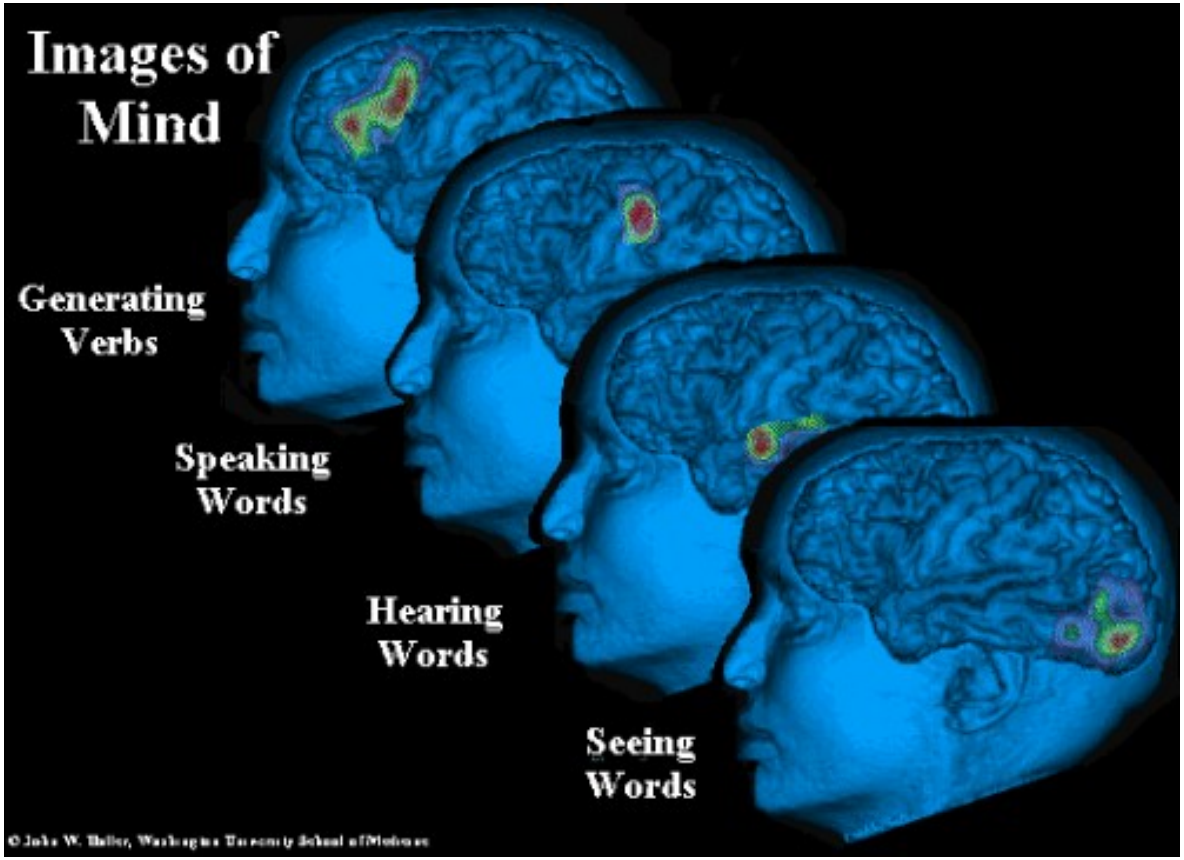


Audition (Hearing)

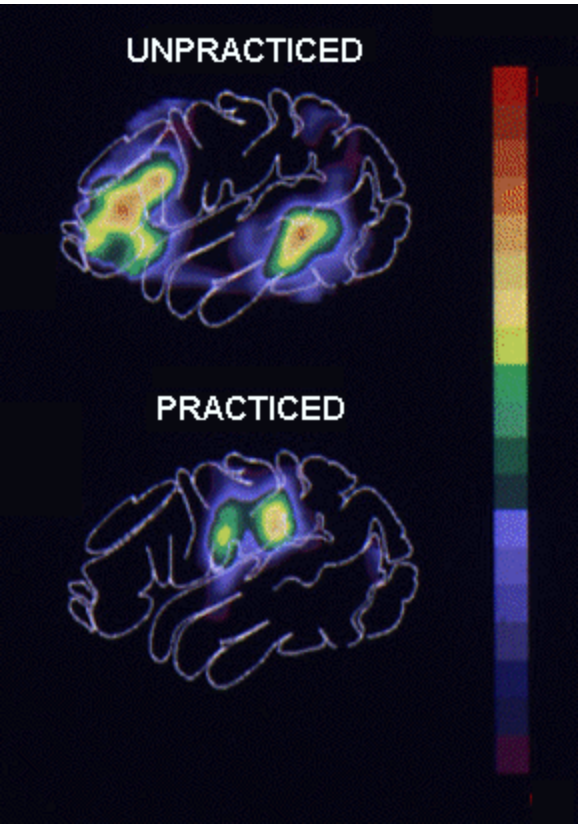
- Sound waves enter your ear canal and hit your ear drum.
- This makes the ear drum vibrate.
- Three tiny bones in your middle ear link the vibrating ear drum with the inner part of your ear.
- The last of these bones is connected to a tiny bone structure that looks a bit like a snail shell, but is about the size of a pea. It is called the cochlea (pronounced *cock-lee-ah*).
- Your cochlea is filled with a liquid that carries the vibrations to thousands of tiny hair cells.
- Each cell is tuned to a particular sound (or frequency).
- As these little hair cells move in the fluid, they carry a message to the nerve that is connected to your brain, which turns this signal into what you hear.



Language and Images of the Mind



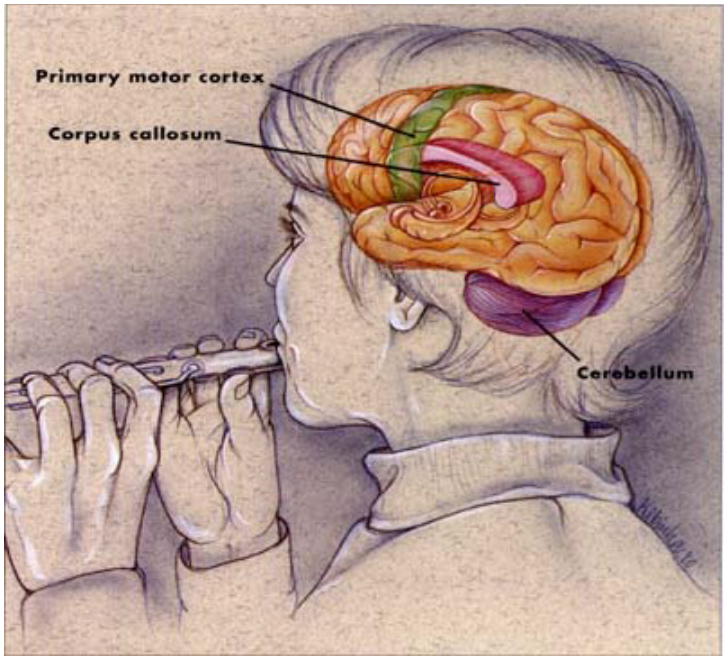
Language Processing



- Unpracticed Task
  - Yellow and red regions are "hotter – higher cell activity
  - Patient was unpracticed at the language learning task.
  - The highest brain activities in the temporal lobe responsible for the hearing perception
  - Prefrontal cortex responsible for understanding language.
- Practiced Task
  - Same individual has now learned the language task and is spelling out.
  - Concentrated in the Broca area of the cortex which is responsible for the motor control of voice
  - Real-time image of brain function.

Music and the Brain

- Familiar music activates Broca's area (left hemisphere)
- Rhythm notes are activated in Broca's area and the cerebellum
- Harmony activates the left side of the brain more than the right in the inferior temporal cortex.
- Timbre activated the right hemisphere (the only musical element that did)
- Pitch activated an area on the left back of the brain - the precuneus.
- Melody activated both sides of the brain.
- Composite listening - Left and Right Hemisphere - Auditory Cortex
- Understanding lyrics - Wernicke's Area



Music is processed differently for different people depending on kind of music and musical background.

Mind's Eye to Emotion's Seat

"Music goes much deeper than that—below the outer layers of the auditory and visual cortex to the limbic system, which controls our emotions. The emotions generated there produce a number of well-known physiological responses. Sadness, for instance, automatically causes pulse to slow, blood pressure to rise, a drop in the skin's conductivity and a rise in temperature. Fear increases heart rate; happiness makes you breathe faster."

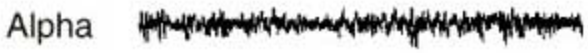
Emotional Impact of Music

- Music modulates our body's stress responses.
- Music can decrease or increase stress levels.
- Music is a strong and powerful mood enhancer.
- Music strengthens our immune systems and enhances wellness.
- Sounds connect us to our sympathetic and parasympathetic (stress/distress response) nervous systems.
- Music impacts blood flow in the body.

Brainwaves

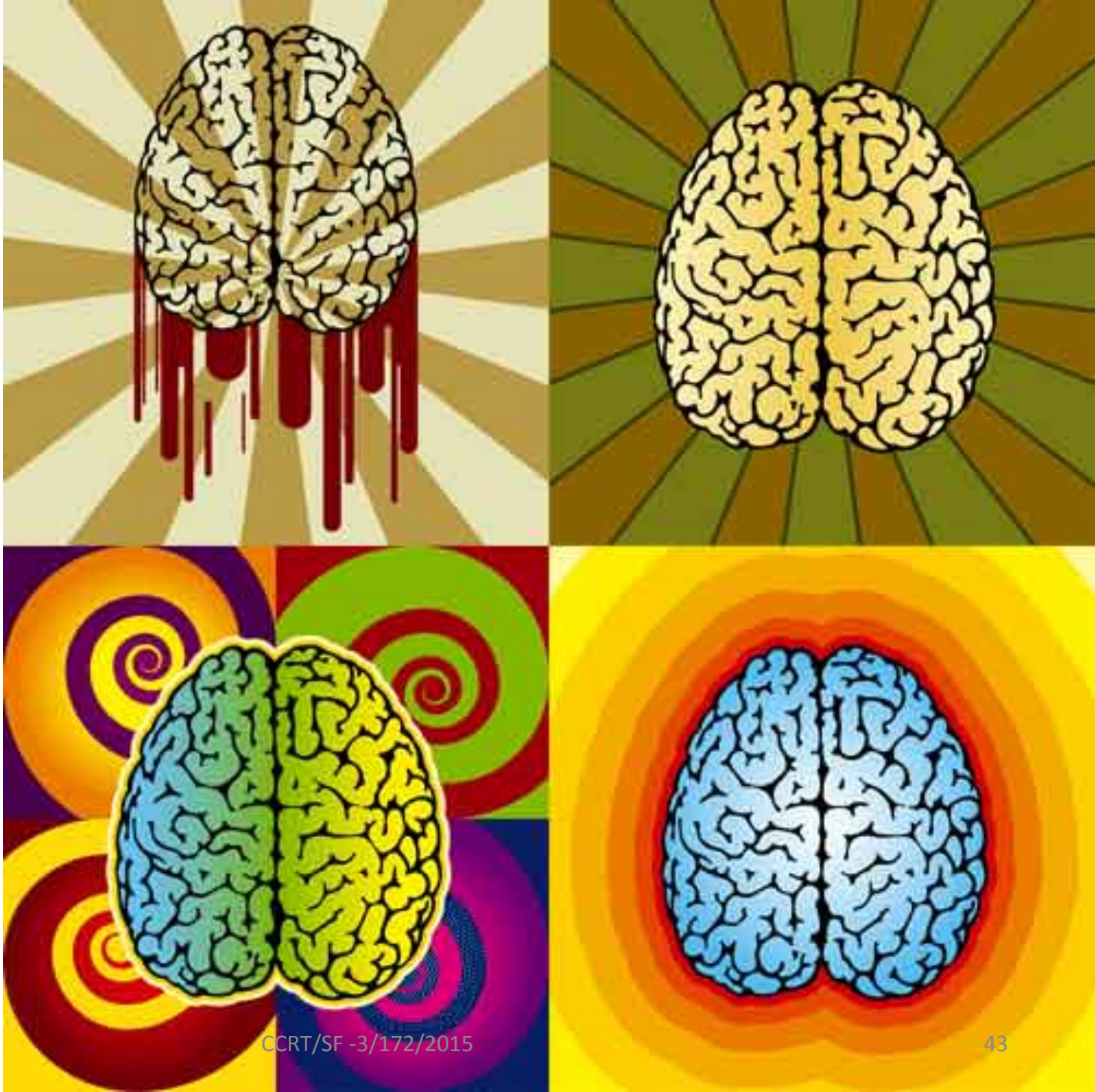
Brainwave	Cycles Per Second (CPS)	Brainwave Activity
	1-4 cps	deep sleep state
	4-7 cps	twilight zone - half awake and half asleep
	8-12 cps	relaxed alertness, reflection, calm, prepared
	12-25 cps	busy classroom activities, discussion
Super Beta (no example)	25+ cps	intensity, drama, exercise, simulations

Emotional Impact of Music



- Evidence exists that music can be helpful in healing.
- Possible Explanation - Music can help the body get back in synch since the body emits and responds to sounds and vibrations.
- Natural state of rest - 8 cycles per second (8 cps) - corresponding with alpha brainwave state
- Every function in the body has a modifiable, basic rhythmic pattern and vibratory rate that impacts our nerves through sound.
- Body is maintained through rhythmic vibration.
- Changes in harmonic patterns, tonal sequences, rhythmic patterns might affect physical and mental health.

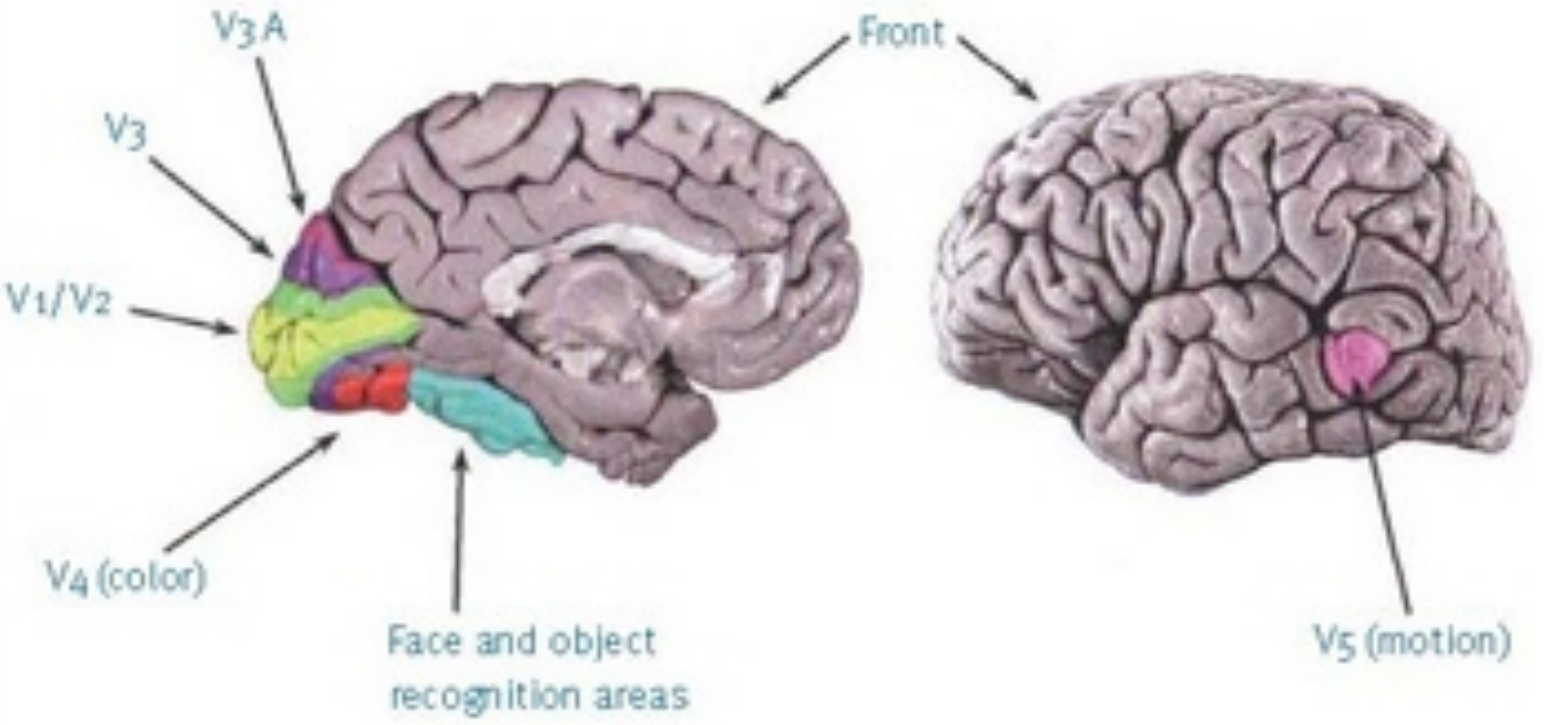
Brain Research and Art Education

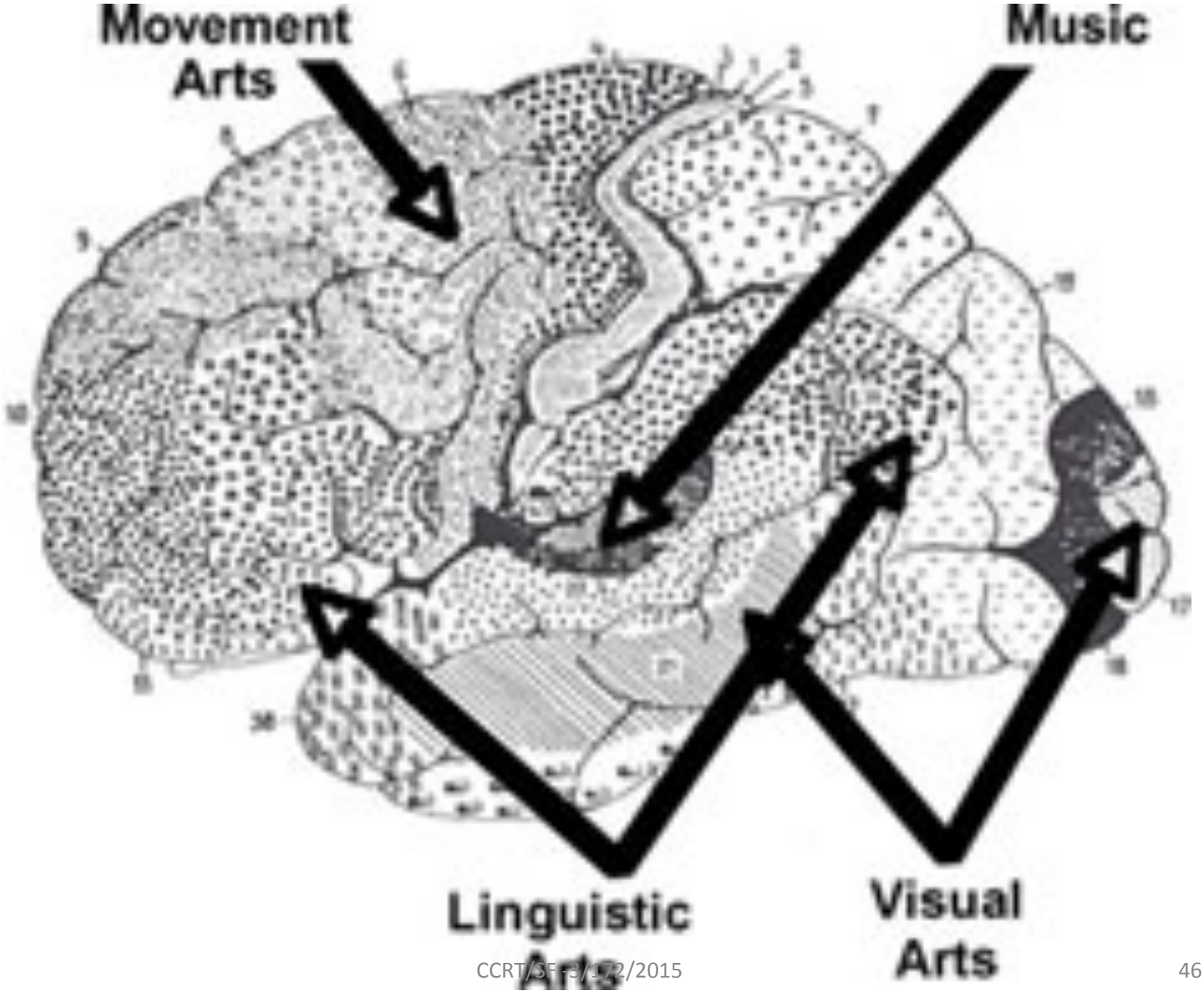


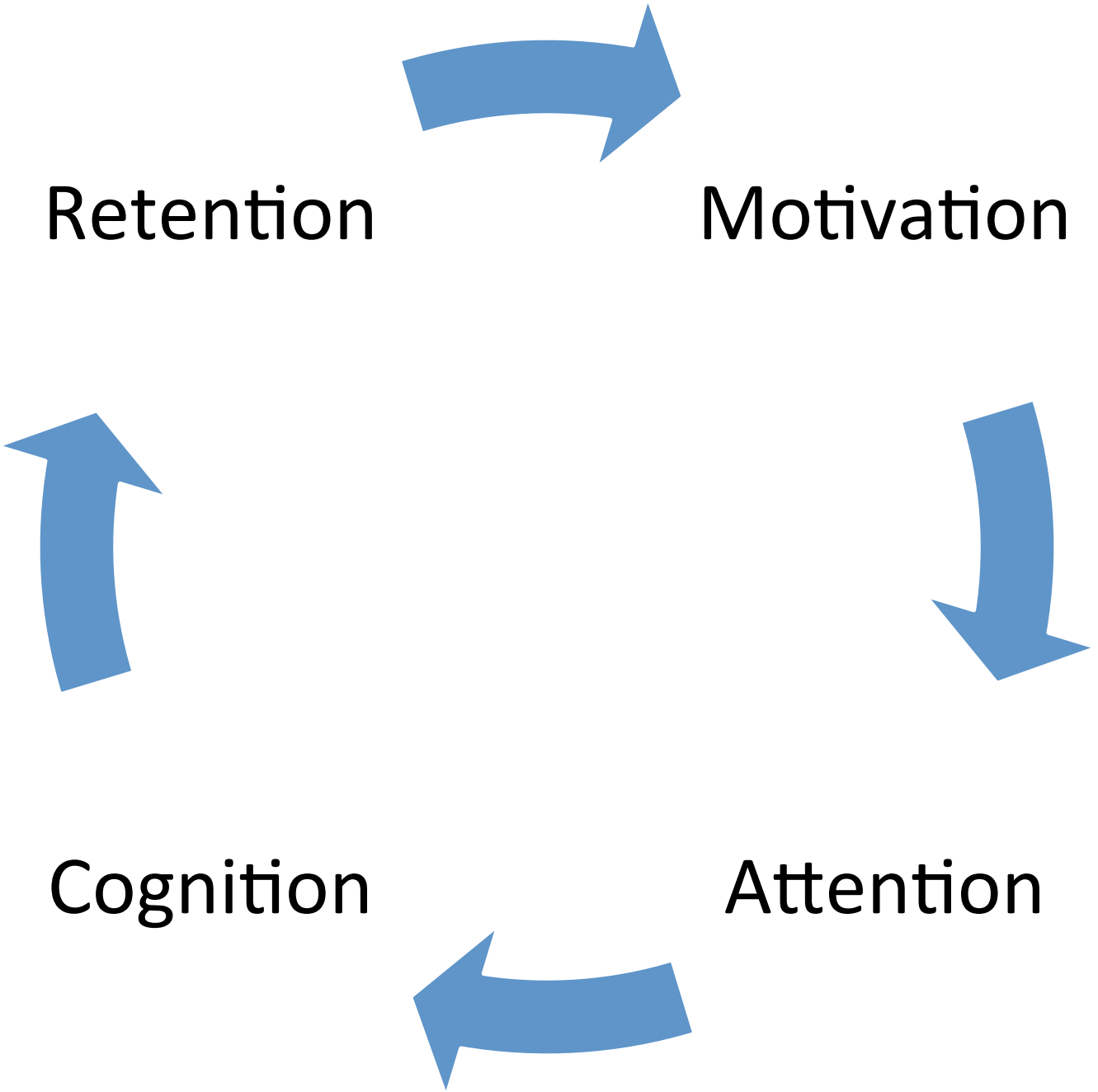
Artist can only deal with aspects that they observe♪

What if bees created art?

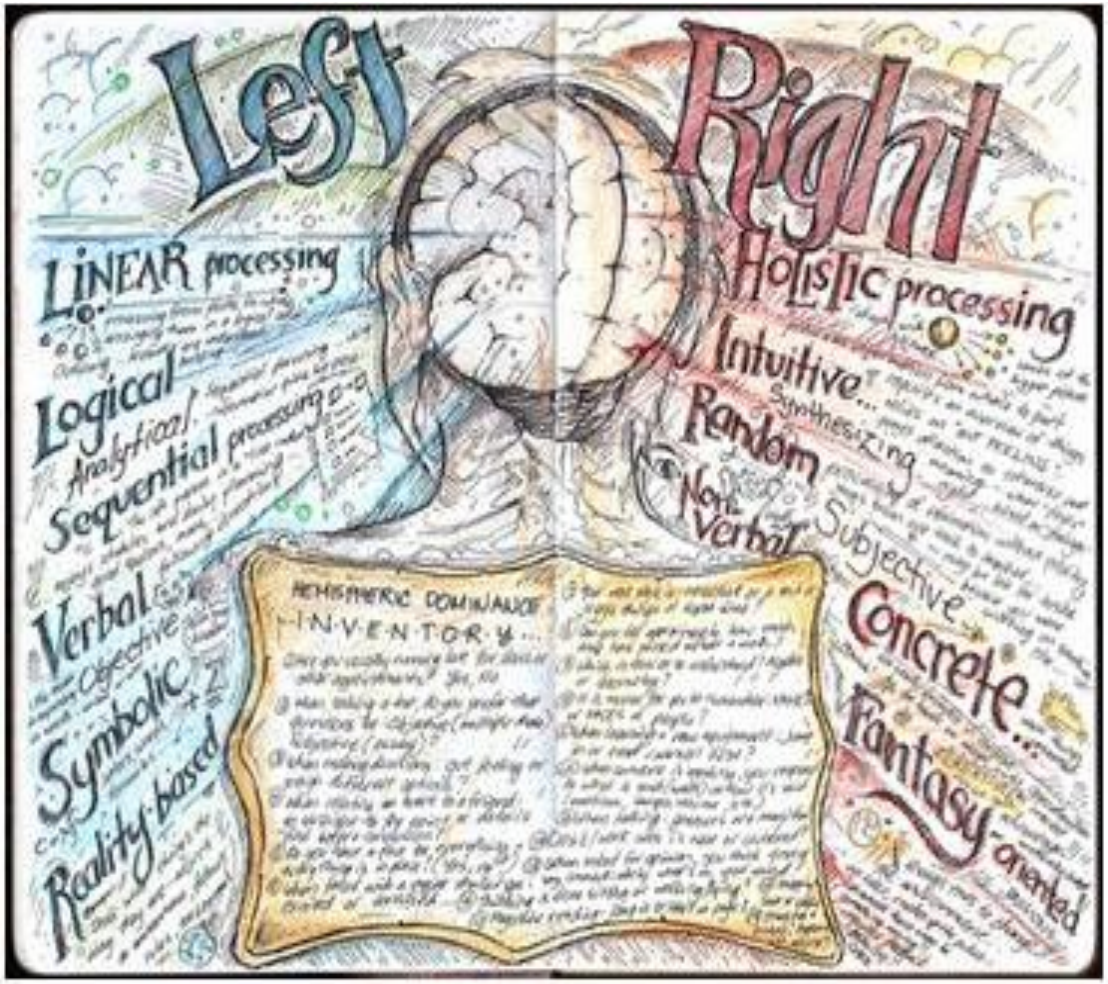
How We See


V3A
V3
V1/V2
V4 (color)
Face and object recognition areas
Front
V5 (motion)


Movement Arts
Music
Linguistic Arts
Visual Arts

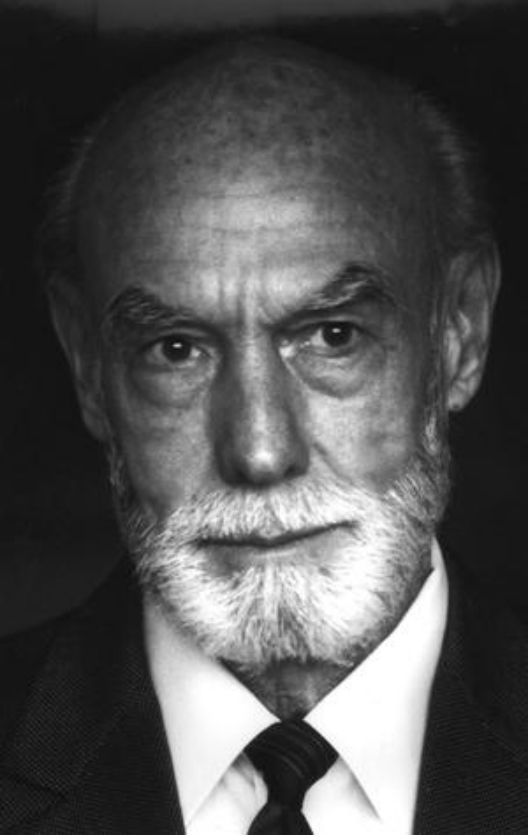

Retention
Motivation
Attention
Cognition

Split Brain Research

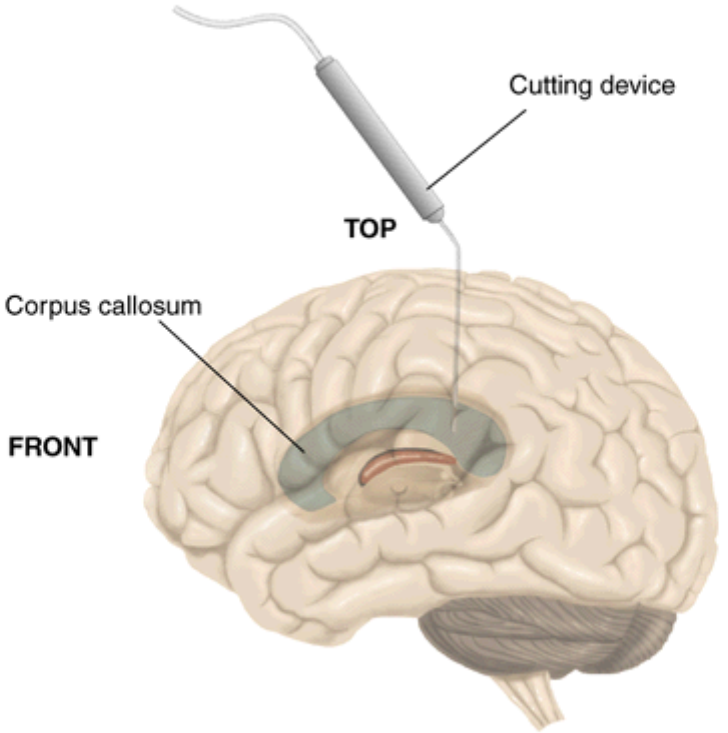


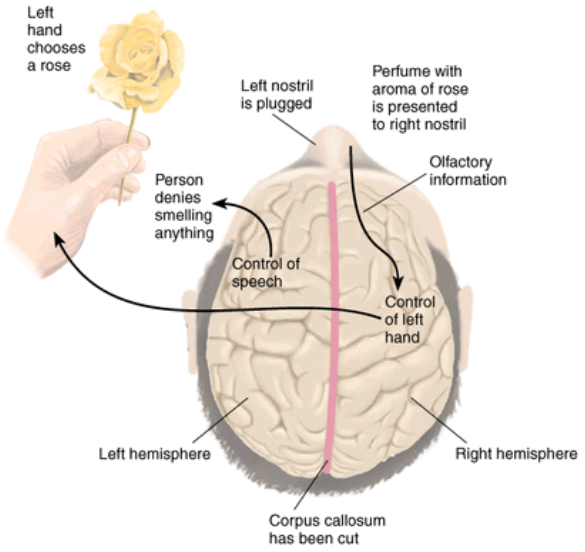
Roger Sperry

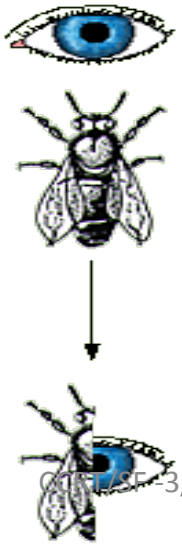
Betty Edwards



"The two disconnected hemispheres function independently and in effect have each a separate mind of its own. Each of the separated hemispheres appears to have its own private sensations, perceptions, thoughts, feelings and memories. Each hemisphere has its own inner visual world, each cut off from the conscious awareness of the other."
~Roger Sperry







Look at the chart and say the COLOUR not the word

YELLOW BLUE ORANGE
BLACK RED GREEN
PURPLE YELLOW RED
ORANGE GREEN BLACK
BLUE RED PURPLE
GREEN BLUE ORANGE

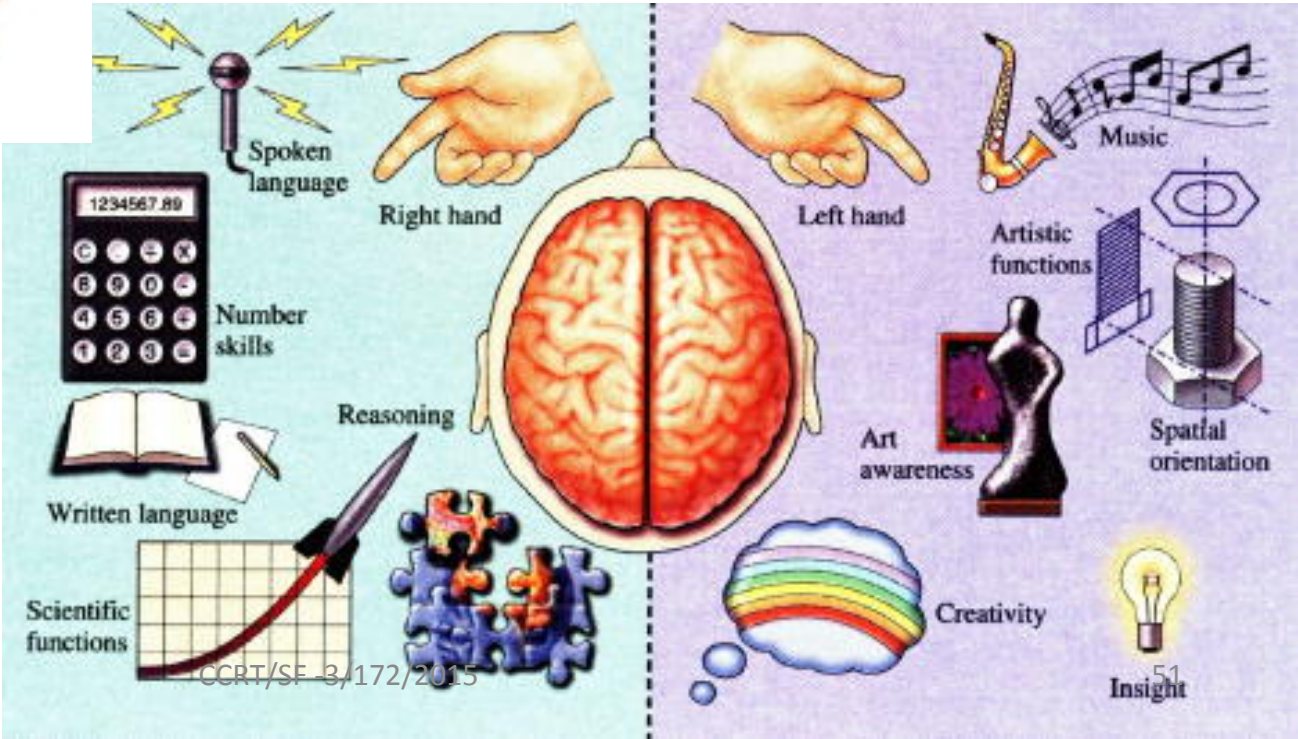
Left – Right Conflict

Your right brain tries to say the colour but your left brain insists on reading the word.

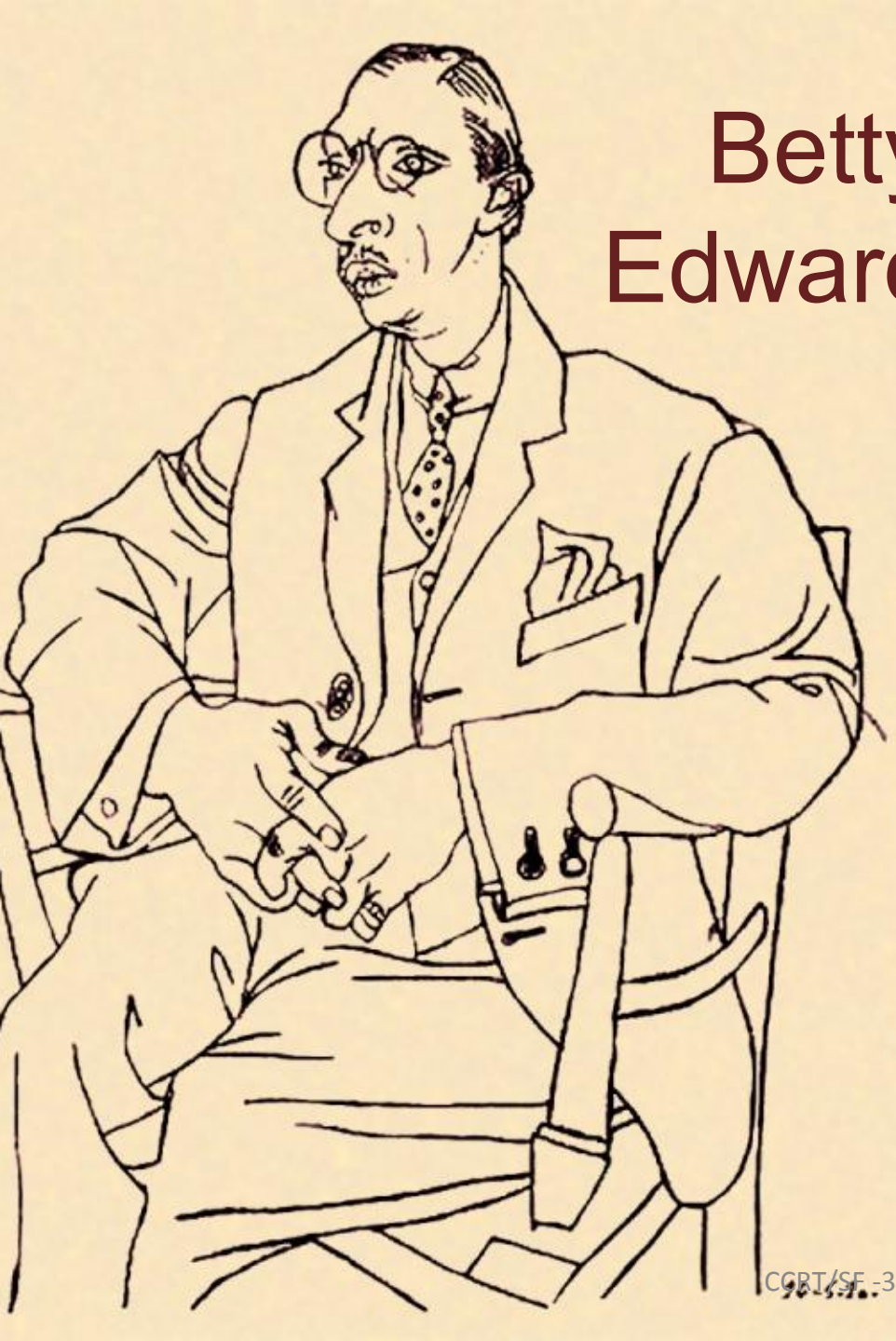
Left-hemisphere (L-mode): foursquare, upright, sensible, direct, true, hard-edged, un-fanciful, and forceful

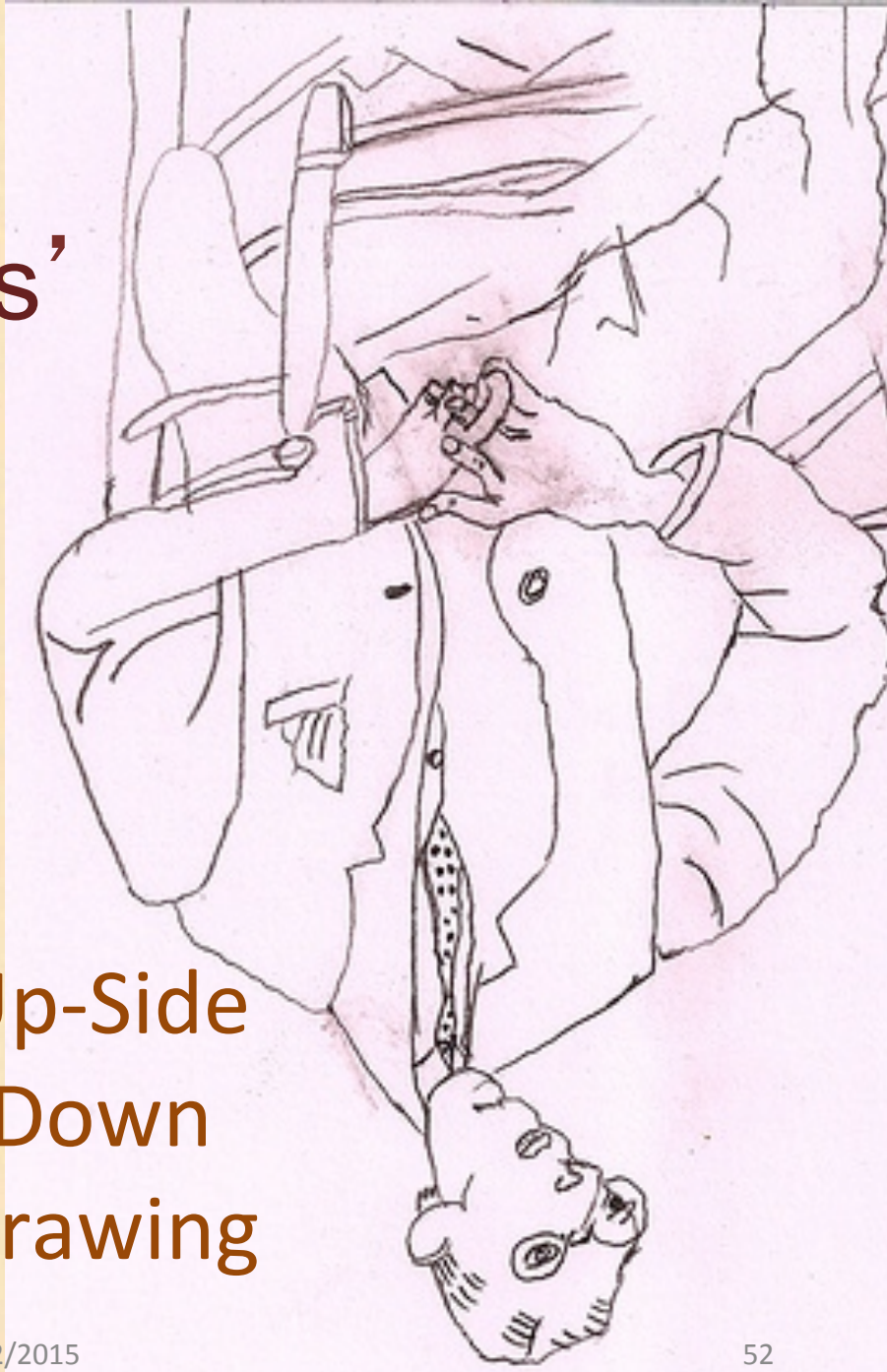
Are you Right or Left Brained?

Right-hemisphere (R-mode): curvy, flexible, more playful in its unexpected twists and turns, more complex, diagonal, and fanciful



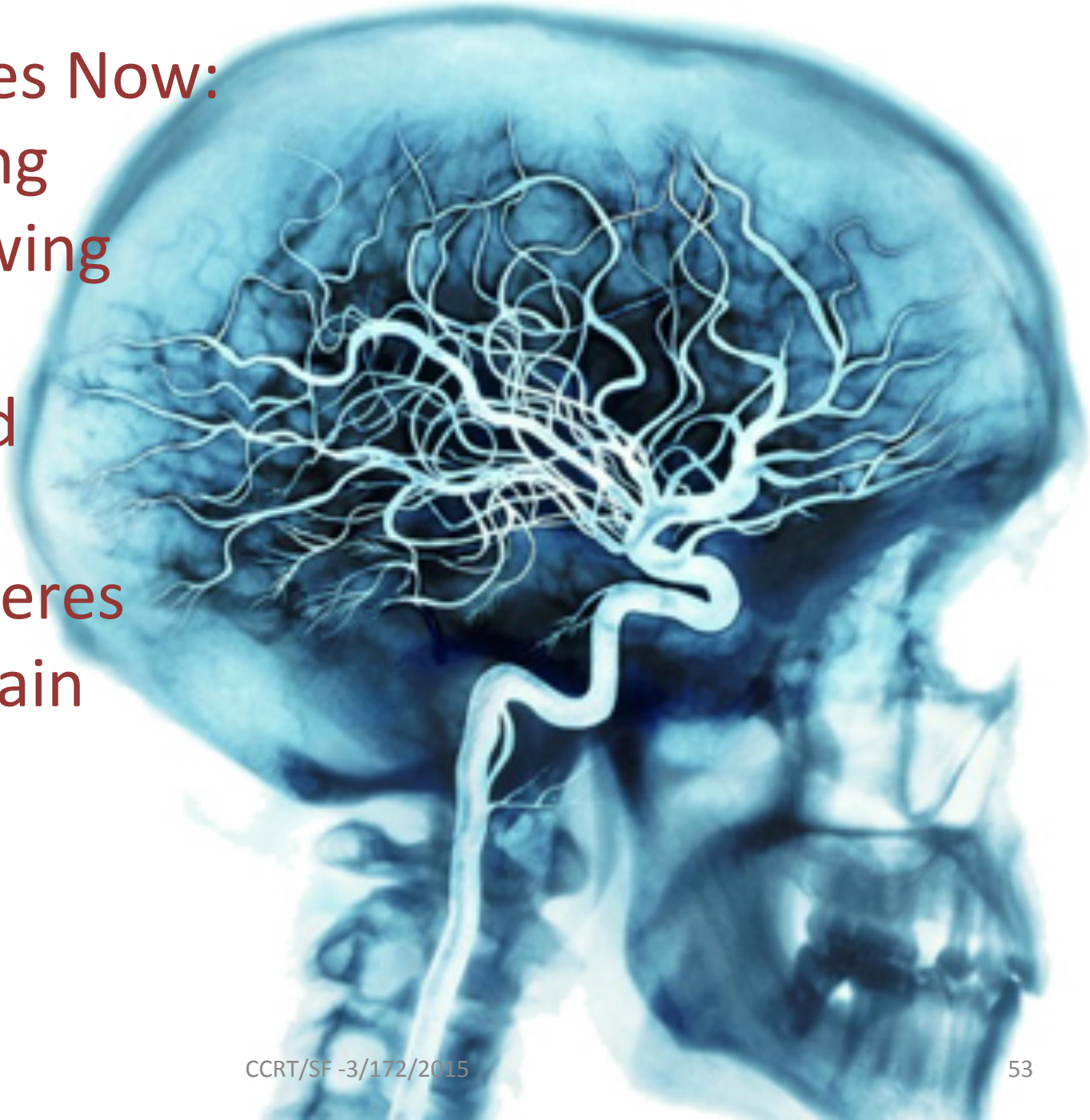
Betty Edwards'





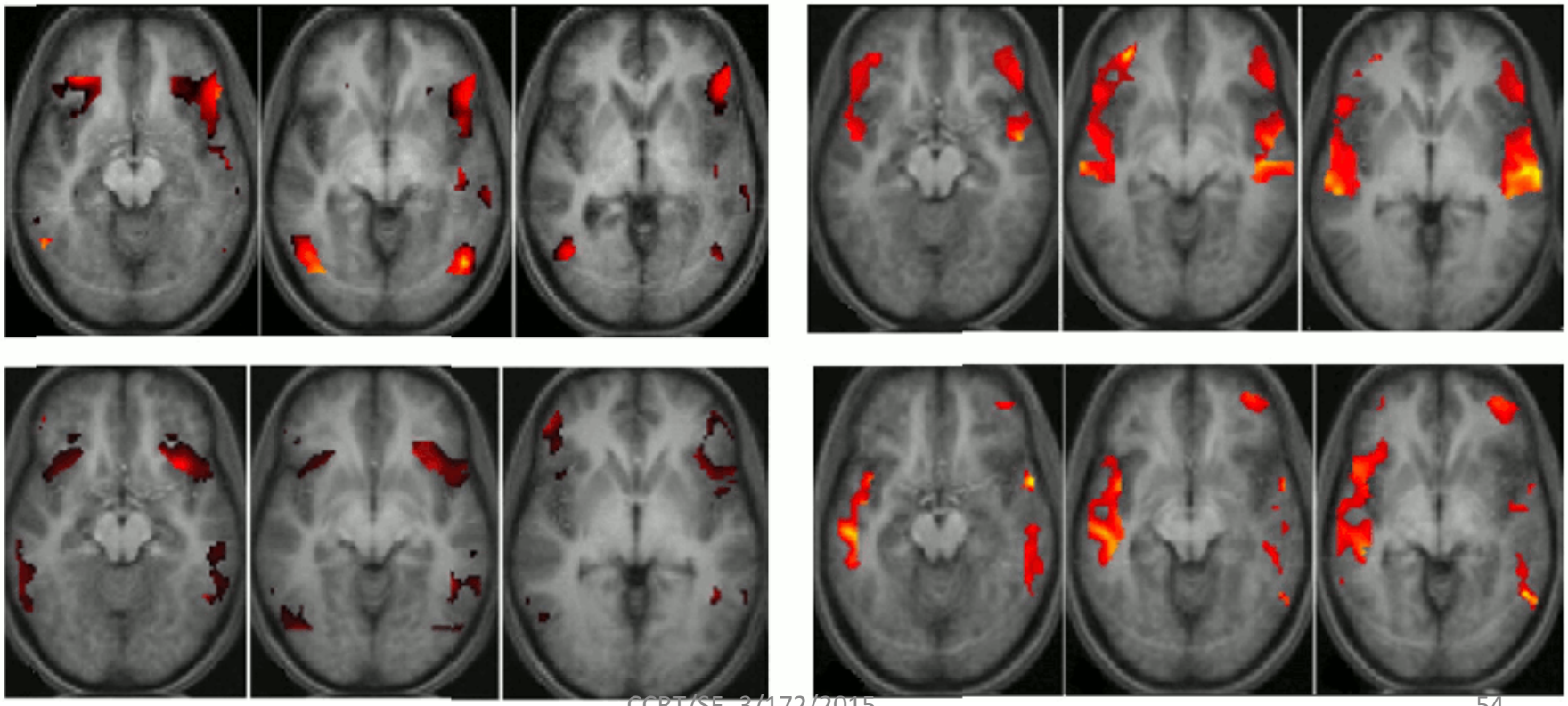
Up-Side Down Drawing

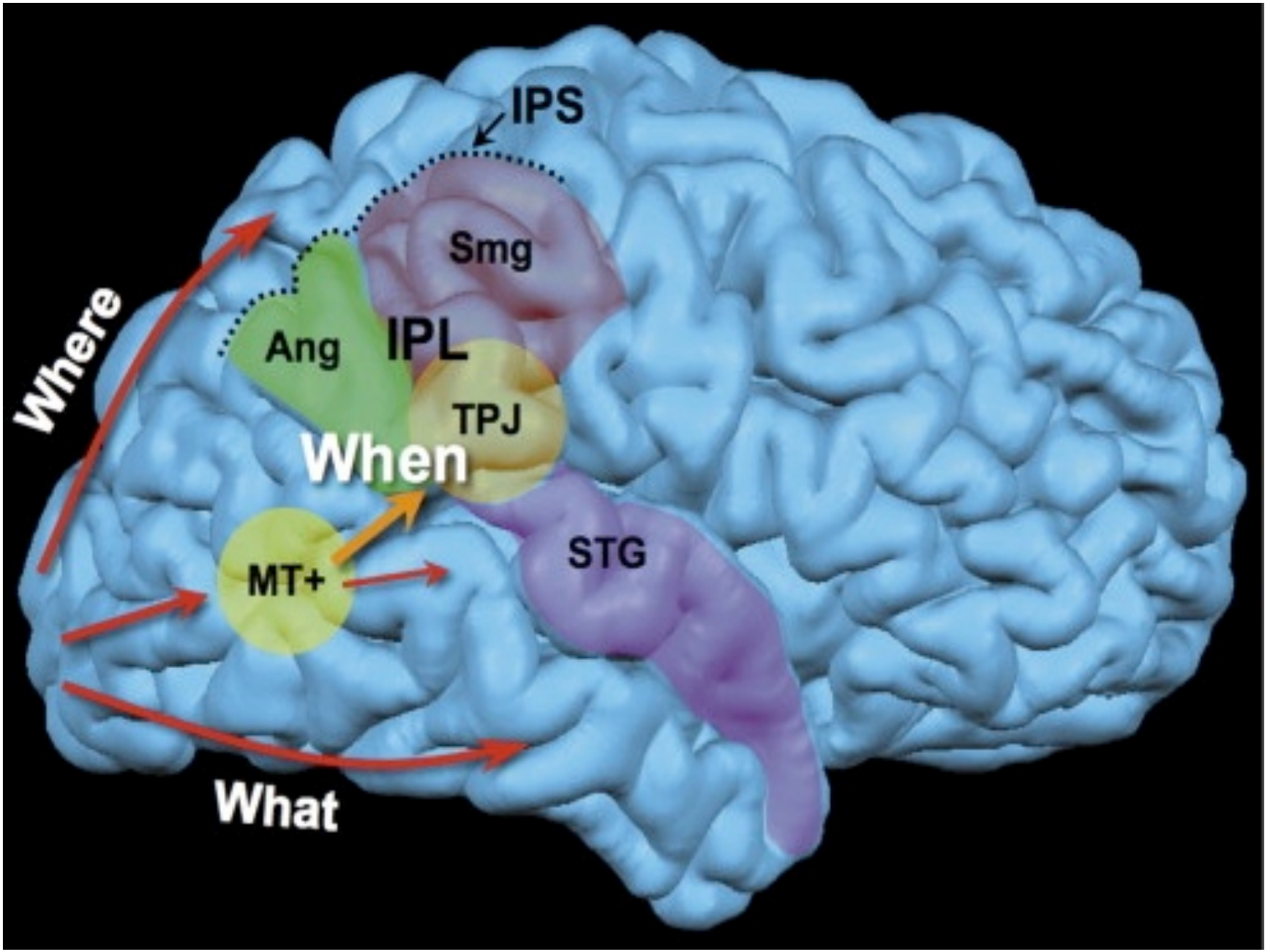
Both Sides Now: Visualizing and Drawing with the Right and Left Hemispheres of the Brain

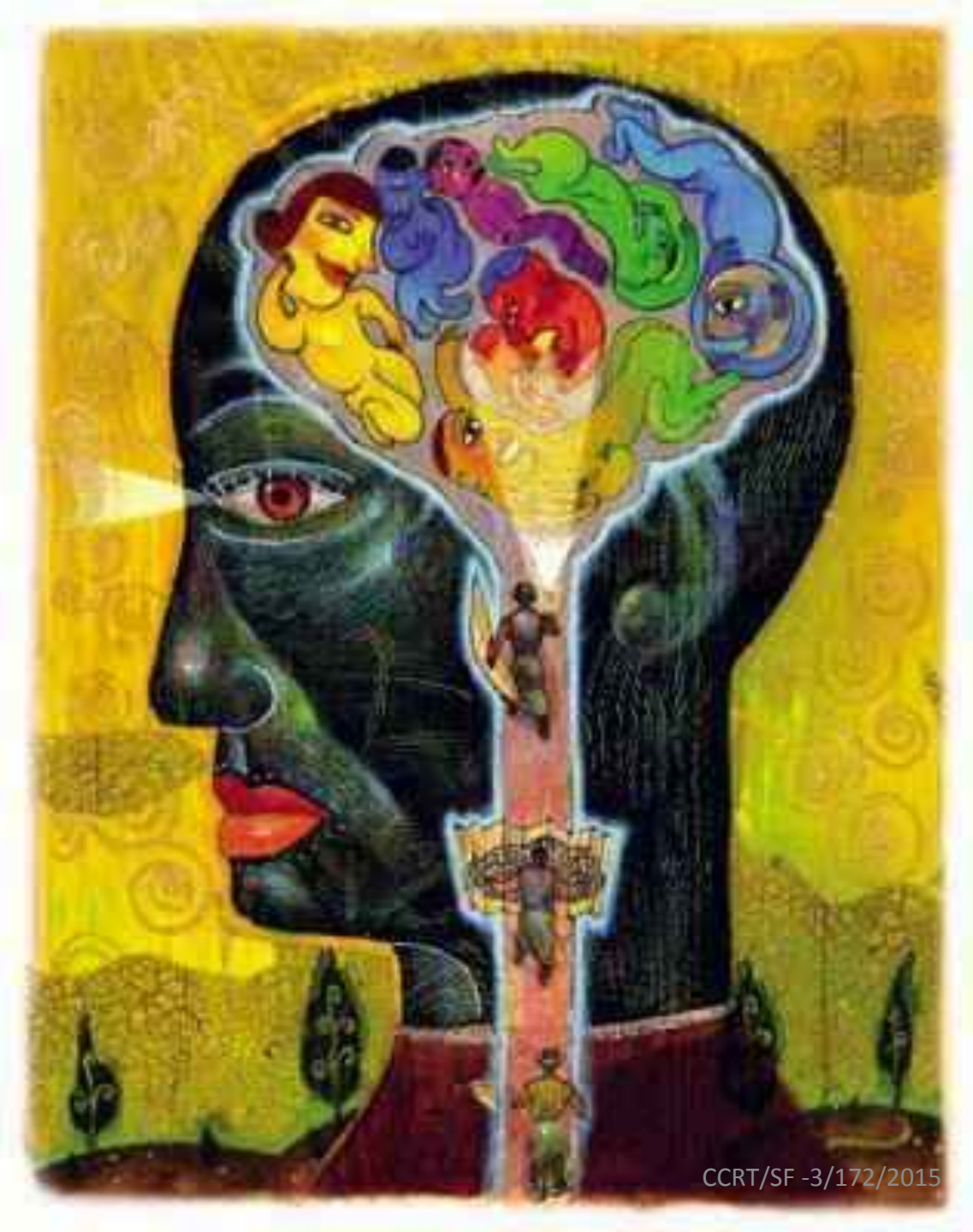


“For some tasks, responses concentrate heavily in one hemisphere while for other cognitive functions both hemispheres respond robustly. In many studies, responses fall between these two extremes. Even the ability to read and write in English – where a strong left hemisphere response is well documented – involves right hemisphere activity.”

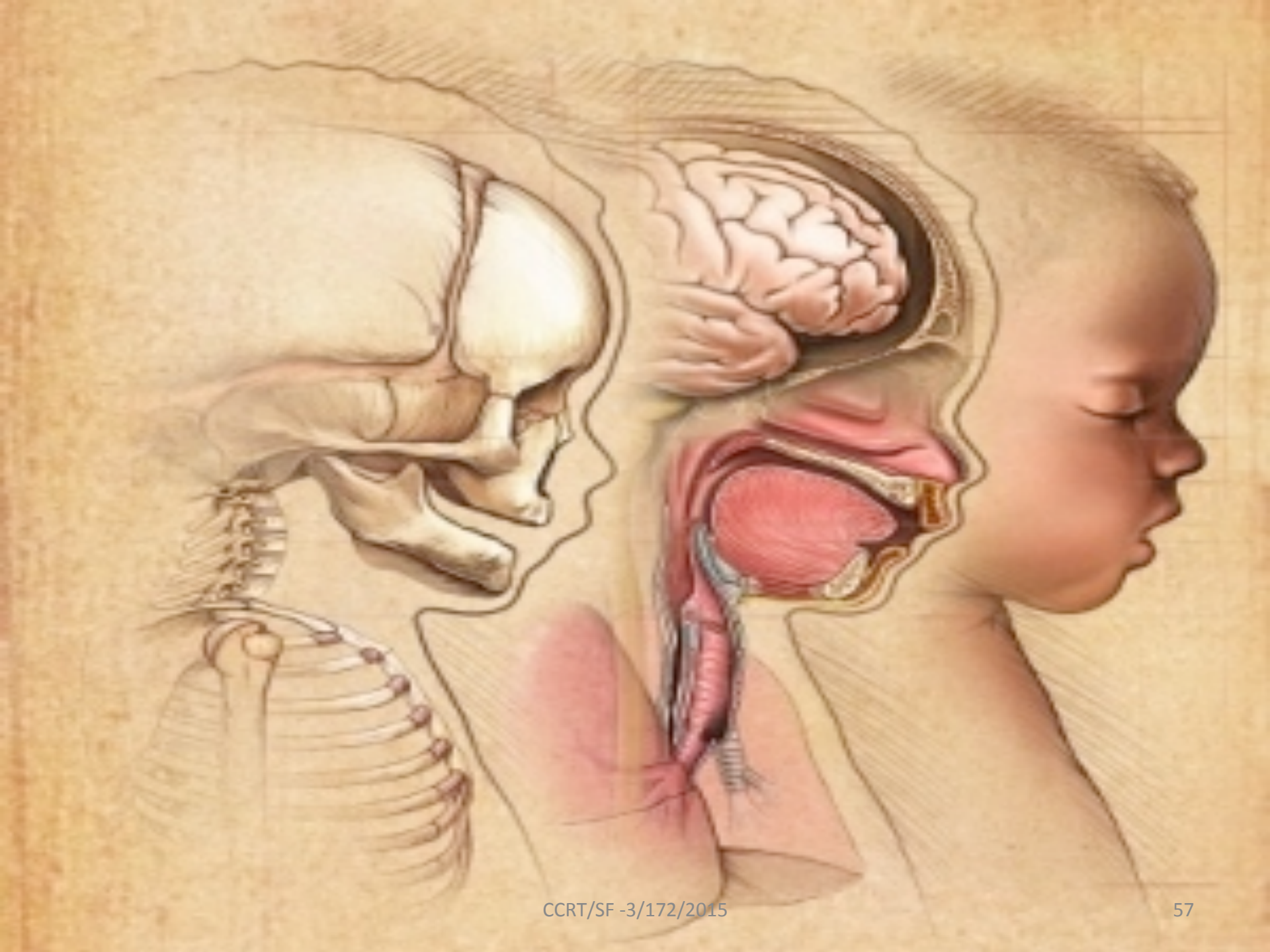
~ Irene Schiferl




IPS
Smg
Ang
IPL
TPJ
When
Where
MT+
STG
What

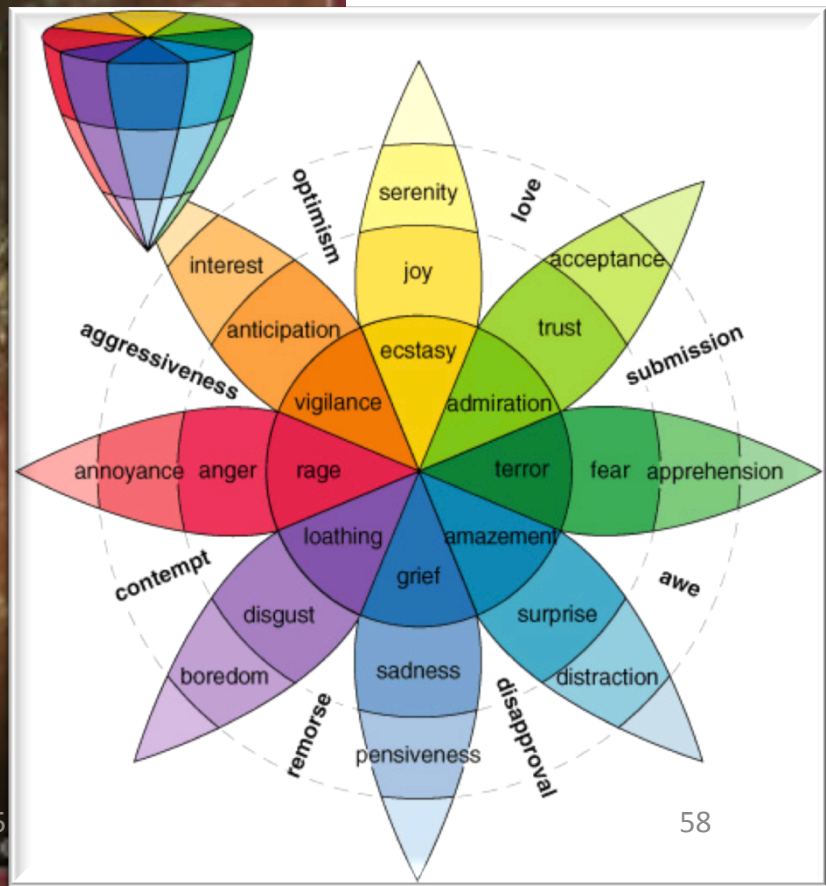


Implications of Brain Research in Art Education

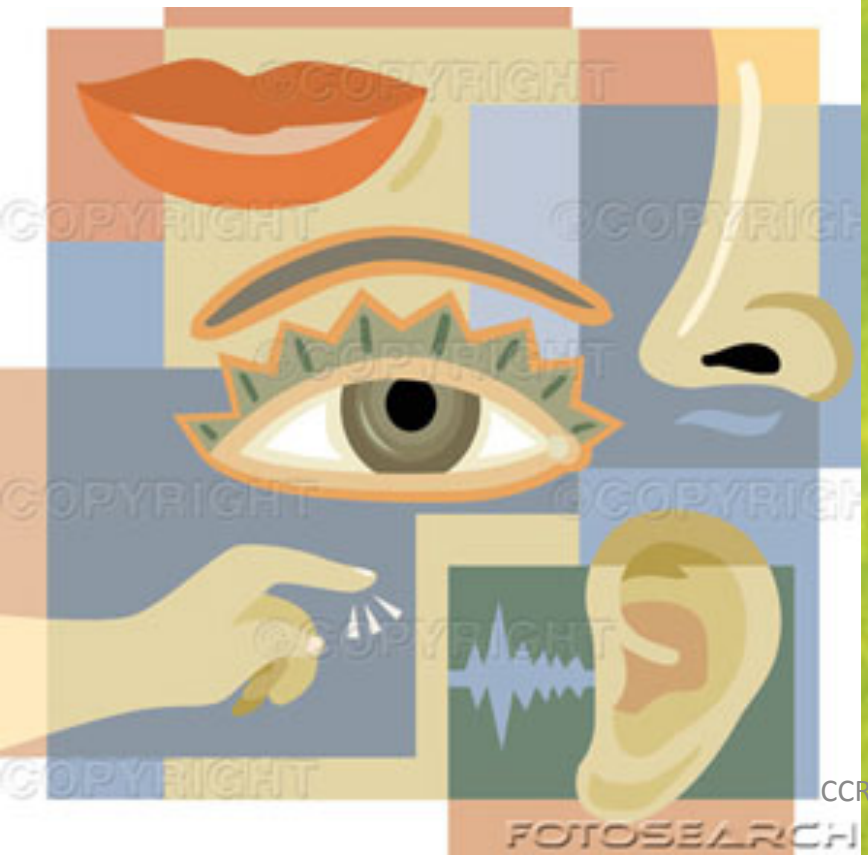


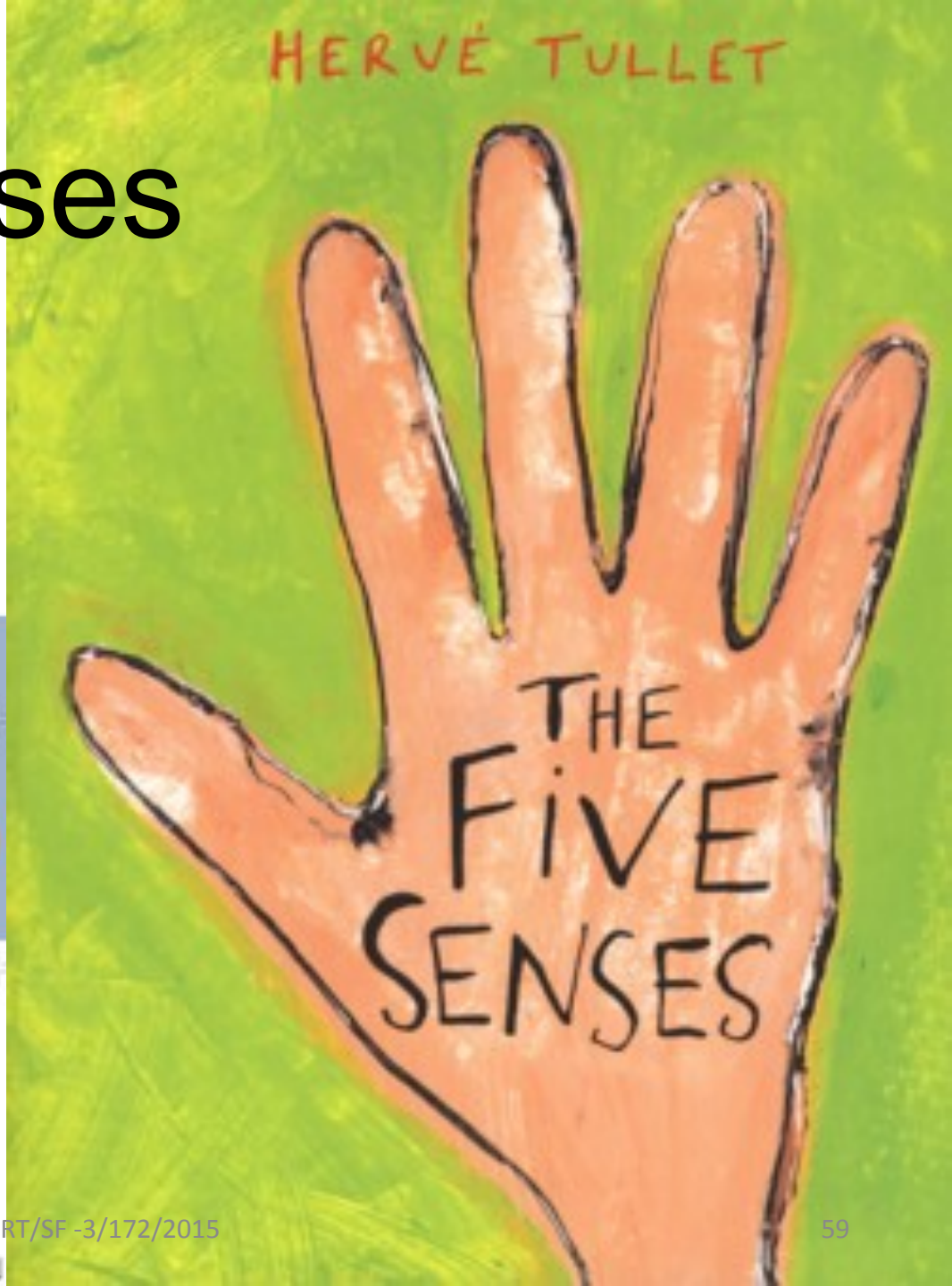
Implication One

Emotion



All the Senses





Introduction

- A sensory receptor is a specialized cell or cell process that monitors conditions in the body or the external environment
- Stimulation of the receptor directly or indirectly alters the production of action potentials in a sensory neuron
- The sensory information arriving at the CNS is called a sensation

  - a perception is a conscious awareness of a sensation

General and Special Senses

General senses

- Sensations of temperature, pain, touch, pressure, vibration, and proprioception (body position)
- Receptors throughout the body
- Sensations arrive at the primary sensory cortex (somatosensory cortex)

Special Senses

- Sensations of smell (olfaction), taste (gustation), balance (equilibrium), hearing, and vision
- Specialized receptor cells that are structurally more complex than those of the general senses

Receptors

- Receptor specificity – each responds to one type of stimulus
- Receptive field – the area a receptor monitors
- Tonic receptors – always send signals, information is based on the frequency of the action potentials
- Phasic receptors – send action potentials only if stimulated
- Peripheral adaptation – receptors may stop sending AP even if the stimulus is still present
- Central adaptation – CNS ignoring a AP from a receptor

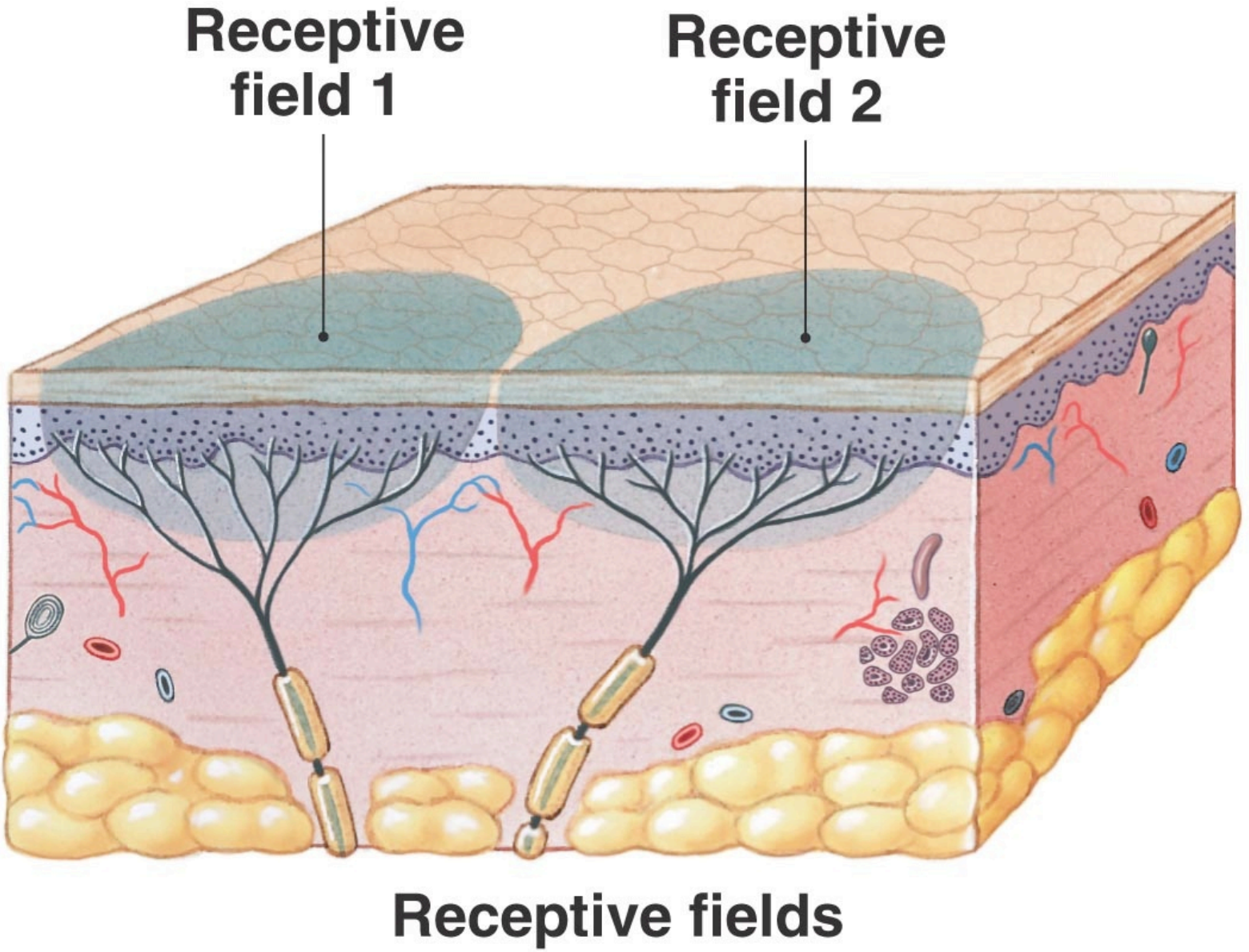


Figure 18.1

Sensory Limitations

- Humans do not have receptors for every possible stimulus
- Our receptors have characteristic ranges of sensitivity
- A stimulus must be interpreted by the CNS

  - our perception of a particular stimulus is an interpretation and not always a reality

The General Senses

Receptors classified by location

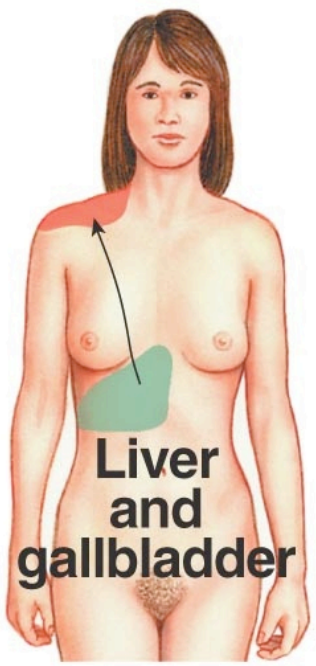
- Exteroceptors provide information about the external environment
- Proprioceptors monitor body position
- Interoceptors monitor conditions inside the body

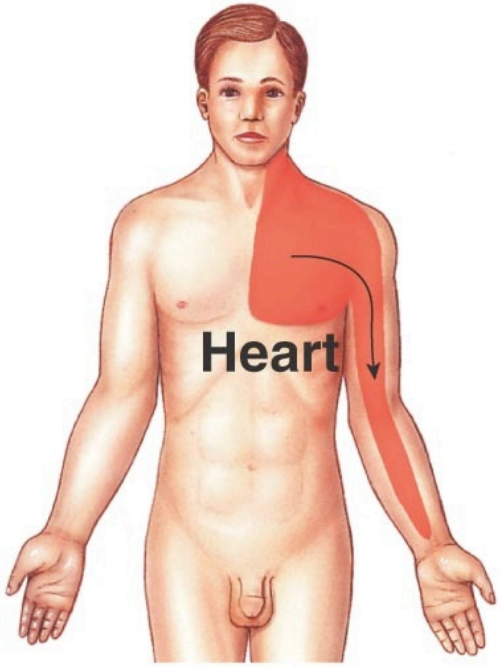
Receptors classified by type of stimulus

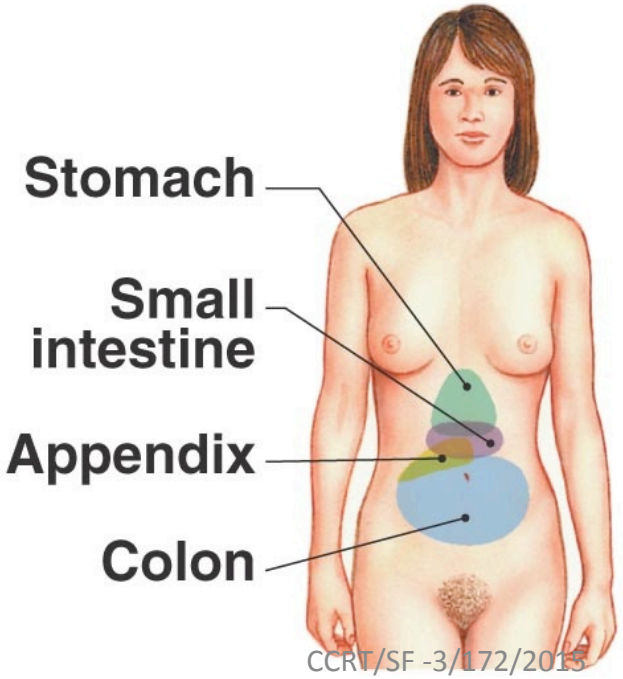
- Nociceptors = tissue damage
- Thermoreceptors = change in temperature
- Mechanoreceptors = physical distortion, contact, or pressure
- Chemoreceptors = chemical composition of body fluids

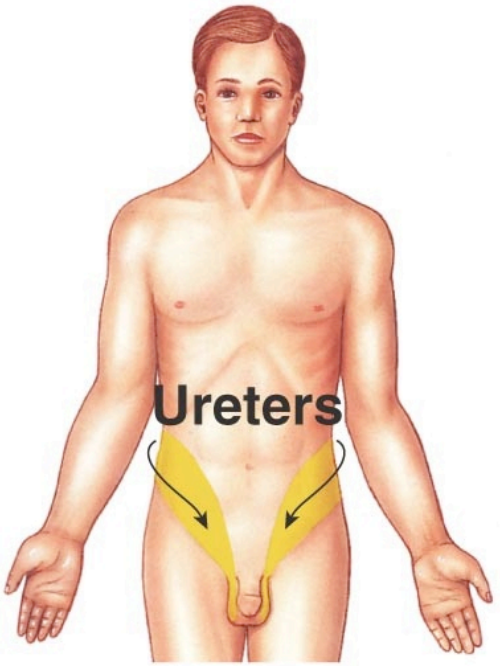
Referred Pain

Pain sensations originating in visceral organs are often perceived as involving specific regions of the body surface innervated by the same spinal nerves









The Olfactory Organs

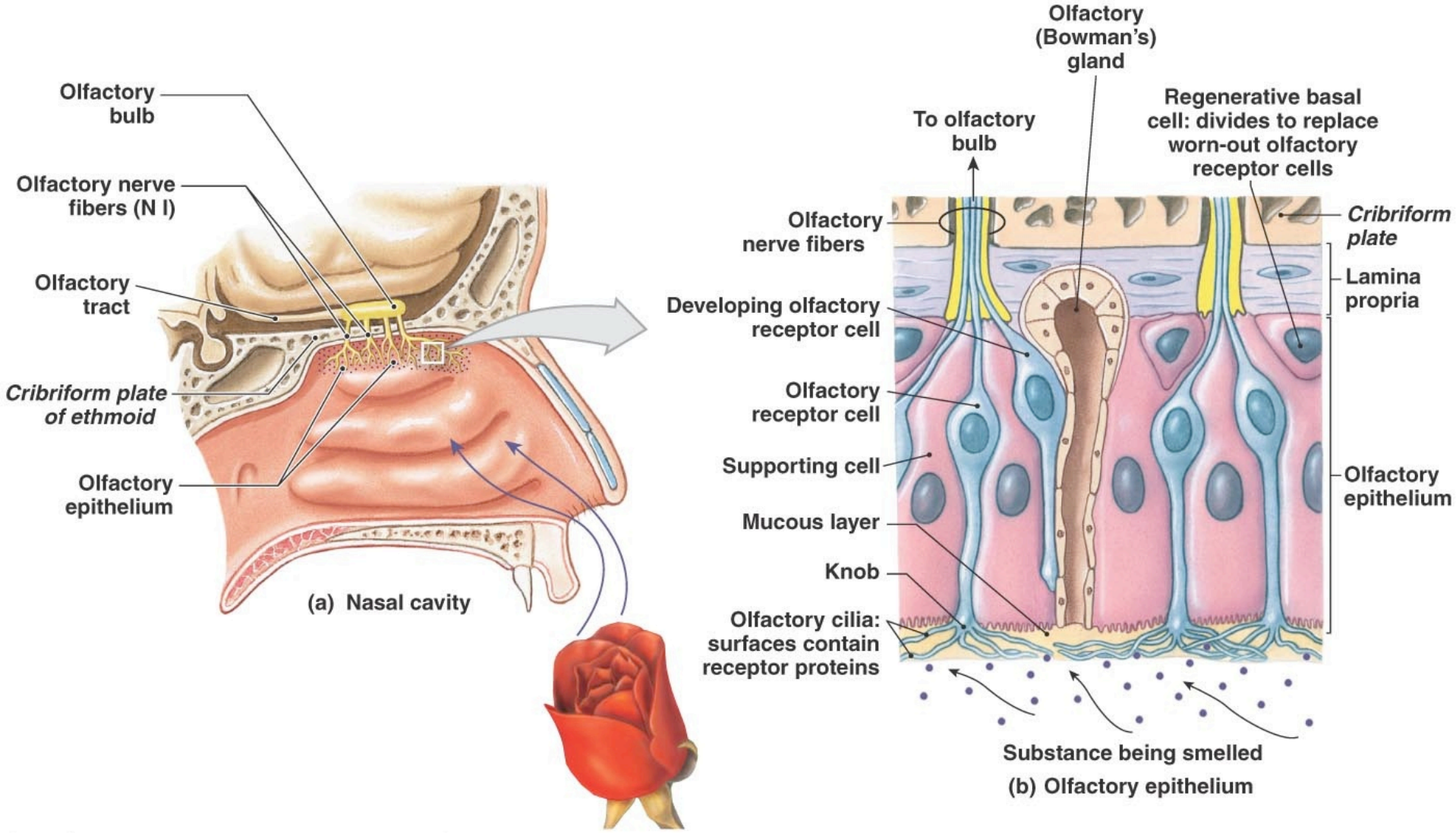
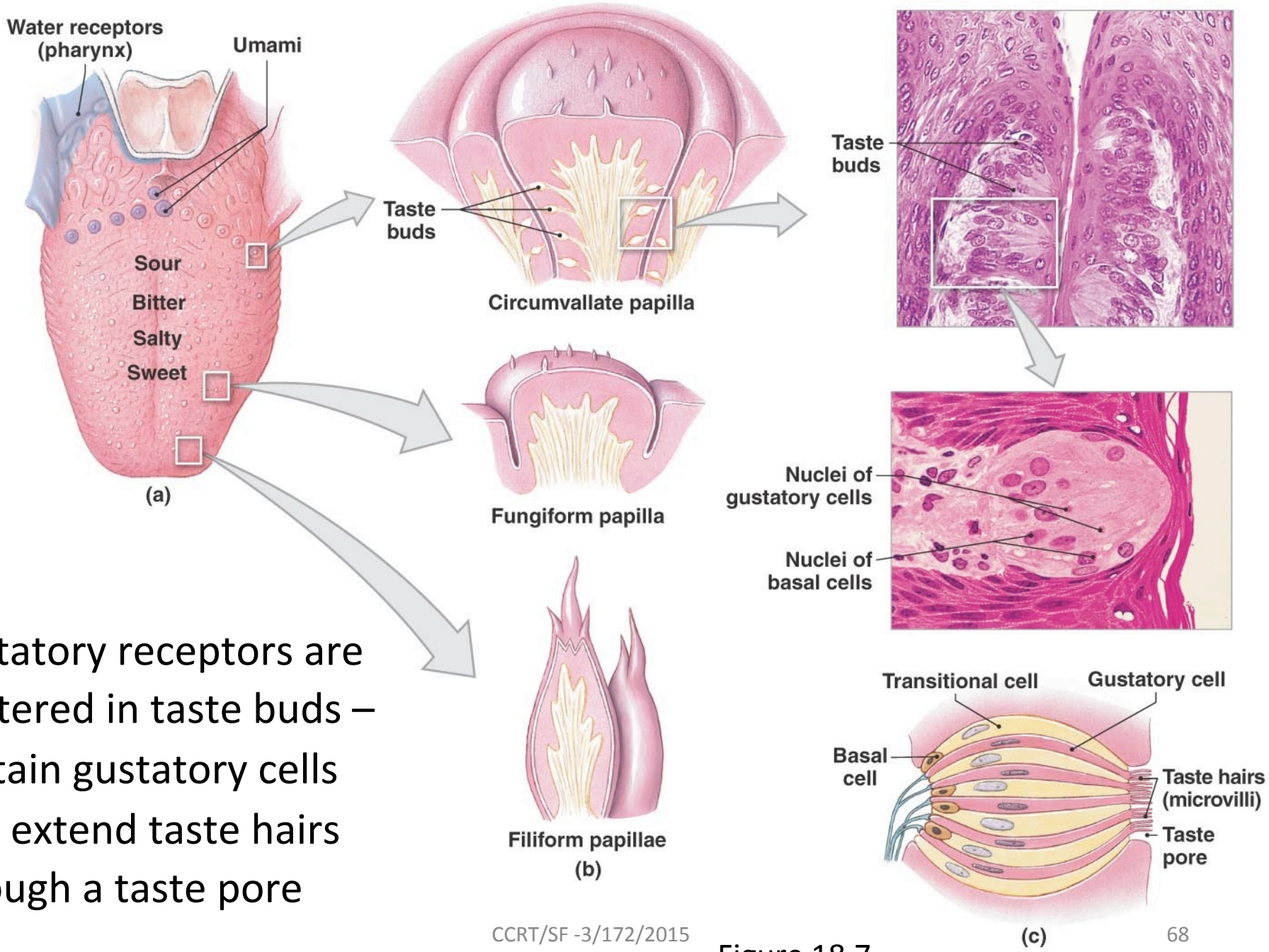


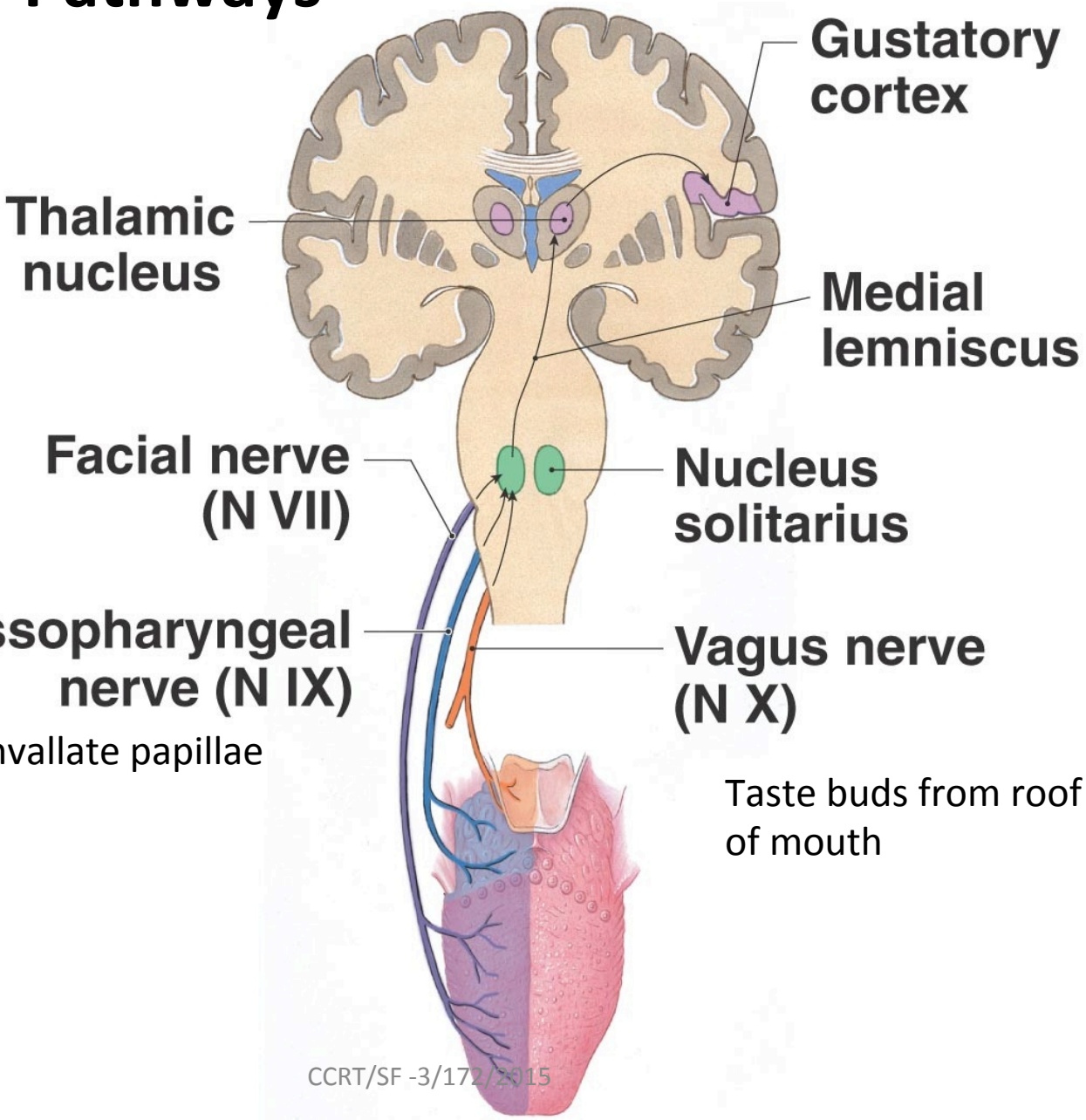
Figure 18.6



Gustatory receptors are clustered in taste buds – contain gustatory cells that extend taste hairs through a taste pore

Figure 18.7

Gustatory Pathways



Fungiform and filiform papillae

Circumvallate papillae

Taste buds from roof of mouth

Figure 18.8

Equilibrium and Hearing

Sense of hearing perceived by the ear

- External Ear – auricle or pinna and external acoustic meatus auditory canal with tympanic membrane
- Middle ear – auditory ossicles (malleus, incus, stapes) auditory or Eustachian tube in petrous part of temporal
- Inner ear – vestibule and semicircular canals (equilibrium); Cochlea - hearing

Anatomy of the Ear

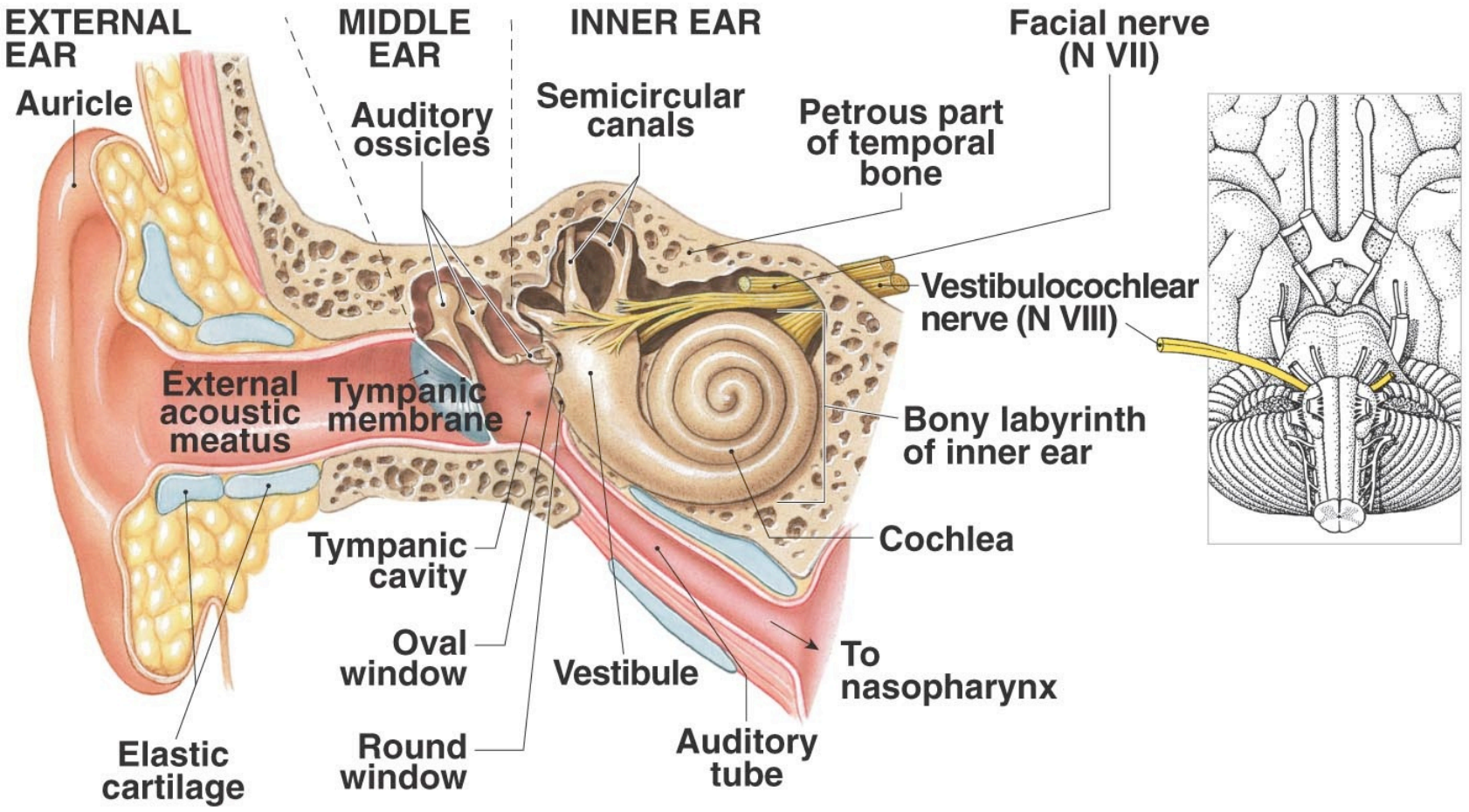
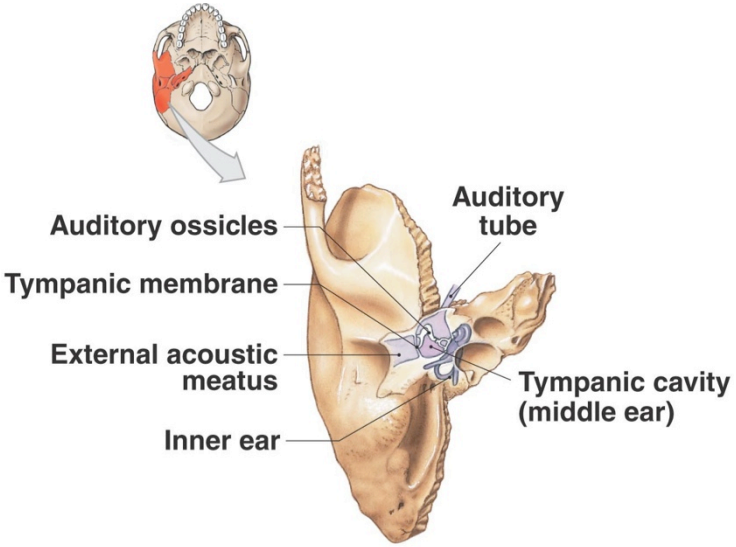


Figure 18.9

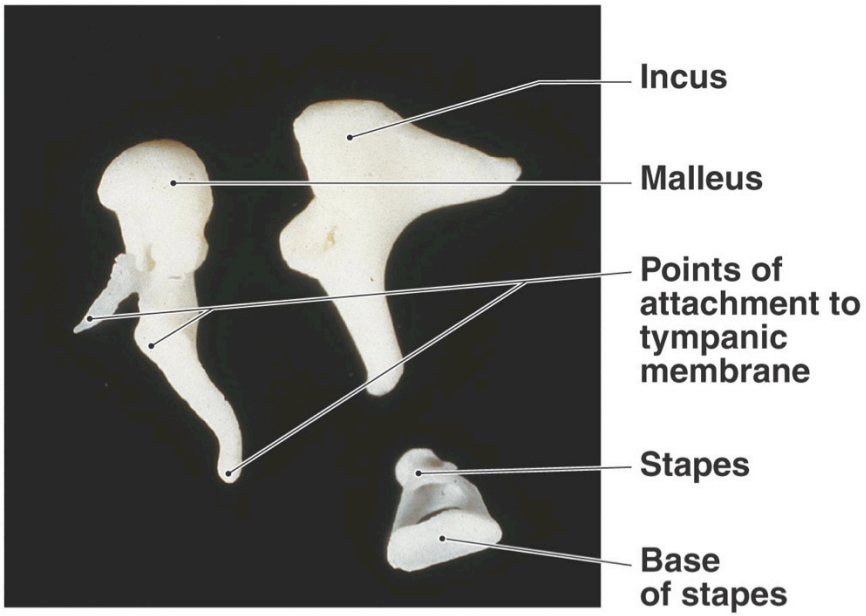
TABLE 18.2 Steps in the Production of an Auditory Sensation

1. Sound waves arrive at the tympanic membrane.
2. Movement of the tympanic membrane causes displacement of the auditory ossicles.
3. Movement of the stapes at the oval window establishes pressure waves in the perilymph of the vestibular duct.
4. The pressure waves distort the basilar membrane on their way to the round window of the tympanic duct.
5. Vibration of the basilar membrane causes vibration of hair cells against the tectorial membrane, resulting in hair cell stimulation and neurotransmitter release.
6. Information concerning the region and intensity of stimulation is relayed to the CNS over the cochlear branch of N VIII.

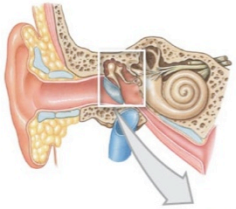
The Middle Ear

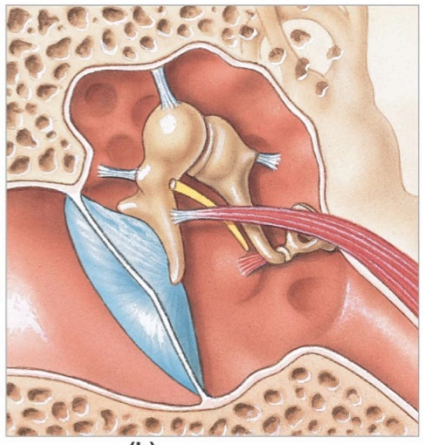


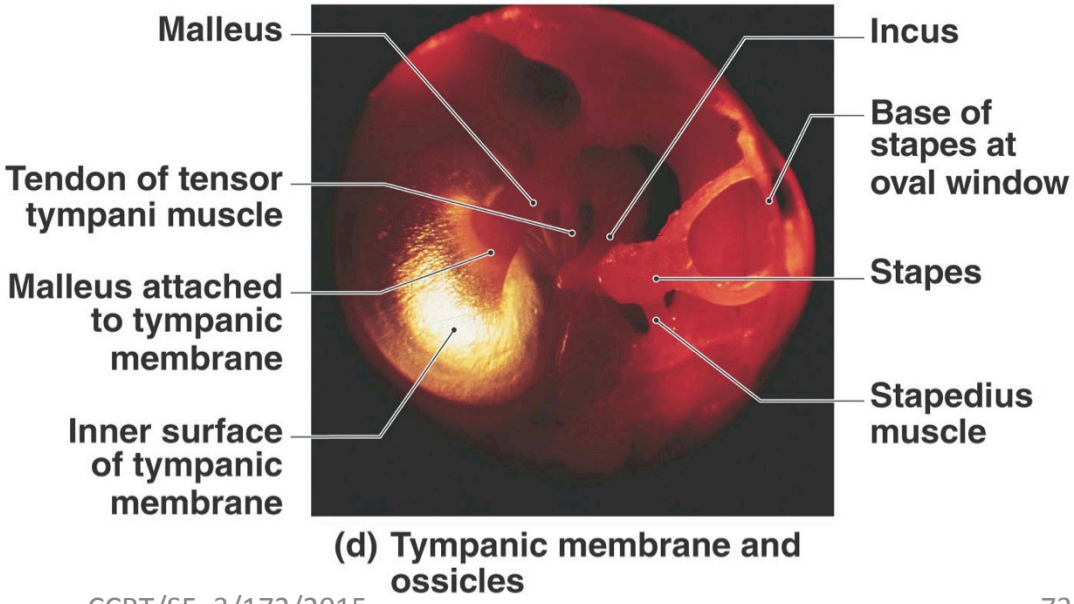
(a) Temporal bone, inferior view



(c) Auditory ossicles




(b)



(d) Tympanic membrane and ossicles

Figure 18.10

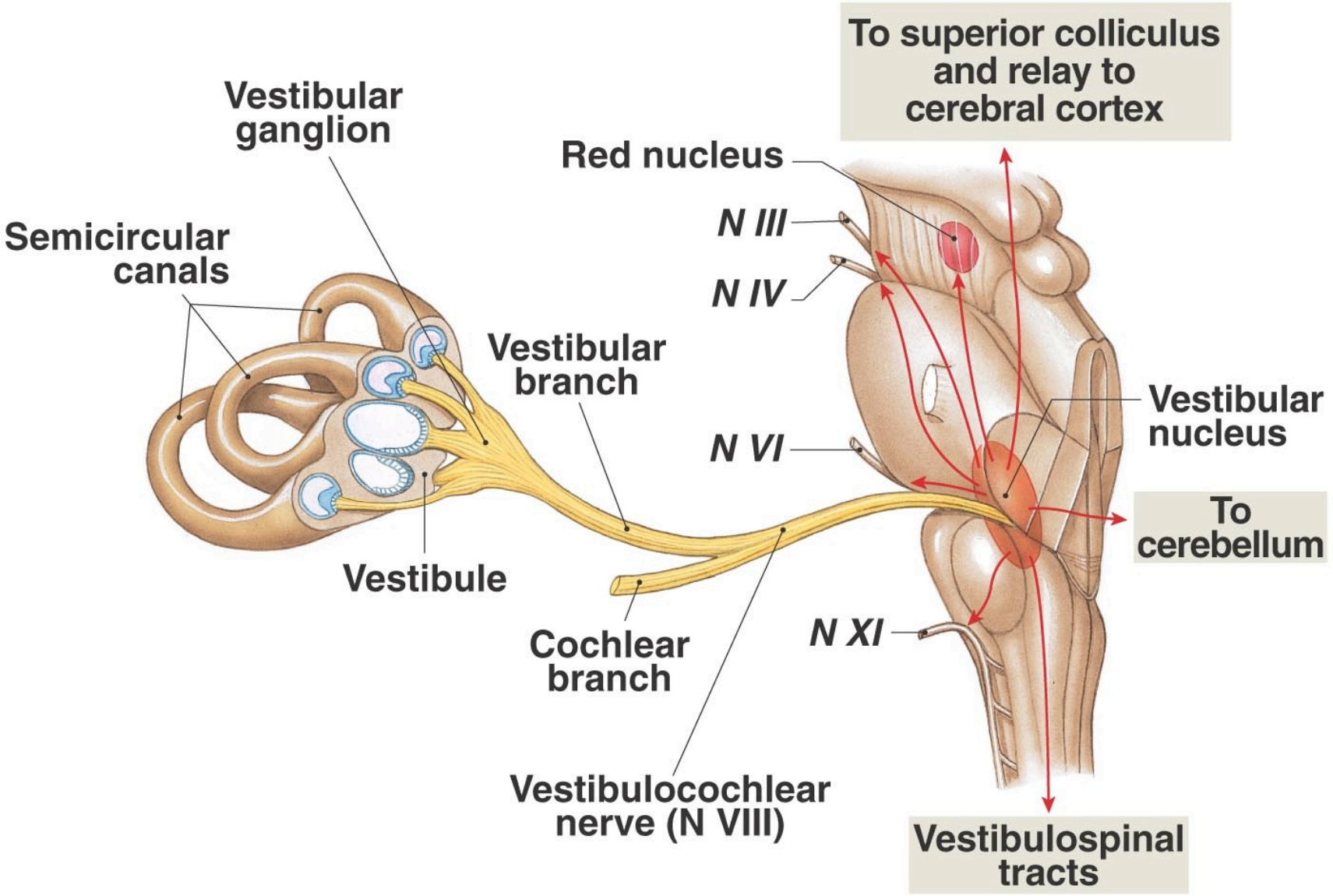


Fig 18.16 **Neural Pathways for Equilibrium Sensations**

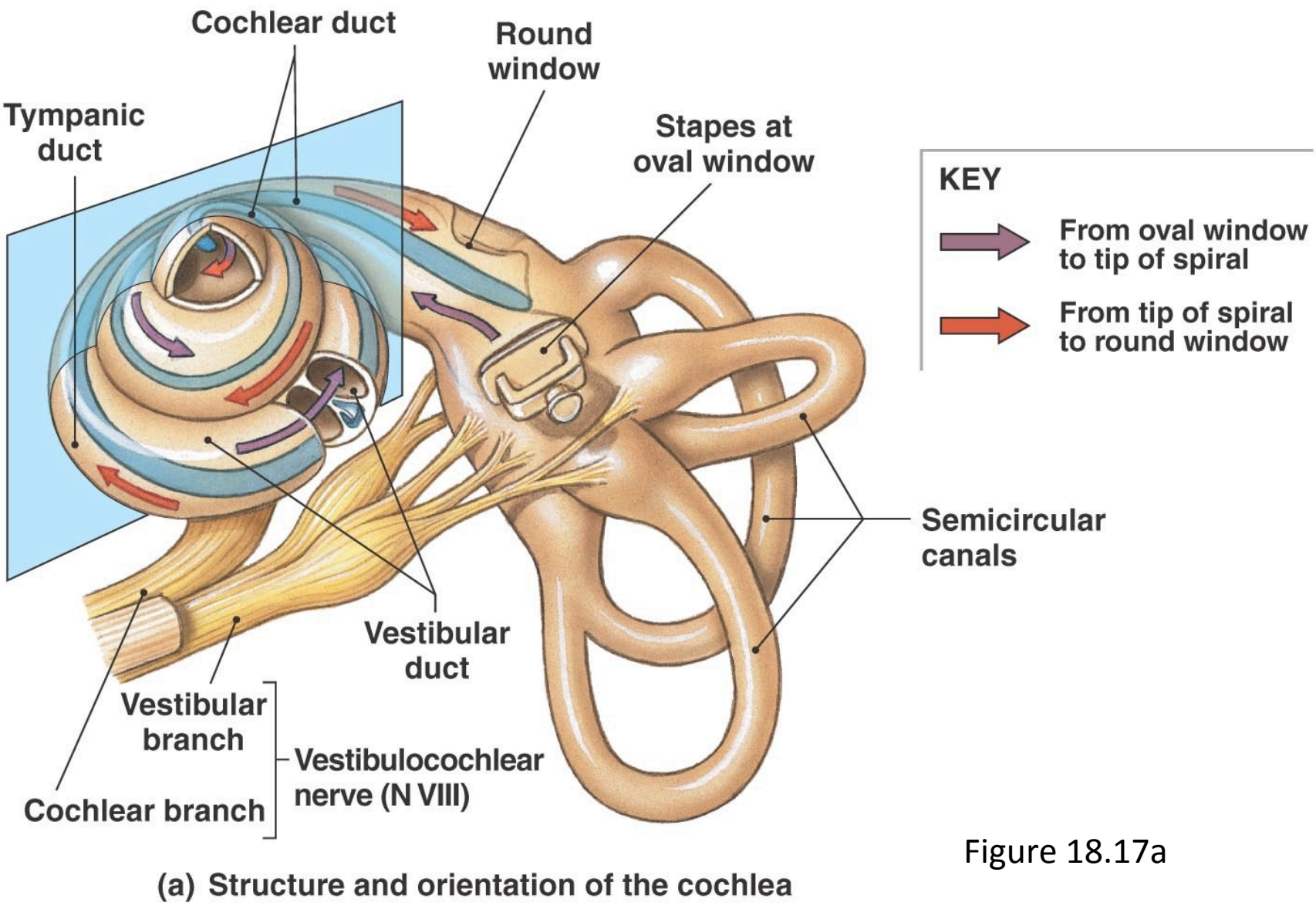


Figure 18.17a

The Cochlea and Organ of Corti

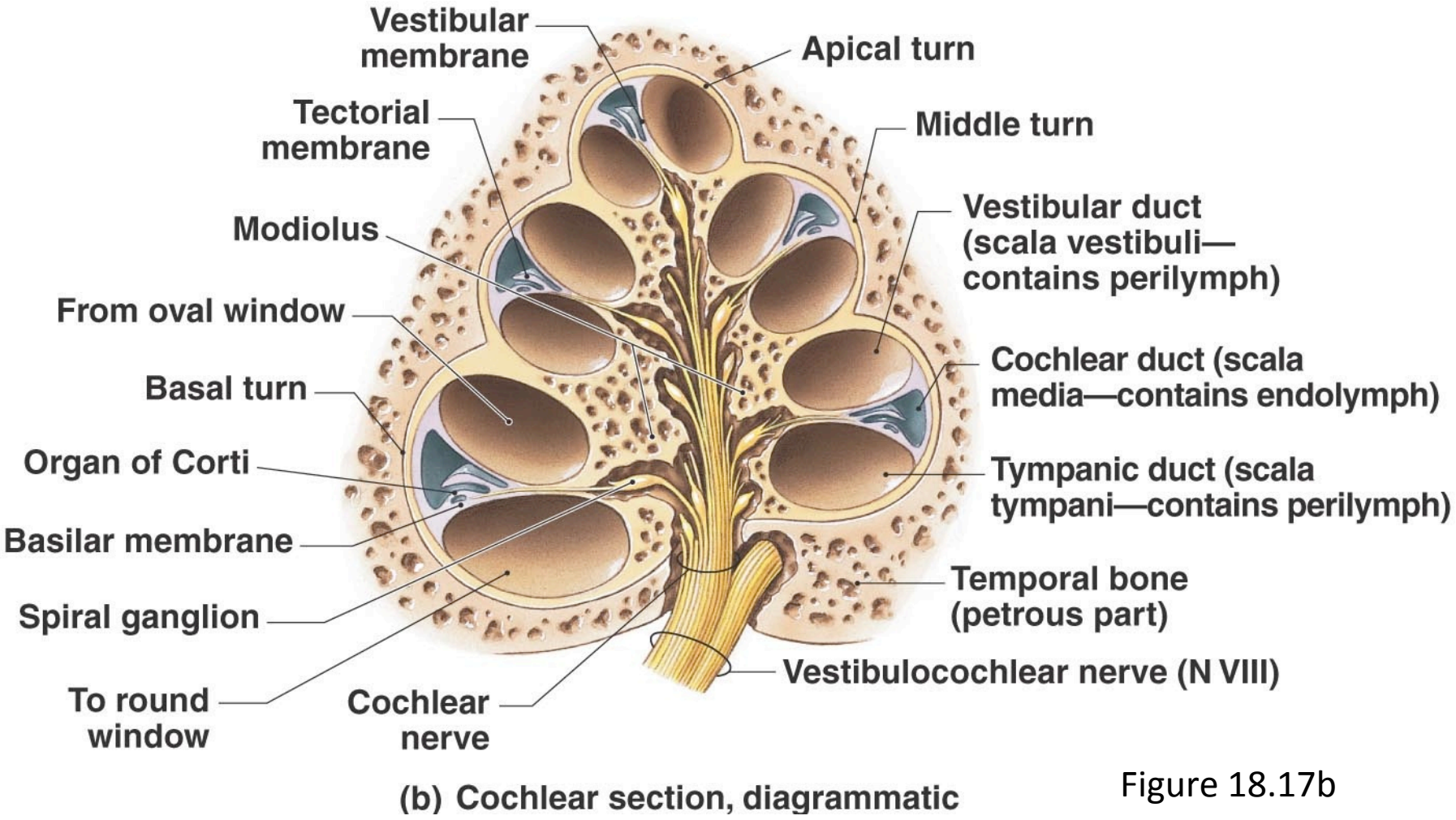
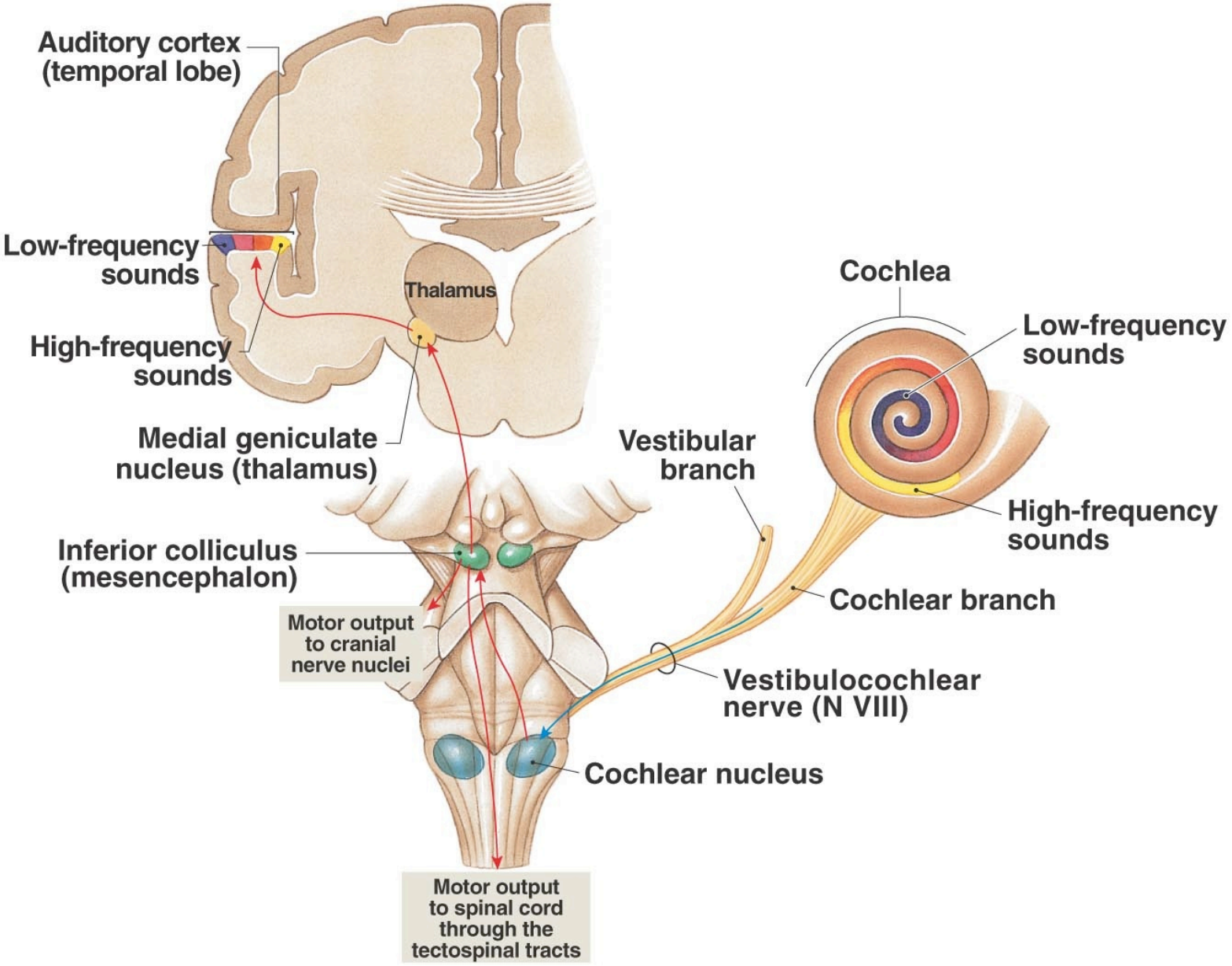


Figure 18.17b

The Cochlea and Organ of Corti



Pathways for Auditory Sensations

Vision

- Accessory Structures – eyelids and lacrimal apparatus
- Eye – 3 layers or Tunics

  - Fibrosa: sclera (white), cornea (transparent)

  - Vascularis: choroid (vascular supply)

  - Nervosa: retina contain the photoreceptors (rods for night vision and cones for day vision)
- Photoreceptors are neurons whose axons synapse with other neurons and continue together as the optic nerve

Cavities of the eye: posterior and anterior

- Anterior has 2 chambers (anterior and posterior)

  - aqueous humor formed from interstital fluids (resembles CSF)

  - fluid cushion, nutrient and waste transport

- Posterior or vitreous chamber

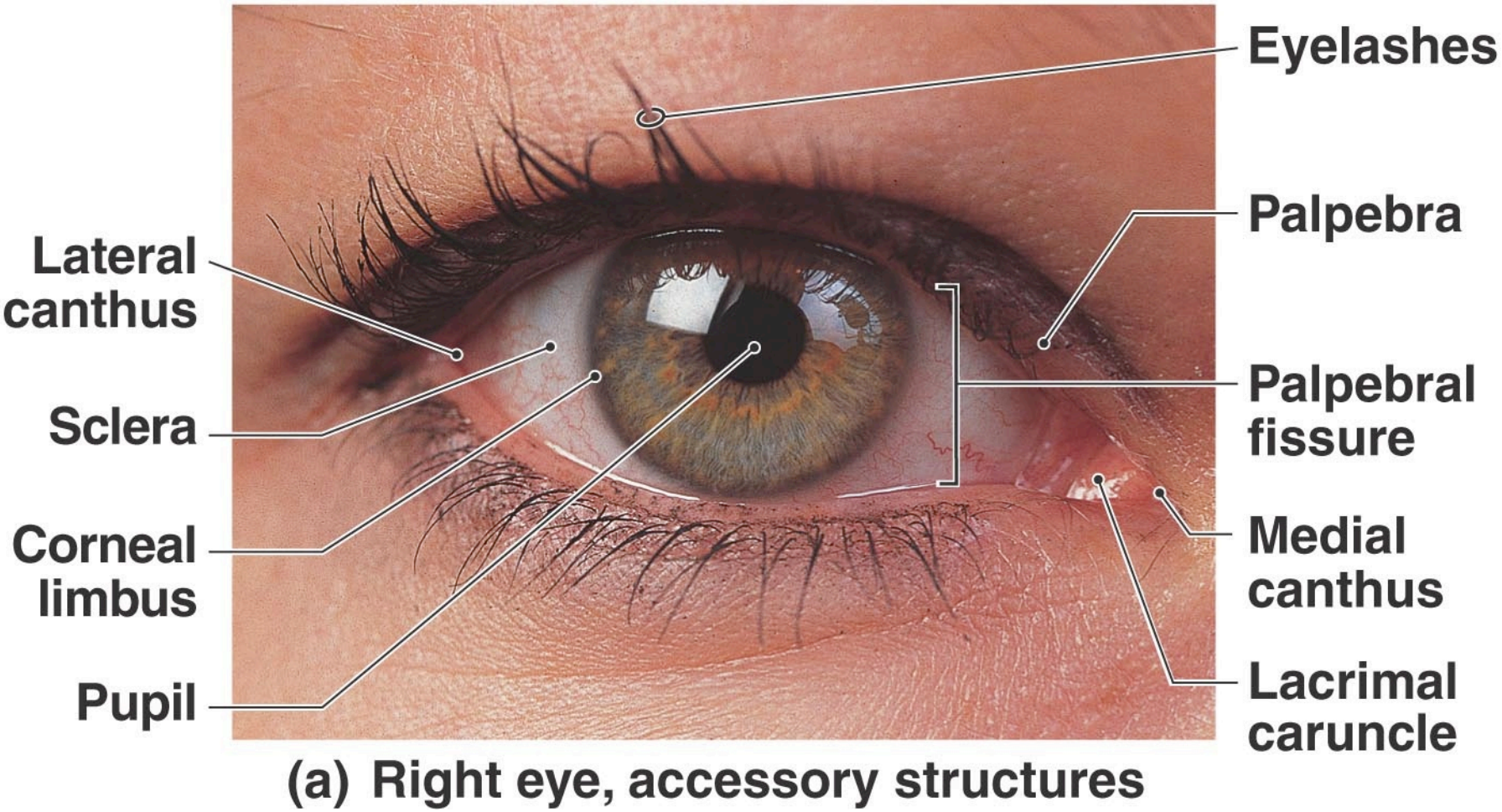
  - vitreous humor gelatinous mass helps support and maintain shape of the eye

- Cilliary muscle – muscular ring

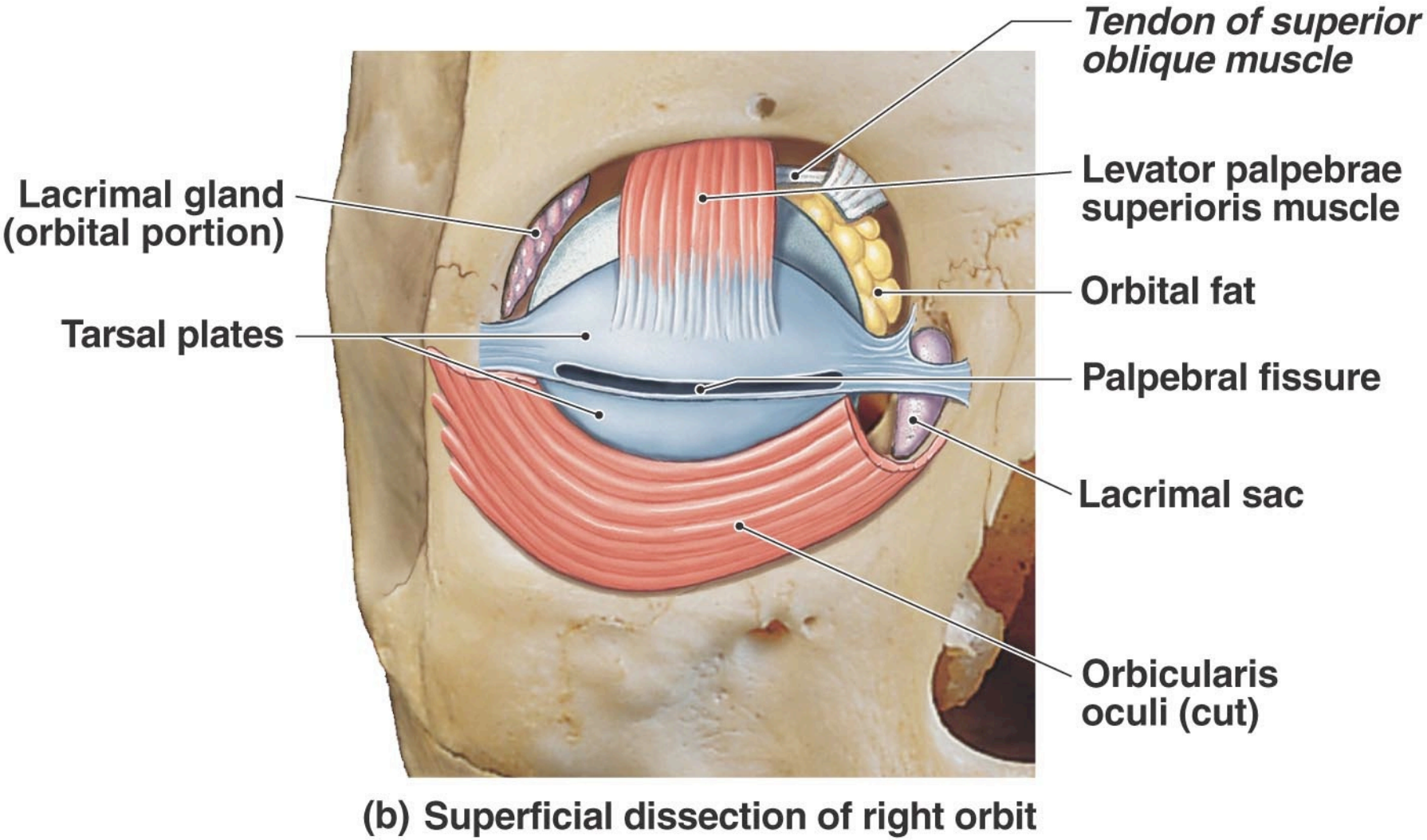
  - suspensory ligaments attach to the lens and help in focusing

- Lens – focus visual image

  - biconvex, refracts the light coming in through the pupil



(a) Right eye, accessory structures



(b) Superficial dissection of right orbit

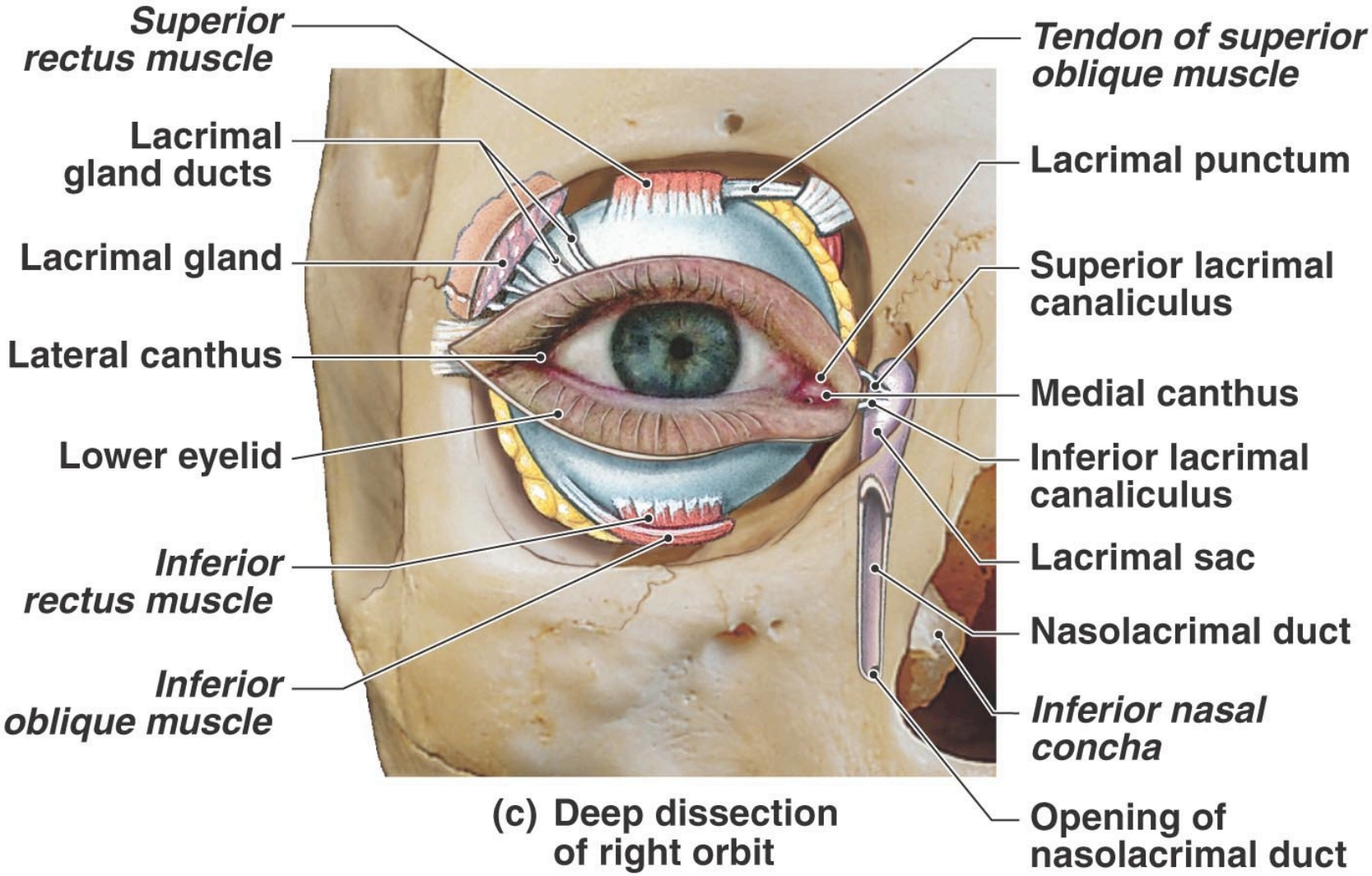


Figure 18.19c

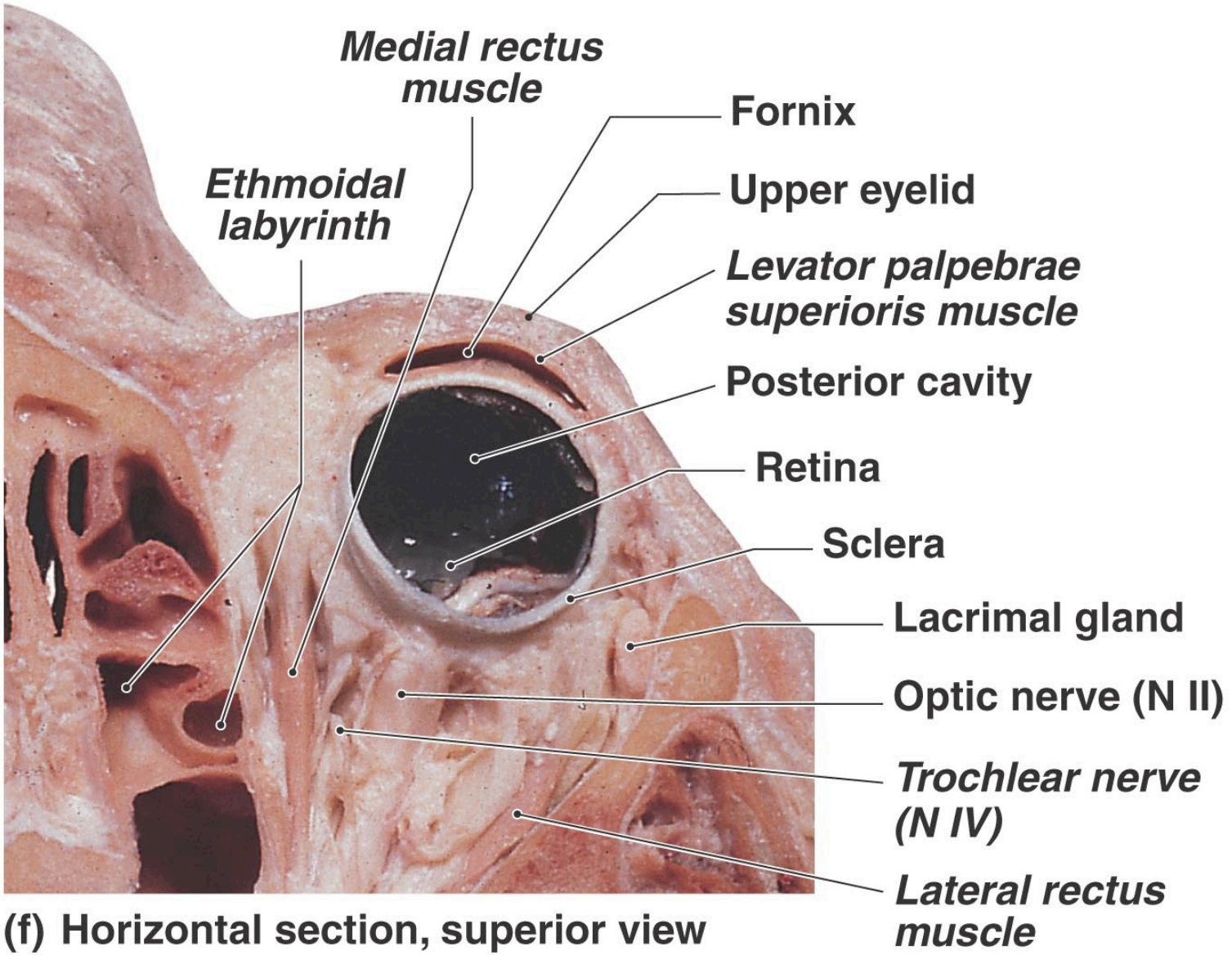
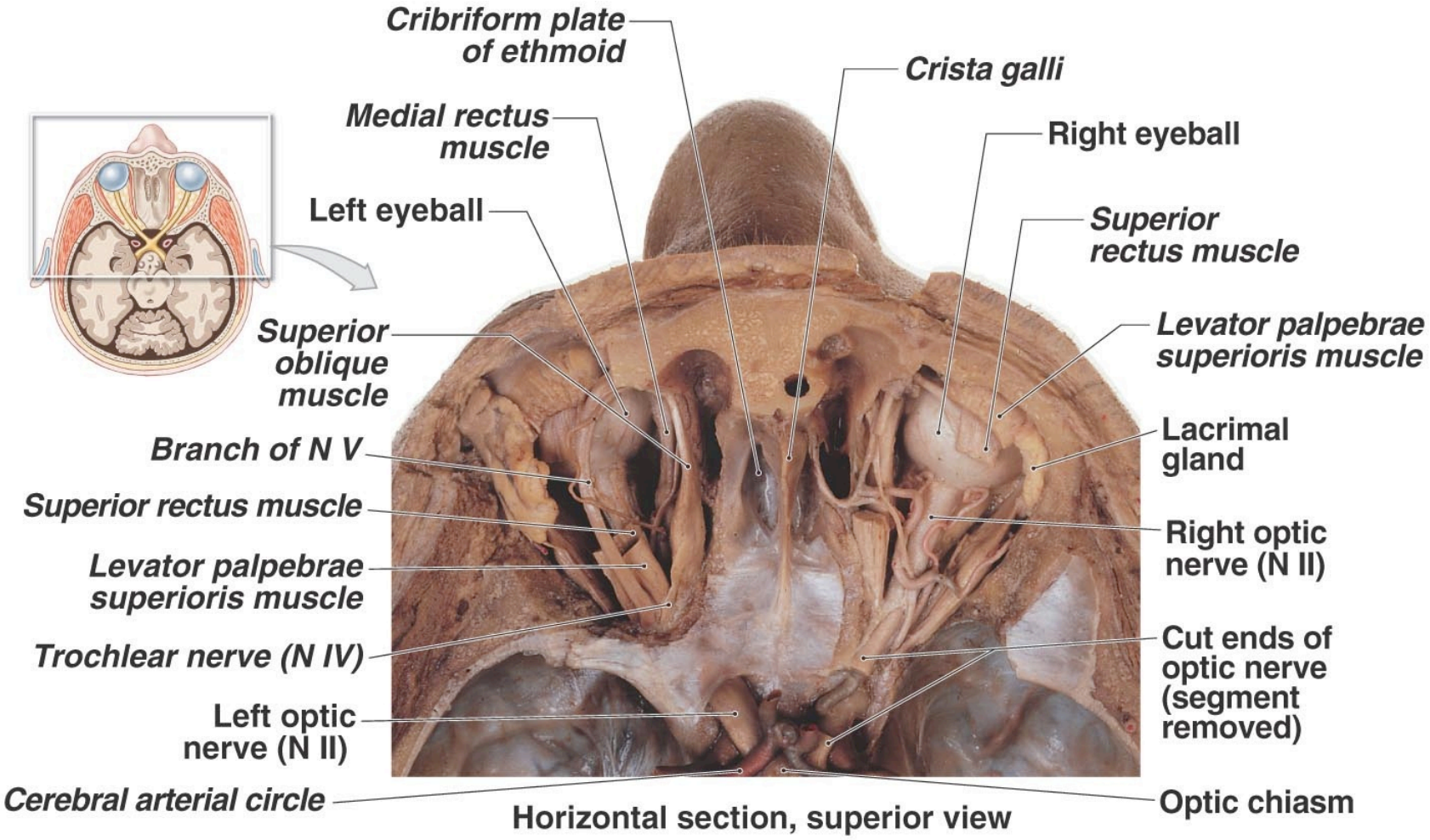
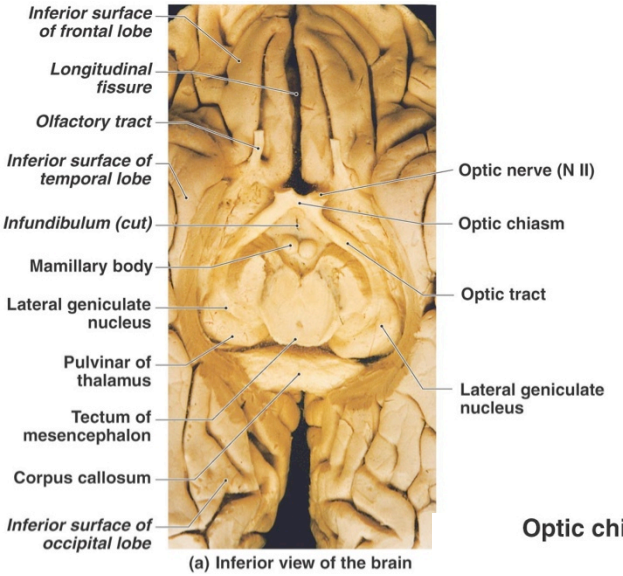


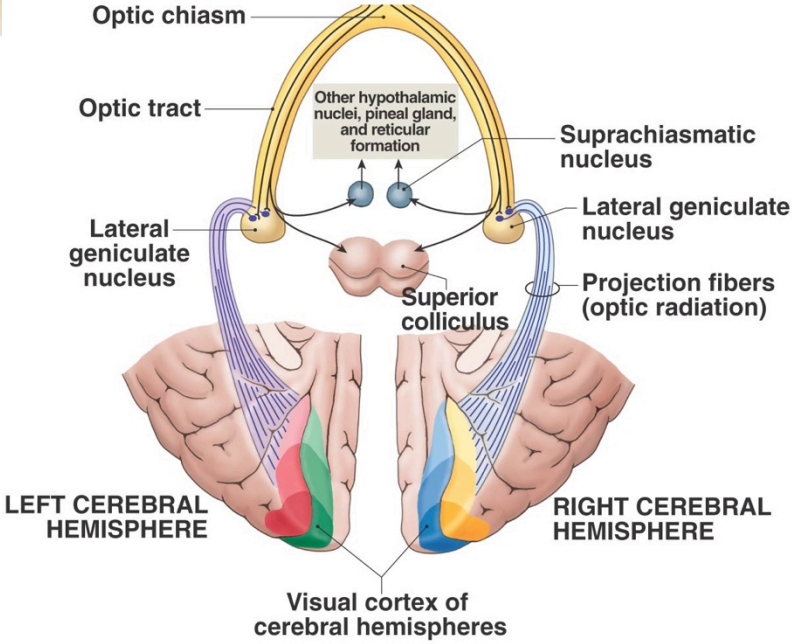
Figure 18.21f



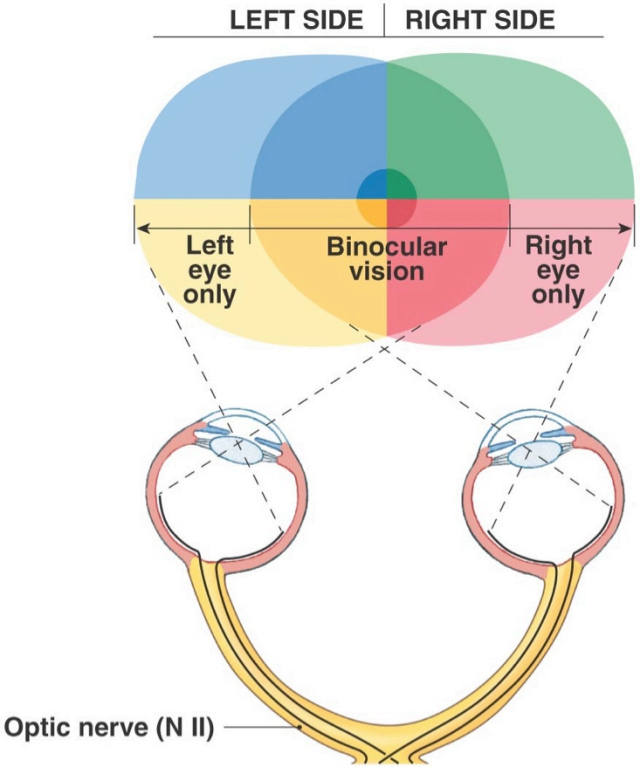
Anatomy of the Visual Pathways



(a) Inferior view of the brain



(b) Visual pathways



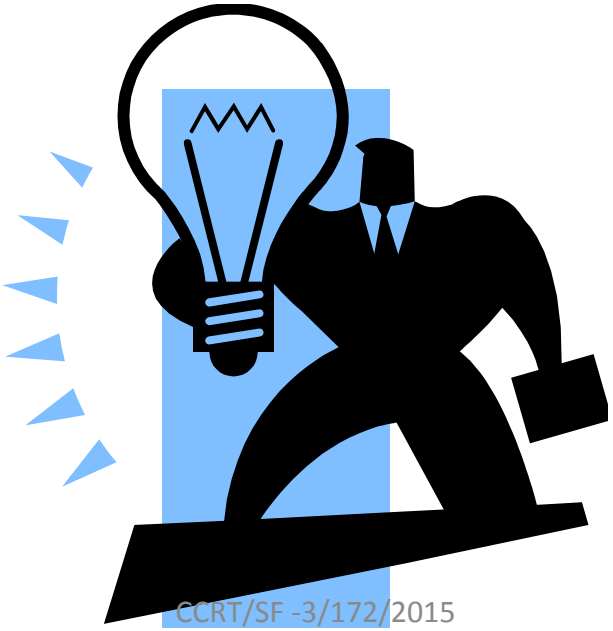
Anatomy of the Visual Pathways

"How can you expect to talk about realism, perspective and other sights of the eye if you don't actually know how the eyes and brain work?"
~Irene Schiferl

How Your Brain Learns and Remembers

- ☐ What happens inside your brain
- ☐ Brain-friendly ways to learn better
- ☐ How homework helps your brain
- ☐ How emotions affect learning and memory

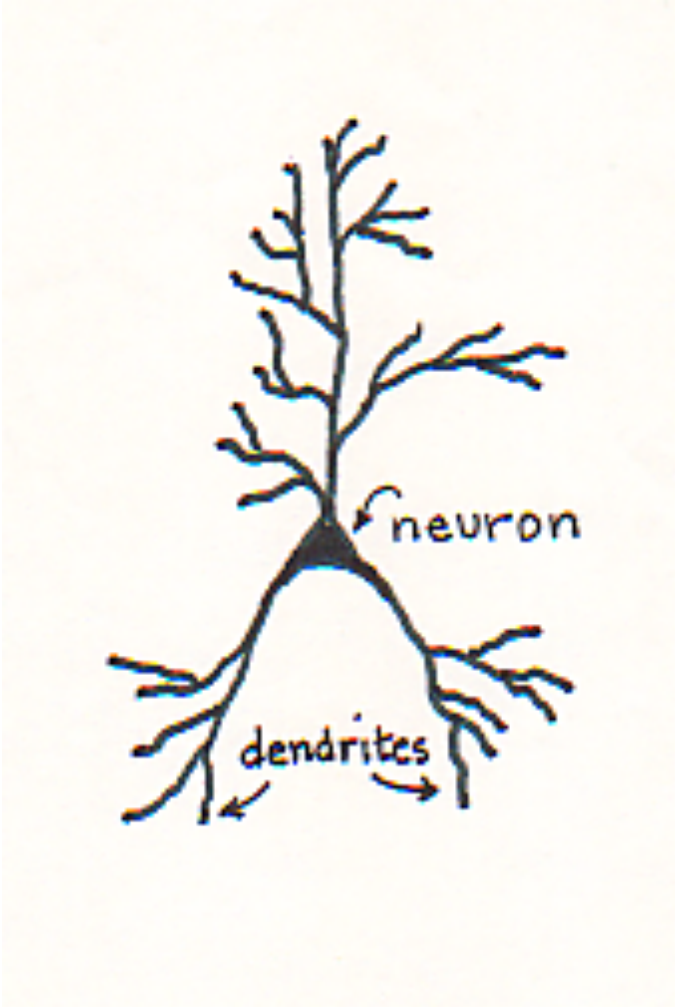
- **What happens inside your brain when you learn something new?**



This is your brain…

- Brain cells are called **neurons**.
- You are born with at least 100 billion neurons.
- **Dendrites** (fibers) grow out of the neurons when you listen to/write about/ talk about/ practice something.

Learning is natural!

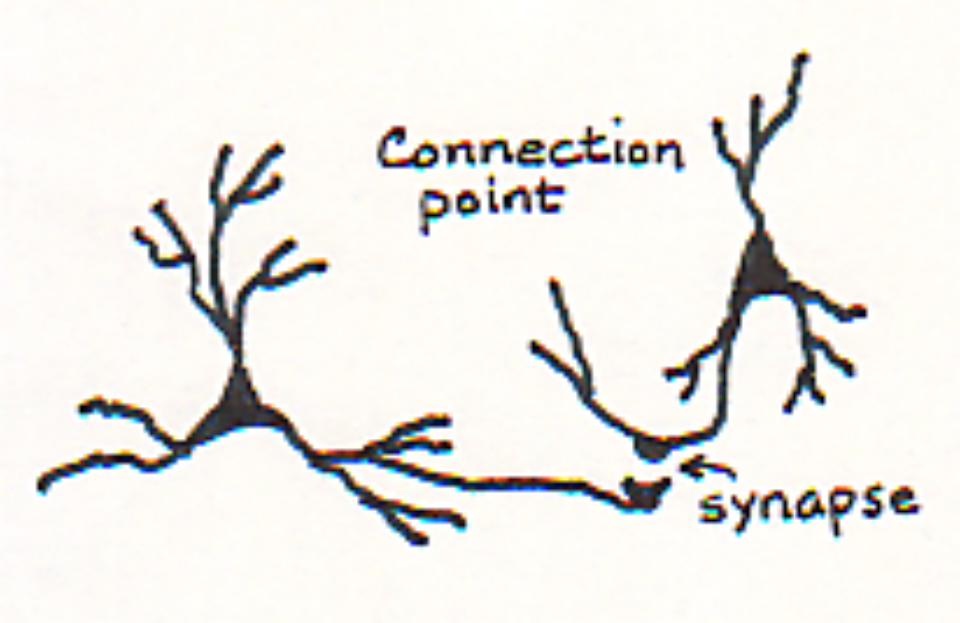


- Neurons know how to grow dendrites, just like a stomach knows how to digest food.
- **Learning = Growth of dendrites**.
- New dendrites take time to grow; it takes a lot of practice for them to grow.

Connections form between neurons.

- When two dendrites grow close together, a contact point is formed. A small gap at the contact point is called the **synapse**.

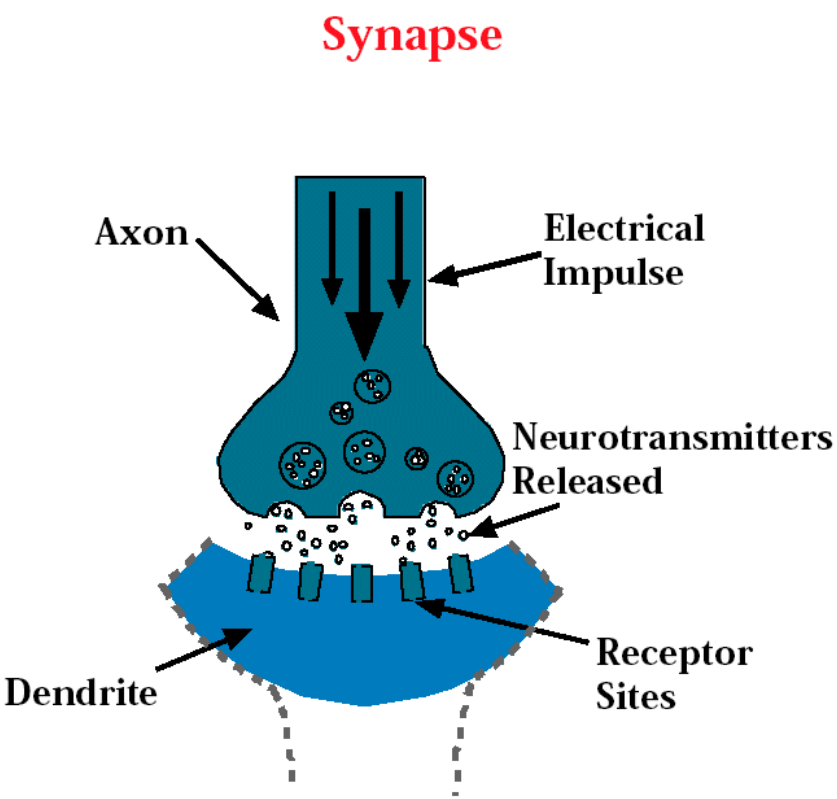
- Messages are sent from one neuron to another as electrical signals travel across the synapse.



Practice builds strong connections!

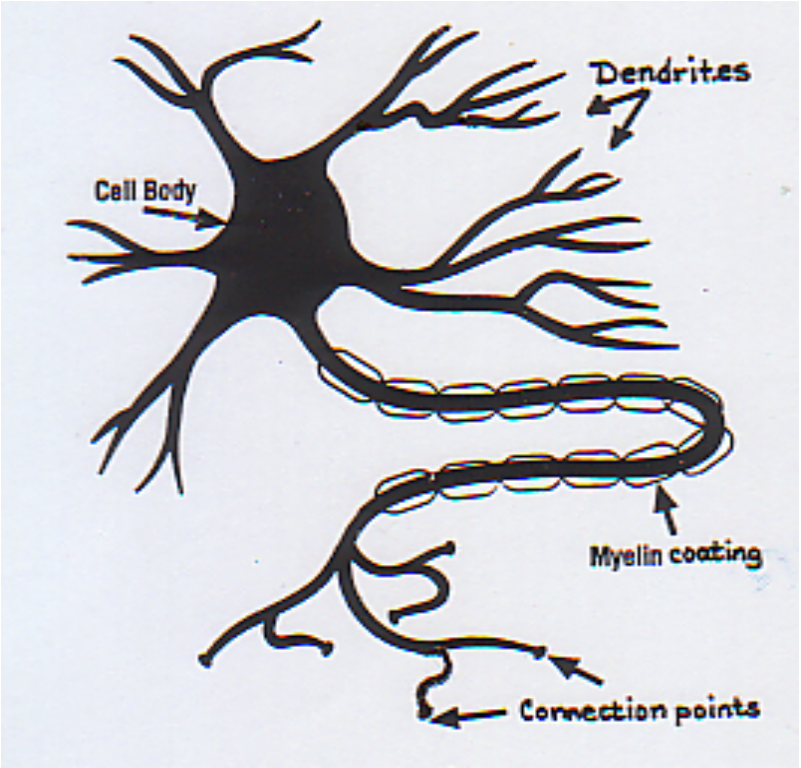
- Special chemicals called **neurotransmitters** carry the electrical signals across the synapse.

- When you practice something, it gets easier for the signals to cross the synapse. That's because the contact area becomes wider and more neuro-transmitters are stored there.



Practice builds faster connections.

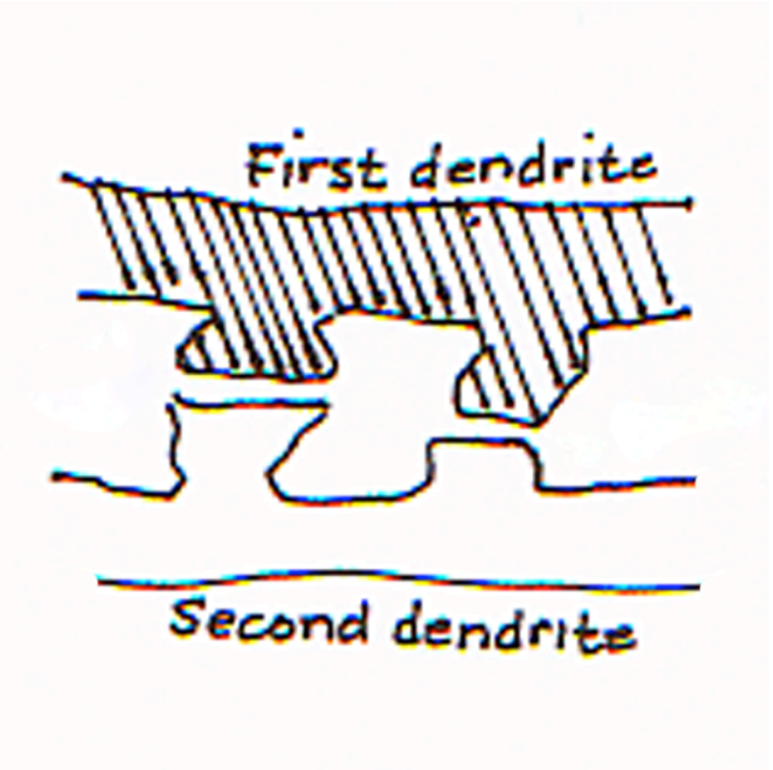
- When you practice something, the dendrites grow thicker with a fatty coating of **myelin**.
- The thicker the dendrites, the faster the signals travel. The myelin coating also reduces interference.



Practice builds double connections.

- With enough practice, the dendrites build a *double* connection.

- Faster, stronger, double connections last a very long time. You remember what you learned!



Short-term memory is VERY short!

- If you learn something new and do it only once or twice, the dendrite connection is very fragile and can disappear within hours.
  - Within 20 minutes, you remember **only 60%.**
  - Within 24 hours, you remember **only 30%.**

But if you practice within 24 hours, and then practice again later, you **remember 80%**.

Make the most of practice time…

- You grow dendrites for **exactly** the same thing you are practicing.

- If **you listen or watch** while math problems are solved, **you grow dendrites for listening or for watching**.

- If **you actually solve** the problems yourself, **you grow dendrites for solving**.

The dendrites this toddler is growing are for what skill or concept?

You are naturally smart, because …

- Your brain knows how to grow dendrites just like your stomach knows how to digest food.

- Think about a baby who learns to speak in its native language without any special classes or training!

- **You must do something active (explain, solve, draw, write, etc.) in order to learn, because…**

You must do something active to learn, because…

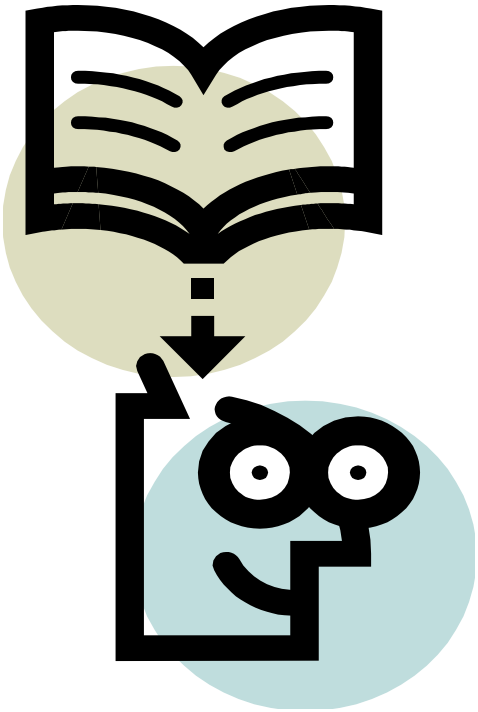
- Dendrites grow ONLY when you are actively doing something.

- No one else can grow dendrites for you!

- **Dendrites cannot grow in a void. They can only grow …**

Dendrites cannot grow in a void.

- New dendrites can only grow off of what is already there. New skills must connect to, and grow off of, previously learned skills.
- If you do **not** have the necessary dendrites in place, new material will seem to go "right over your head".
- So, start with a math course that matches your skill level.



- **Dendrites take time to grow, because…**

Dendrites take time to grow, because…

- It takes a lot of practice for dendrites to grow.
- This is why you do homework.
- This is why trying to cram everything into your brain the night before a test doesn't work.

- **Mistakes, with feedback, are essential and good, because…**

Mistakes are essential, because…

- Making mistakes, and getting feedback so you can correct them, allows you to check the accuracy of the connections in your brain.

- Be sure to get feedback quickly so you don't practice the wrong thing and build a strong, but wrong, connection!

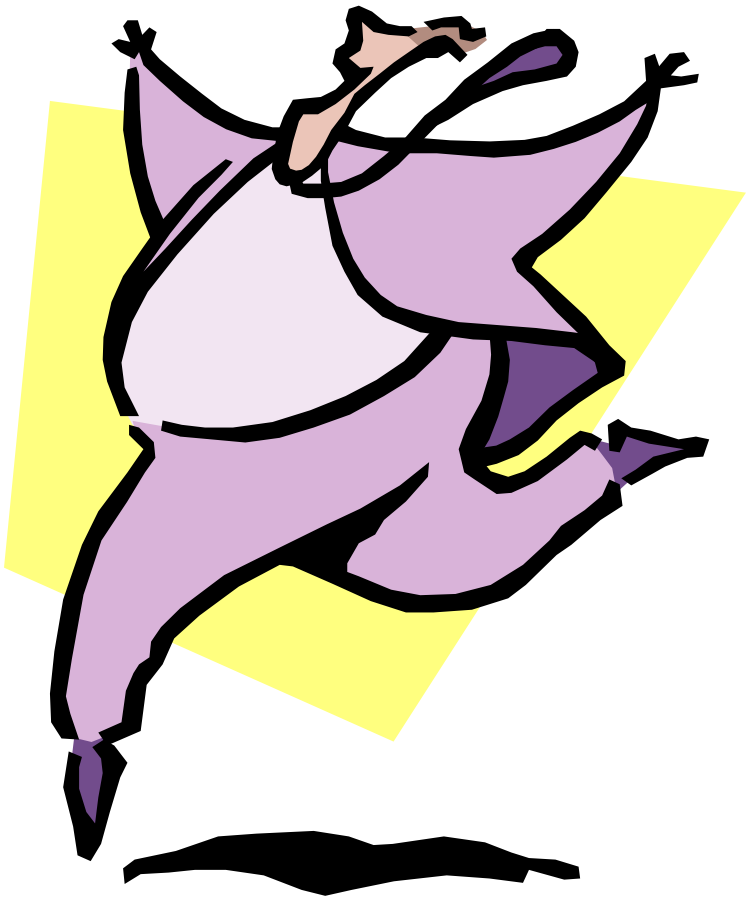
- **Emotions affect learning and memory! Let's see how it works…**

What can emotions do to you?

- Anxiety floods your body with **adrenaline** (“fight or flight”).
- Adrenaline makes it hard for the neuro-transmitters to carry messages across the synapses in your brain.
- That causes “blanking out” on a test.

How can emotions help you?

- **Endorphins** make you feel calm.
- Your body produces endorphins when you relax, exercise, laugh, or learn new things.
- If you practice producing calming hormones, it will help when you are under stress.



BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART
Scheme Specific Unique No :
CCRT/SF -3/172/2015

ART FORMS AND ITS IMPACT ON NEUROSCIENCE -
Application of Cognitive Dynamics through art in Alzheimer's and dementia patients

REPORT II
DEMENTIA – CAUSES AND PREVENTION THROUGH TIME TESTED ART THERAPHY

The powerful impact of art therapy on the lives of people

Art is a uniquely human activity associated fundamentally with symbolic and abstract cognition. Its practice in human societies throughout the world, coupled with seeming non-functionality lead to the theory that the localized brain regions and pathways theory links art to multiple neural regions.

We know art stimulates the senses and this realization is a dawn of a new age in the study of art. *The Power of Images* and the colors in it and its psychological and behavioral effects, while creating it and also by observing it.

Color has an effect on memory. We live in a world of color and images and most important trigger of memory. If color can increase arousal, and arousal can increase memory, then it is possible that study of intersection between art and neuroscience from the perspective of a practicing artist.

DEMENTIA
AND ITS
CAUSES
PREVENTION

Dementia isn't a disease but a condition

Why a Lack of Exercise and Poor Diet May Be Leading to Memory Loss, Mental Decline, and Dementia

EXERCISE OF MIND AND BODY

Idle man's brain is devil's workshop. The devil is quite friendly with Alzheimer's. So, we must keep both of them at bay. Never be idle. Keep doing something or the other that is meaningful, even if it is not gainful economically. regular exercise has been shown to help prevent normal cognitive decline due to aging and dementia.

Exercise affects blood glucose levels...The more one exercises, the more the cells are using up energy. This increased demand for energy creates an increased demand for glucose. By exercising, you make your cells more "thirsty" for glucose, thereby prompting the cell to create more locks that can interact with insulin, so that it can "soak" up the glucose as soon as it's available. If you remove more glucose from the blood, the blood is now able to flow more freely and effectively, thereby allowing for better cell growth (and neurogenesis).

More exercise, more glucose "soak," and more new cell growth. It's that easy!

Dementia can be caused by:

Medical conditions that progressively attack brain cells and connections, most commonly seen in Alzheimer's disease, Parkinson's disease, or Huntington's disease.

Medical conditions such as strokes that disrupt oxygen flow and rob the brain of vital nutrients. Additional strokes may be prevented by reducing high blood pressure, treating heart disease, and quitting smoking.

Poor nutrition, dehydration, and certain substances, including drugs and excess alcohol. Treating conditions such as insulin resistance, metabolic disorders, and vitamin deficiencies may reduce or eliminate symptoms of dementia.

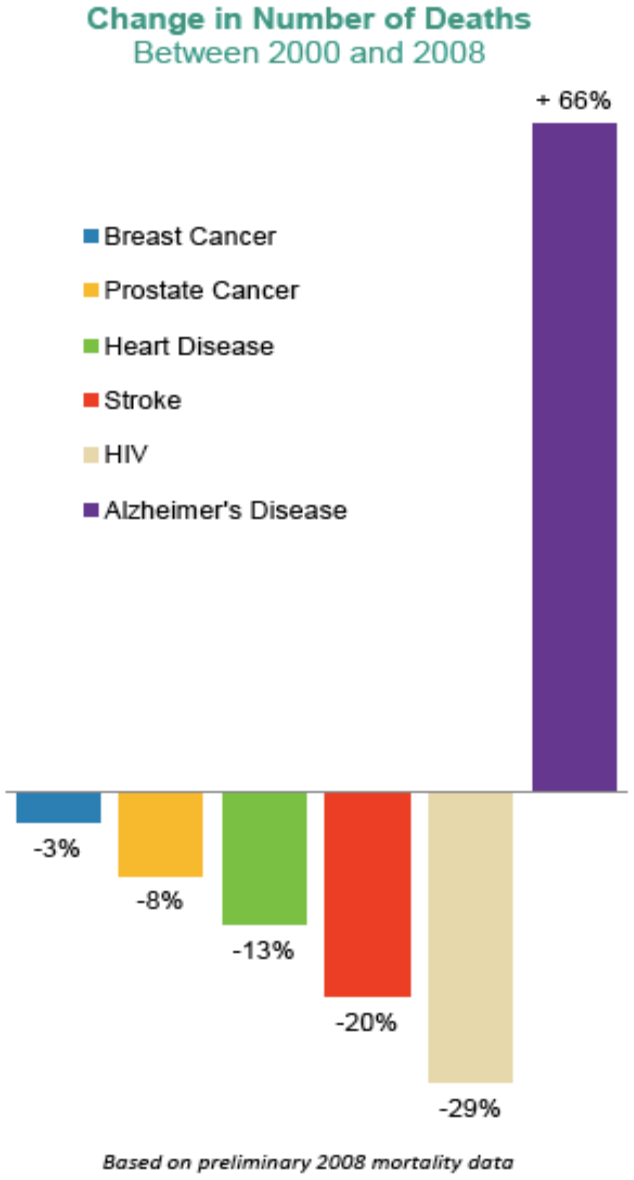
Single trauma or repeated injuries to the brain. Depending on the location of the brain injury, cognitive skills and memory may be impaired.

Infection or illness that affects the central nervous system, including Creutzfeldt-Jakob disease and HIV. Some conditions are treatable, including liver or kidney disease, depression-induced pseudodementia, and operable brain tumors.

POOR LIFESTYLE

The history of mankind had greatly suffered from plague to influenza to cholera to yellow fever to bird flu the public life has been shattered from time to time with lot many epidemics and most of the time our scientific development and health care progress has been of no purpose in the face of widespreaAd death and destruction that never stopped to struck us with repeated and most crushing blows.

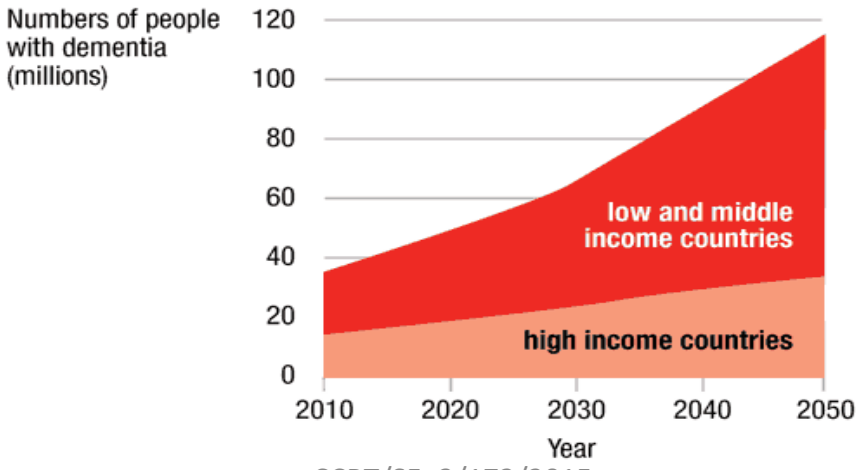
The most violent truth about "TODAY" is the worldwide increase in the stats of the growth rates of the new world disease like Dementia ,Alzheimer ,Autism, Sleep disorders and many other neurological disorders ,in arguably epidemic proportions



On the tremendous influence in turning the wheel of rapid progress of the developments in all the fields and being a victim by no choice to join the race towards development and to sustain we change our life patterns and natural biological patterns and as a result of this journey today our reports says

"As of 2010, there are an estimated 35.6 million people with dementia worldwide. This number will nearly double every 20 years, to an estimated 65.7 million in 2030, and 115.4 million in 2050. Much of the increase will be in developing countries. Already 58% of people with dementia live in developing countries, but by 2050 this will rise to 71%"..

The growth in numbers of people with dementia in high income countries and low and middle income countries



Population Ageing

World Population --- 6.1 billion
80% live in developing countries
Average life expectancy in developing countries: 41 years in 1950 62 in1990 and 70 in 2020
By 2020, no. of people aged 60 or above > 1000 million, 70% in developing countries

Do you see this board on your way everyday?

The plague ,cholera and so on epidemics have been chosen as the biggest epidemics that the world has ever seen because of their great role in the changing course of civilizations and races and simultaneously because of their ferocity in bringing death and destruction to the masses.

But the biggest epidemics the world is waiting to see is by our choice..a world....loneliness a new civilization ..

Many people with Alzheimer's live alone – and are left to fend for themselves.

• An estimated 800,000 individuals with Alzheimer's (more than one in seven) live alone.

• Of those who live alone, up to half of them do not have an identifiable caregiver.

• People with Alzheimer's and other dementias who live alone are exposed to higher risks – including inadequate self-care, malnutrition, untreated medical conditions, falls, wandering from home unattended, and accidental deaths – compared to those who do not live alone.

Alzheimer's is not just memory loss – Alzheimer's kills.

• Alzheimer's disease is the 6th leading cause of death in the United States and the 5th leading cause of death for those aged 65 and older.

• Alzheimer's is the only cause of death among the top 10 in America without a way to prevent, cure or even slow its progression.

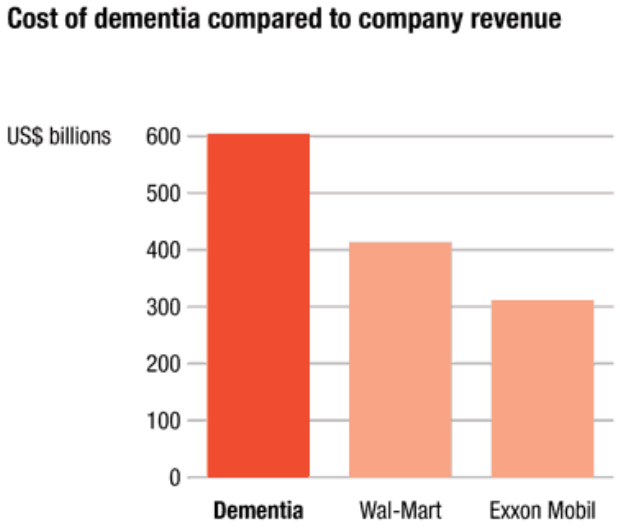
• Deaths from Alzheimer's increased 66 percent between 2000 and 2008, while deaths from other major diseases, including the number one cause of death (heart disease), decreased.

Economic impact of dementia

The total estimated worldwide cost of dementia was US$604 billion in 2010. About 70% of the costs occur in Western Europe and North America. This figure includes costs attributed to informal care (unpaid care provided by family and others), direct costs of social care (provided by community care professionals, and in residential home settings) and the direct costs of medical care (the costs of treating dementia and other conditions in primary and secondary care).

Costs of informal care and the direct costs of social care generally contribute similar proportions of total costs, while the direct medical costs are much lower. However, in low and middle income countries informal care accounts for the majority of total costs and direct social care costs are negligible. These costs are around 1% of the world's gross domestic product, varying from 0.24% of GDP in low income countries, to 0.35% in low middle income countries, 0.50% in high middle income countries, and 1.24% in high income countries.

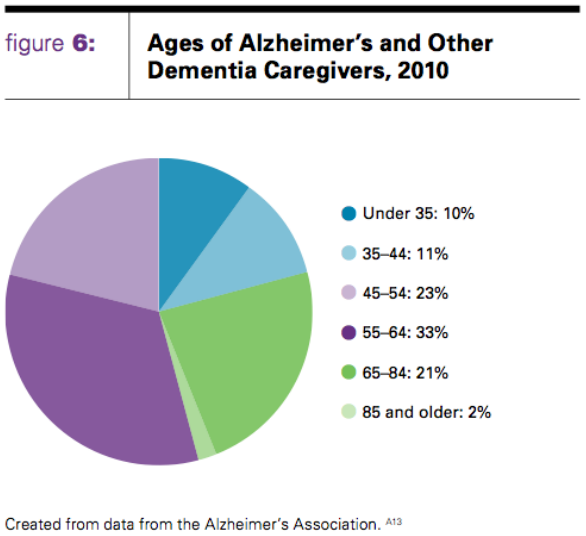
If dementia care were a country, it would be the world's 18th largest economy, ranking between Turkey and Indonesia. If dementia care were a company, it would be the world's largest by annual revenue exceeding Wal-Mart (US$4



WHO says dementia is a ticking time bomb

Lack of information and diagnosis is a major problem. Even in high-income countries, only one fifth to one half of cases of dementia are routinely recognized. When a diagnosis is made, it often comes at a relatively late stage of the disease. This fuels stigma, which in turn contributes to the social isolation of both the person with dementia and their caregivers, and can lead to delays in seeking diagnosis, health assistance and social support..

It is now vital to tackle the poor levels of public awareness and understanding, and to drastically reduce the stigma associated with dementia," In every region of the world, most care giving is provided by informal caregivers - spouses, adult children, other family members and friends.



The report notes that people who care for a person with dementia are themselves particularly prone to mental disorders, such as depression and anxiety, and are often in poor physical health themselves. Many caregivers also suffer economically as they may be forced to stop working, cut back on work, or take a less demanding job to care for a family member with dementia

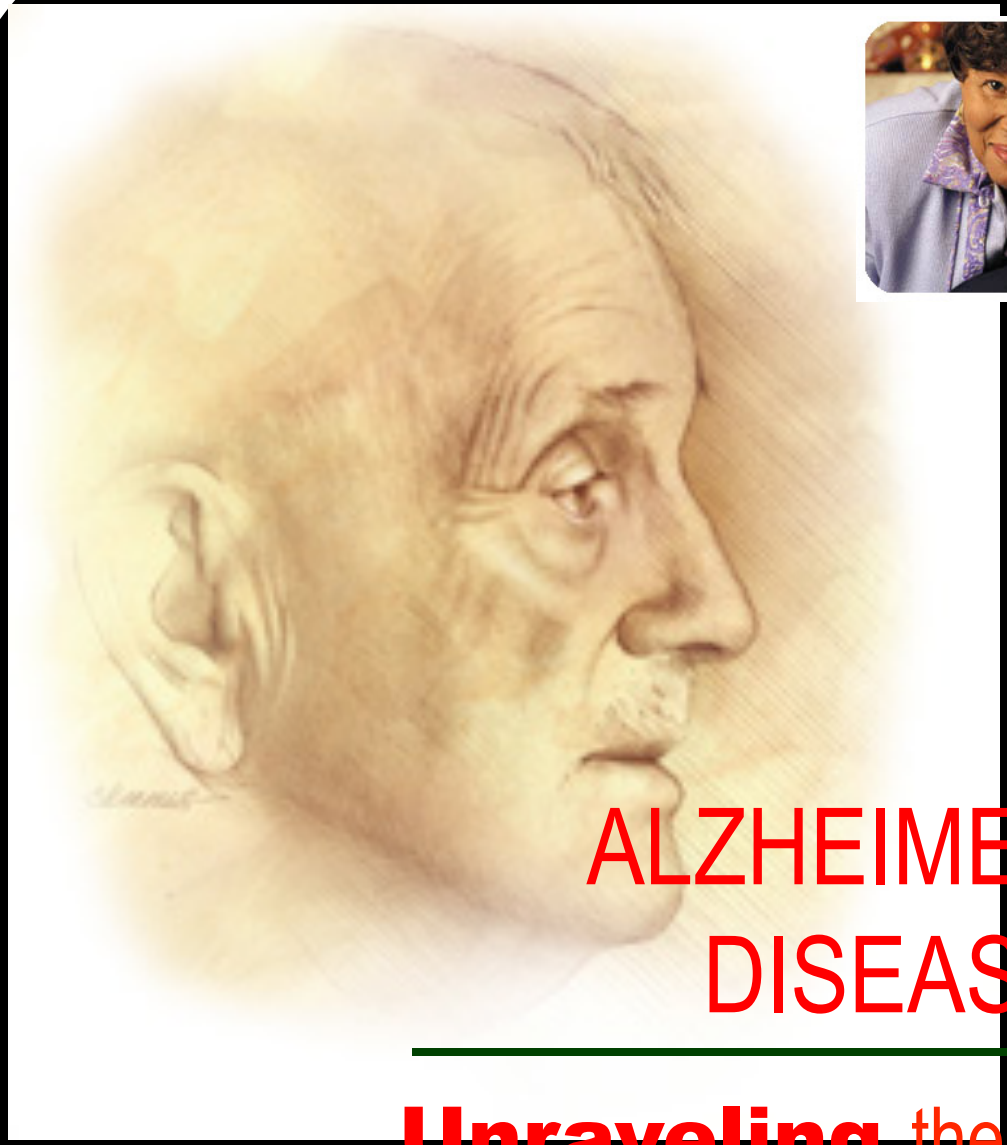
In 2011, 15.2 million family and friends provided 17.4 billion hours of unpaid care to those with Alzheimer's and other dementias – care valued at $210.5 billion. More than 60 percent of Alzheimer's and dementia caregivers rate the emotional stress of caregiving as high or very high; one-third report symptoms of depression.

Due to the physical and emotional toll of caregiving on their own health, Alzheimer's and dementia caregivers had $8.7 billion in additional health care costs in 2011.

Dementia is not a normal part of ageing

Dementia is a subject that most people try to avoid. Just the thought of memory loss - in a loved one, friend, co-worker or, worse yet, ourselves -- makes us terribly uncomfortable. Unless we are confronted directly with dementia, we prefer to think of it as "someone else's problem.

Are we able to visualize a world without recognizing our loved ones or can we visualize to live with some whom you loved and cared and don't know you...That is the world of a dementia



ALZHEIMER'S DISEASE

Unraveling the Mystery

Once considered a rare disorder, Alzheimer's disease is now seen as a major public health problem that is seriously affecting millions of older Americans and their families.

The Federal government's lead agency for Alzheimer's disease research is the National Institute on Aging, part of the National Institutes of Health. NIH is part of the U.S. Department of Health and Human Services.

What is AD?

Alzheimer's disease is an irreversible, progressive brain disease that slowly destroys memory and thinking skills.

Although the risk of developing AD increases with age – in most people with AD, symptoms first appear after age 60 – AD is not a part of normal aging. It is caused by a fatal disease that affects the brain.

What is AD?

AD Statistics….

- AD is the most common cause of dementia among people age 65 and older.
- Scientists estimate that around 4.5 million people now have AD.
- For every 5-year age group beyond 65, the percentage of people with AD doubles.

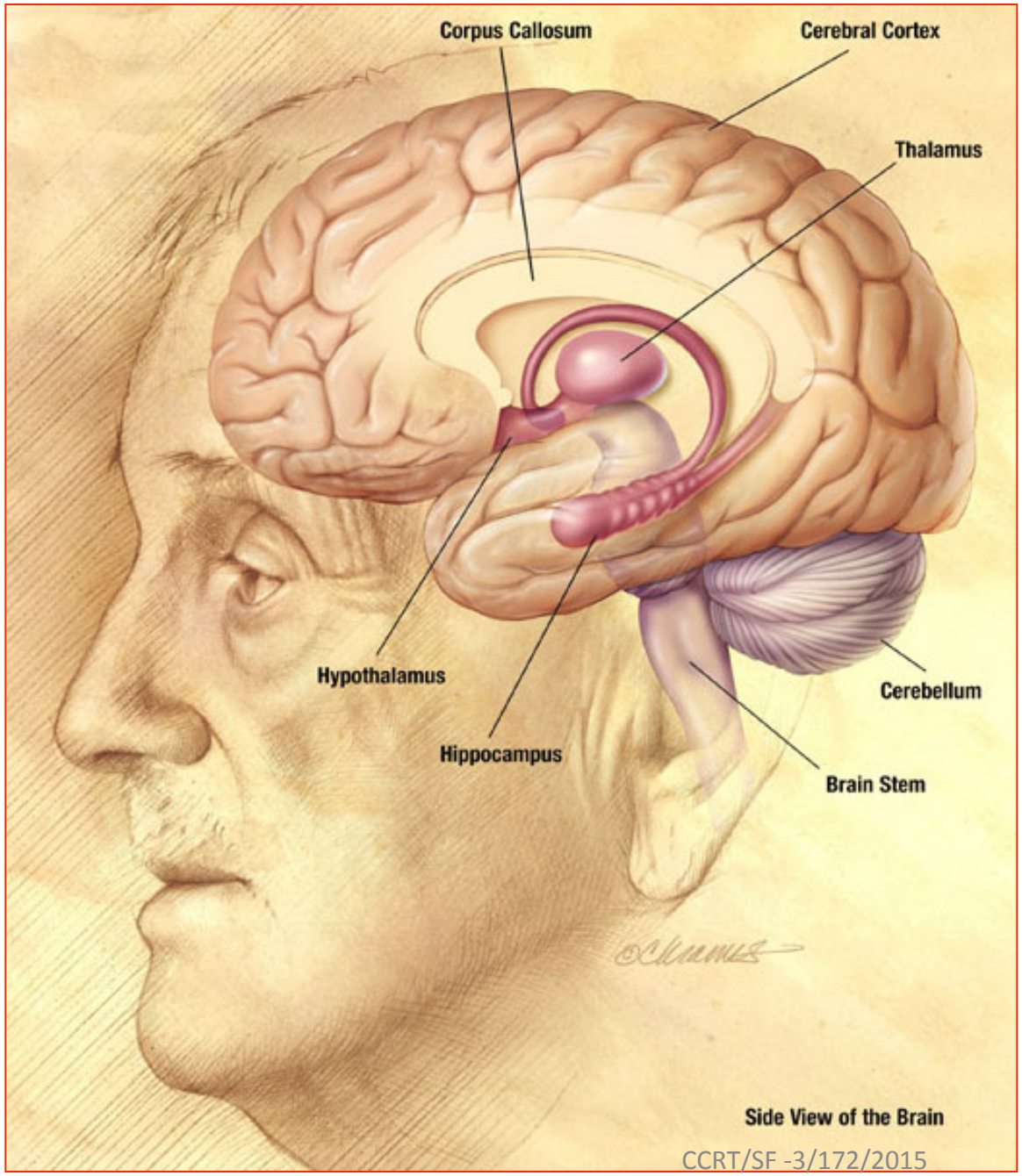
- By 2050, 13.2 million older Americans are expected to have AD if the current numbers hold and no preventive treatments become available.

What is AD?

Where are people with AD cared for?

- home
- assisted living facilities (those in the early stages)
- nursing homes (special care units)

- The national cost of caring for people with AD is about $100 billion every year.



Inside the Human Brain

To understand Alzheimer's disease, it's important to know a bit about the brain…

The Brain's Vital Statistics

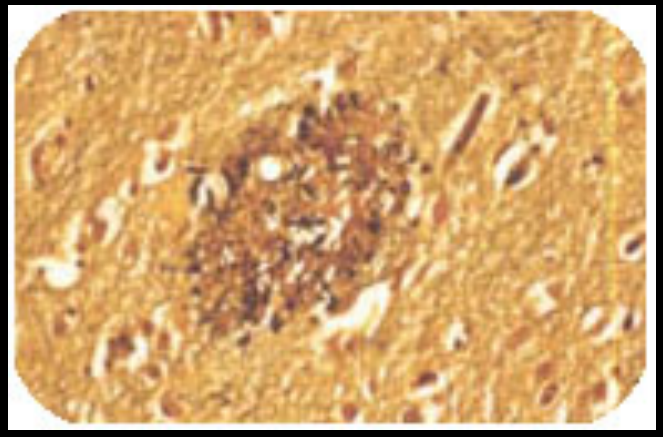
- Adult weight: about 3 pounds
- Adult size: a medium cauliflower
- Number of neurons: 100,000,000,000 (100 billion)
- Number of synapses (the gap between neurons): 100,000,000,000,000 (100 trillion)

AD and the Brain

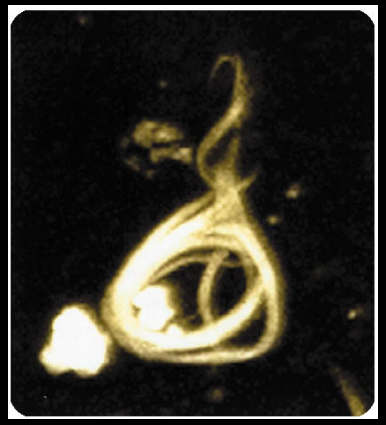
Plaques and Tangles: The Hallmarks of AD

The brains of people with AD have an abundance of two abnormal structures:

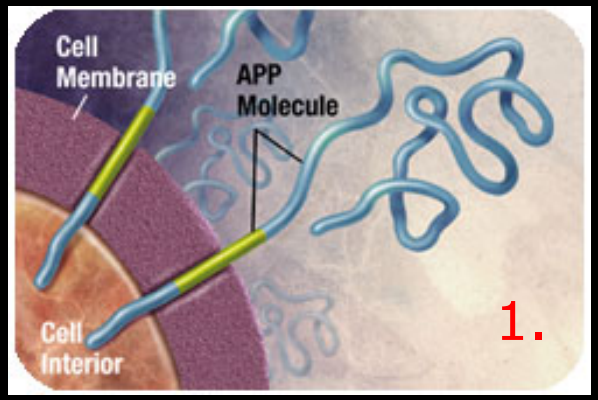
- beta-amyloid plaques, which are dense deposits of protein and cellular material that accumulate outside and around nerve cells
- neurofibrillary tangles, which are twisted fibers that build up inside the nerve cell

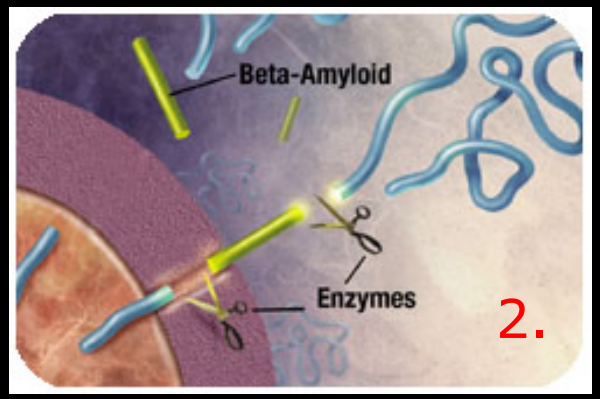


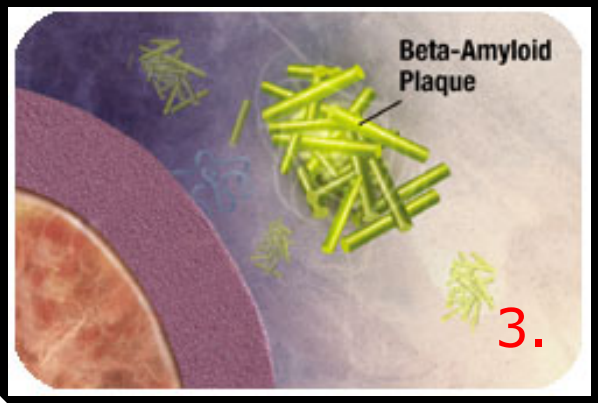
An actual AD plaque



An actual AD tangle







AD and the Brain

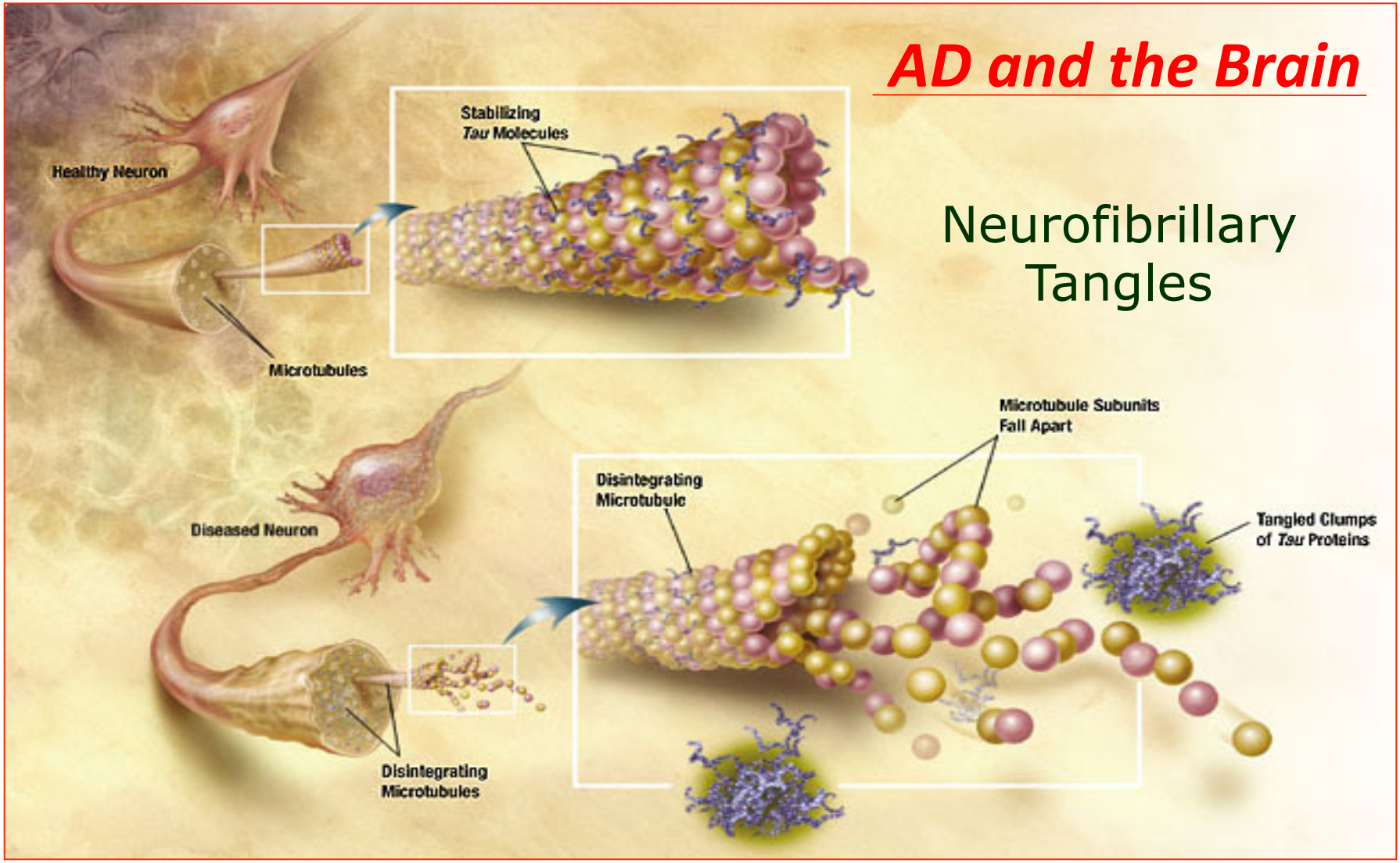
Beta-amyloid Plaques

Amyloid precursor protein (APP) is the precursor to amyloid plaque.

1. APP sticks through the neuron membrane.
2. Enzymes cut the APP into fragments of protein, including beta-amyloid.
3. Beta-amyloid fragments come together in clumps to form plaques.

In AD, many of these clumps form, disrupting the work of neurons. This affects the hippocampus and other areas of the cerebral cortex.

AD and the Brain

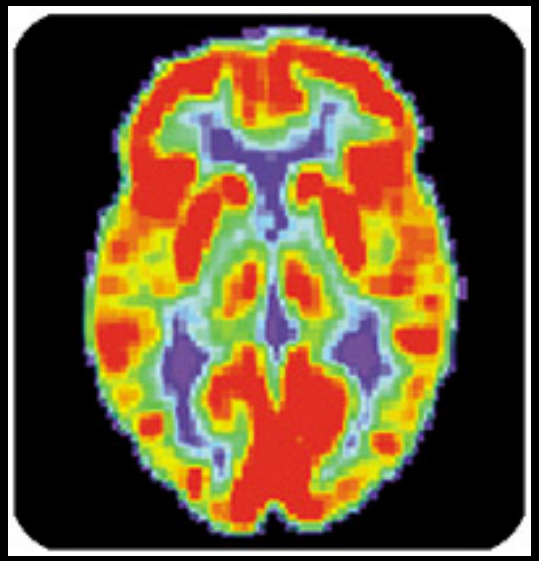


Neurofibrillary Tangles

Neurons have an internal support structure partly made up of microtubules. A protein called *tau* helps stabilize microtubules. In AD, *tau* changes, causing microtubules to collapse, and *tau* proteins clump together to form neurofibrillary tangles.

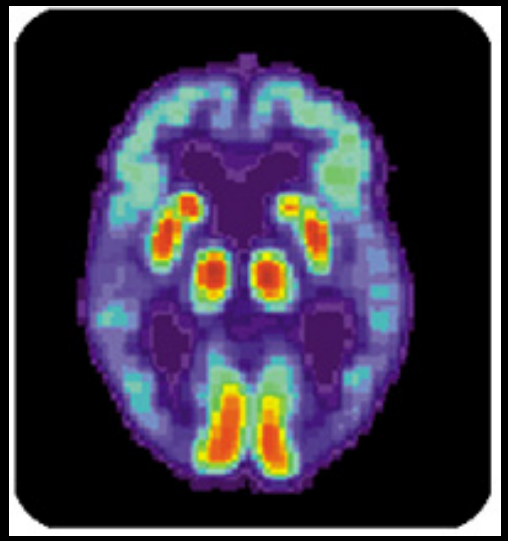
AD and the Brain

The Changing Brain in Alzheimer's Disease



Pet Scan of Normal Brain

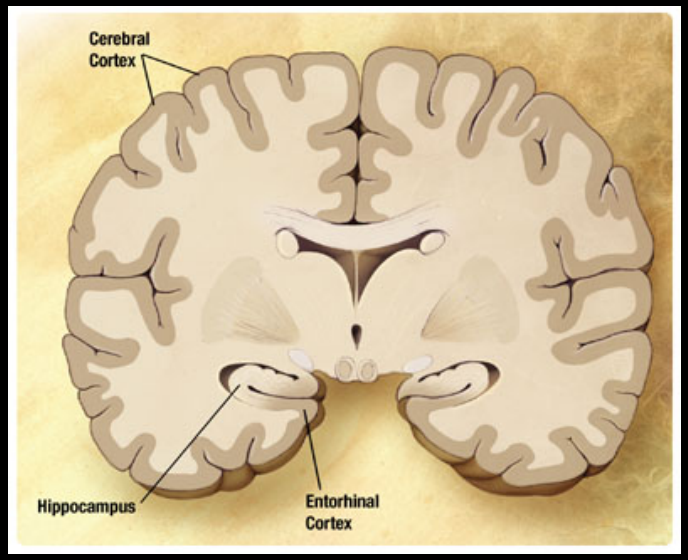
No one knows what causes AD to begin, but we do know a lot about what happens in the brain once AD takes hold.



Pet Scan of Alzheimer's Disease Brain

AD and the Brain

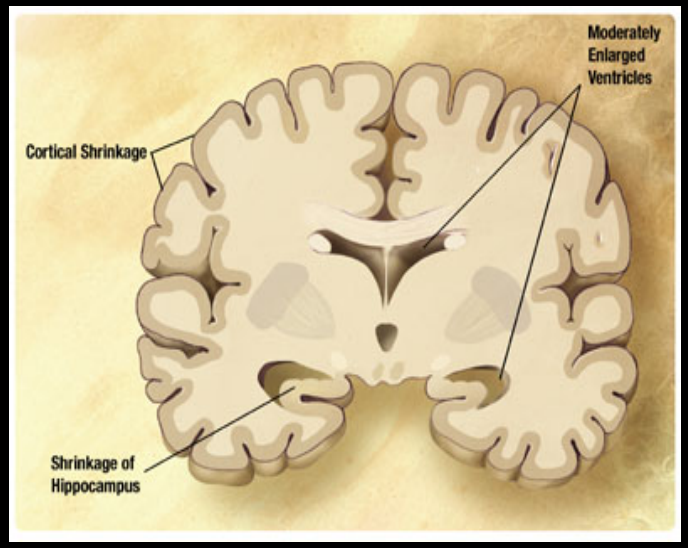
Preclinical AD



- Signs of AD are first noticed in the entorhinal cortex, then proceed to the hippocampus.
- Affected regions begin to shrink as nerve cells die.
- Changes can begin 10-20 years before symptoms appear.
- Memory loss is the first sign of AD.

AD and the Brain

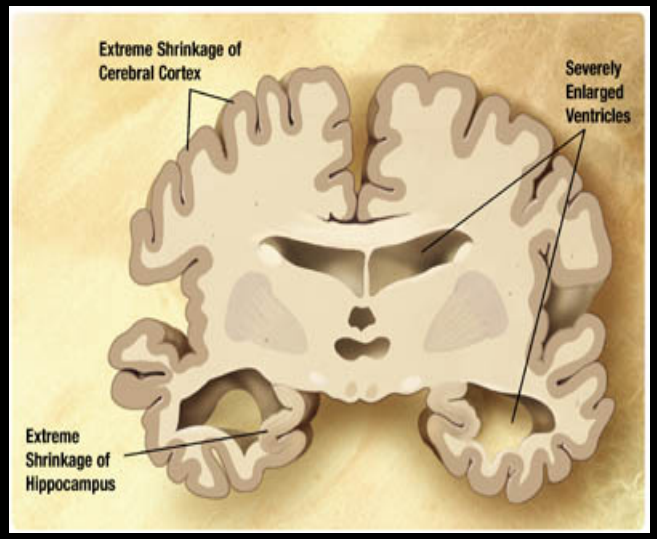
Mild to Moderate AD



- AD spreads through the brain. The cerebral cortex begins to shrink as more and more neurons stop working and die.
- *Mild AD signs* can include memory loss, confusion, trouble handling money, poor judgment, mood changes, and increased anxiety.
- *Moderate AD signs* can include increased memory loss and confusion, problems recognizing people, difficulty with language and thoughts, restlessness, agitation, wandering, and repetitive statements.

AD and the Brain

Severe AD



- In severe AD, extreme shrinkage occurs in the brain. Patients are completely dependent on others for care.
- Symptoms can include weight loss, seizures, skin infections, groaning, moaning, or grunting, increased sleeping, loss of bladder and bowel control.
- Death usually occurs from aspiration pneumonia or other infections. Caregivers can turn to a hospice for help and palliative care.

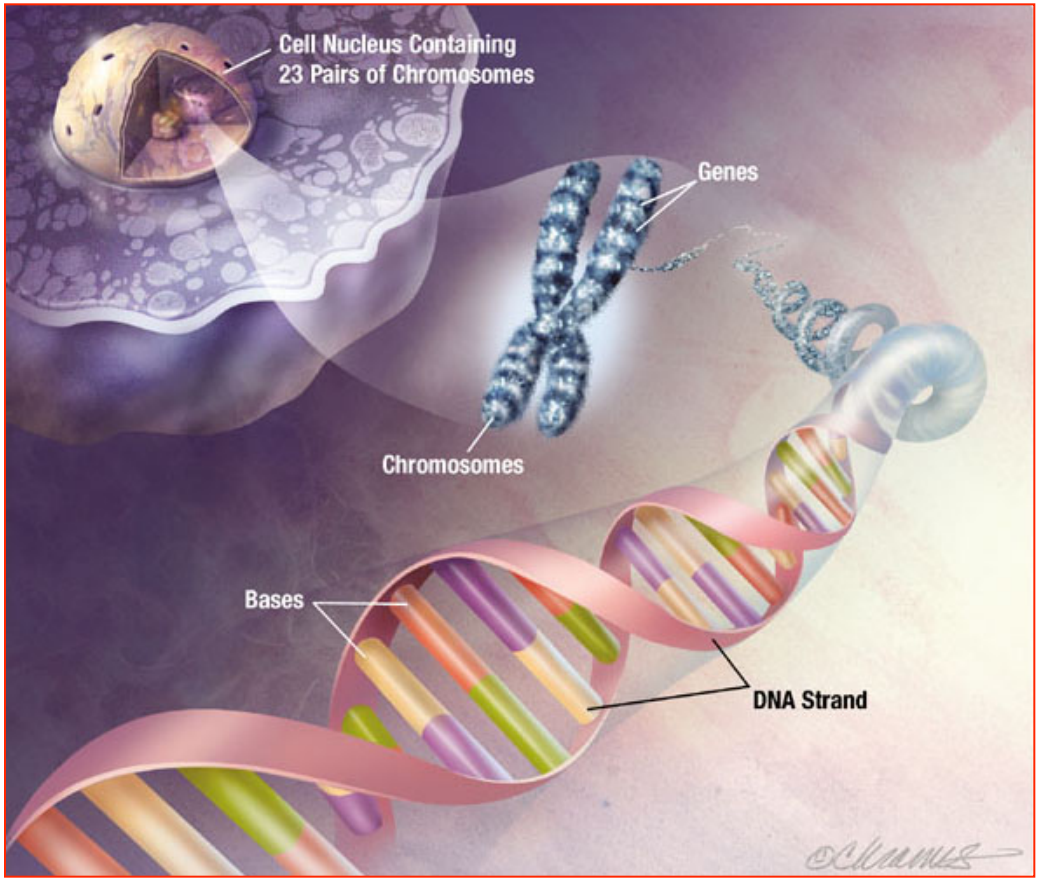
AD Research: the Search for Causes

- AD develops when genetic, lifestyle, and environmental factors work together to cause the disease process to start.
- In recent years, scientists have discovered genetic links to AD. They are also investigating other factors that may play a role in causing AD. NIA-funded Alzheimer's Disease Centers (ADCs) across the country are leading the research efforts looking into causes, diagnosis, and treatment of AD.

AD Research: the Search for Causes

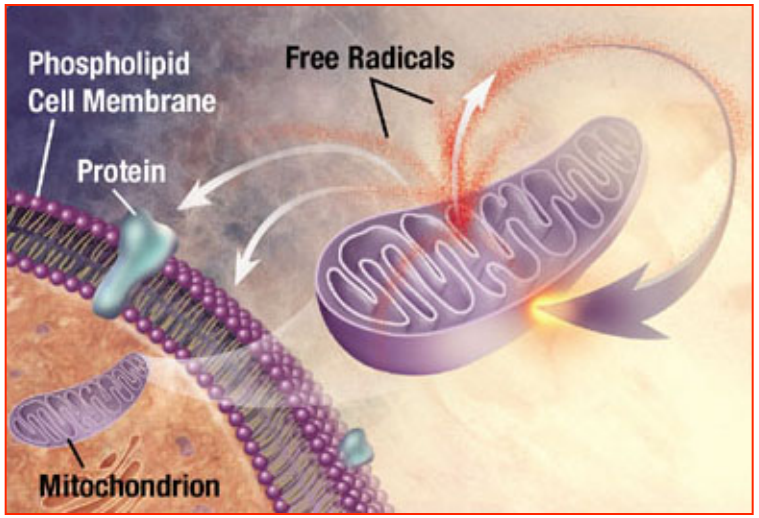
Genetic Studies

The two main types of AD are early-onset and late-onset:



- Early-onset AD is rare, usually affecting people aged 30 to 60 and usually running in families. Researchers have identified mutations in three genes that cause early-onset AD.
- Late-onset AD is more common. It usually affects people over age 65. Researchers have identified a gene that produces a protein called apolipoprotein E (ApoE). Scientists believe this protein is involved in the formation of beta-amyloid plaques.

AD Research: the Search for Causes



Studies at the Cellular and Molecular Level

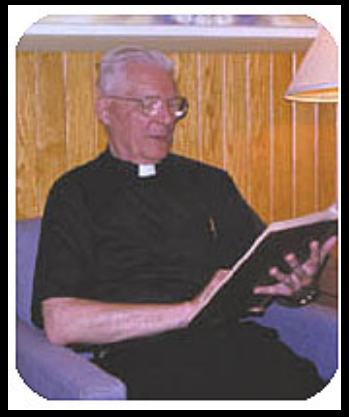
- Oxidative damage from free radical molecules can injure neurons.

- Homocysteine, an amino acid, is a risk factor for heart disease. A study shows that an elevated level of homocysteine is associated with increased risk of AD.
- Scientists are also looking at inflammation in certain regions of the brain and strokes as risk factors for AD.

AD Research: the Search for Causes

Epidemiologic Studies

Scientists examine characteristics, lifestyles, and disease rates of groups of people to gather clues about possible causes of AD. The NIA is currently funding epidemiologic studies in a variety of different groups. Two of the studies focus on religious communities. Researchers conduct yearly exams of physical and mental status, and studies of donated brains at autopsy. Some early results indicate:



- Mentally stimulating activity protects the brain in some ways.
- In early life, higher skills in grammar and density of ideas are associated with protection against AD in late life.

AD Research: Diagnosing AD

Experienced physicians in specialized AD centers can now diagnose AD with up to 90 percent accuracy. Early diagnosis has advantages:

- Doctors can rule out other conditions that may cause dementia.
- If it is AD, families have more time to plan for the future.
- Treatments can start earlier, when they may be more effective.
- It helps scientists learn more about the causes and development of AD.

Why are we here?

Have you wondered lately, as you sit back and analyze ,does it seem that the things we once thought as important, just don't seem to matter anymore. As a society, we seem to have tolerated a systemic degradation of everything, from the simple and mundane, to matters of utmost importance, like national security and debt..A seismic shift in priorities has occurred, and NOBODY has told you or I. Back when our grandparents were in charge, our health was guarded with simple and pure system of life..where are are we going sacrificing our own life and that ignorance and non initiative attitude is the only answer to the question.

Several possible causes have been identified, including genetic factors, exposure to toxins, abnormal protein production, viruses, and difficulties in blood flow to the brain ,several strokes. Aging and heredity (genetic factors) are considered the greatest factors involved in the development of Aizheimer's disease.

Time in people's life has been changing taking us by surprise, with different stress, habit and fears, ways to feed ourselves and more. We are thinking that it is time to change. Is it time to change?

WHAT AND WHEN DO YOU EAT

To function optimally as you age, your brain needs nutritional support in two ways: First is proper nourishment and secondly, the ability to receive and respond to the nourishment properly. The right nutrients must be supplied through diet, but also, the channels within the brain must be open and clear of ama so that the nourishment can penetrate into the brain tissue and carry out its desired effects.The brain needs four basic types of nourishment: oxygen, glucose (blood sugar), fat and protein

Proteins **The brain also needs protein, especially certain amino acids, such as tyrosine, tryptophan and cysteine. The two former amino acids are essential for the manufacture of key neurotransmitters (brain messenger molecules), such as dopamine, and serotonin, while cysteine is a critical amino acid necessary for detoxing the brain (and body) of certain chemicals and heavy metals.**

Oxygen the brain can survive only four minutes without oxygen, and then often with irreparable damage

FAT The brain is an astonishing 60 percent fat. Every one of your neurons (brain cells) is insulated by a layer of fat. So it is no wonder that your brain needs fat for nourishment

Glucose Glucose (sugar) is needed by the brain to create the energy we need to fuel our bodies **.The brain's preferred food is glucose**

Special foods for brain

Vedic medicine has traditionally viewed walnuts as "brain food," and cited the structural allegory implicit in the walnut's shape matching that of the cerebral cortex. We know they are rich in omega three fatty acids, one of those essential to brain health.

A small amount, of 1-2 tsp of ghee per day, is considered as a rejuvenative, for the brain

Vitamins and minerals are also needed by the brain, specifically B12,

Ensure that you are getting enough antioxidants. As mentioned above, eating fruit and vegetables is the best way to fight free radical damage. Chocolate, green tea, vitamin E and vitamin C are other antioxidants that may be important for defending against Dementia

Vitamin D from Sunshine without sunscreen ,Cod liver oil ,Salmon, tuna and mackerel.

Significance of the Six Tastes: Healing with Shad Rasa

Why Sleep?

Functions of sleep include:

- Energy conservation.
- Restoration of the brain and body.
- Memory consolidation.

All animals produce endogenous circadian rhythms, internal mechanisms that operate on an approximately 24 hour cycle ,Regulates the sleep/ wake cycle ,frequency of eating and drinking, body temperature, secretion of hormones, volume of urination, and sensitivity to drugs

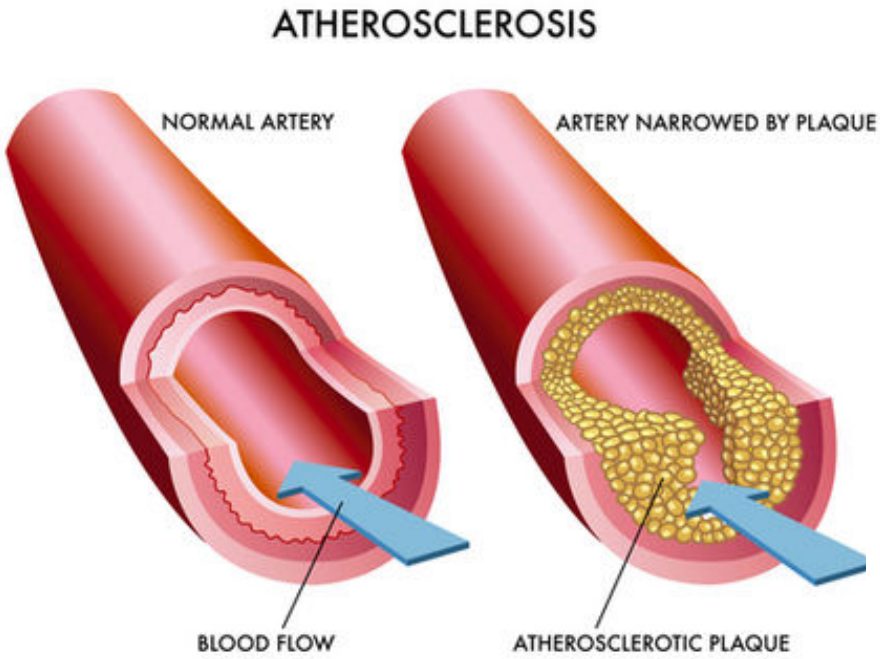
The suprachiasmatic nucleus (SCN) is part of the hypothalamus and the main control center of the circadian rhythms of sleep and temperature. Damage to the SCN results in less consistent body rhythms that are no longer synchronized to environmental patterns of light and dark .The SCN regulates the pineal gland, an endocrine gland located posterior to the thalamus results in Insomnia ,stress ,epilepsy, Parkinson's disease, Sleep apnea, depression, anxiety or other psychiatric conditions

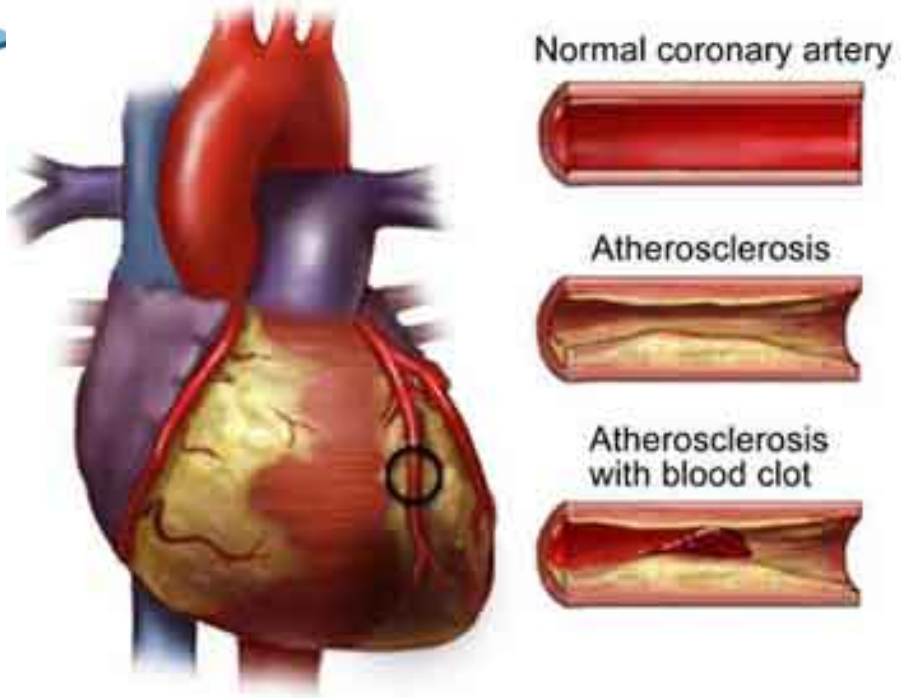
Working non-traditional hours is more common than you might think. In industrialized nations, up to 20% of workers work either night or rotating shifts, Although not everyone who works odd hours has shift work sleep disorder, a lot can be at stake. People with shift work disorder have higher rates of absenteeism and accidents related to sleepiness than night workers without the disorder..Memory and ability to focus can become impaired, and shift workers who are sleep-deprived often get irritable or depressed

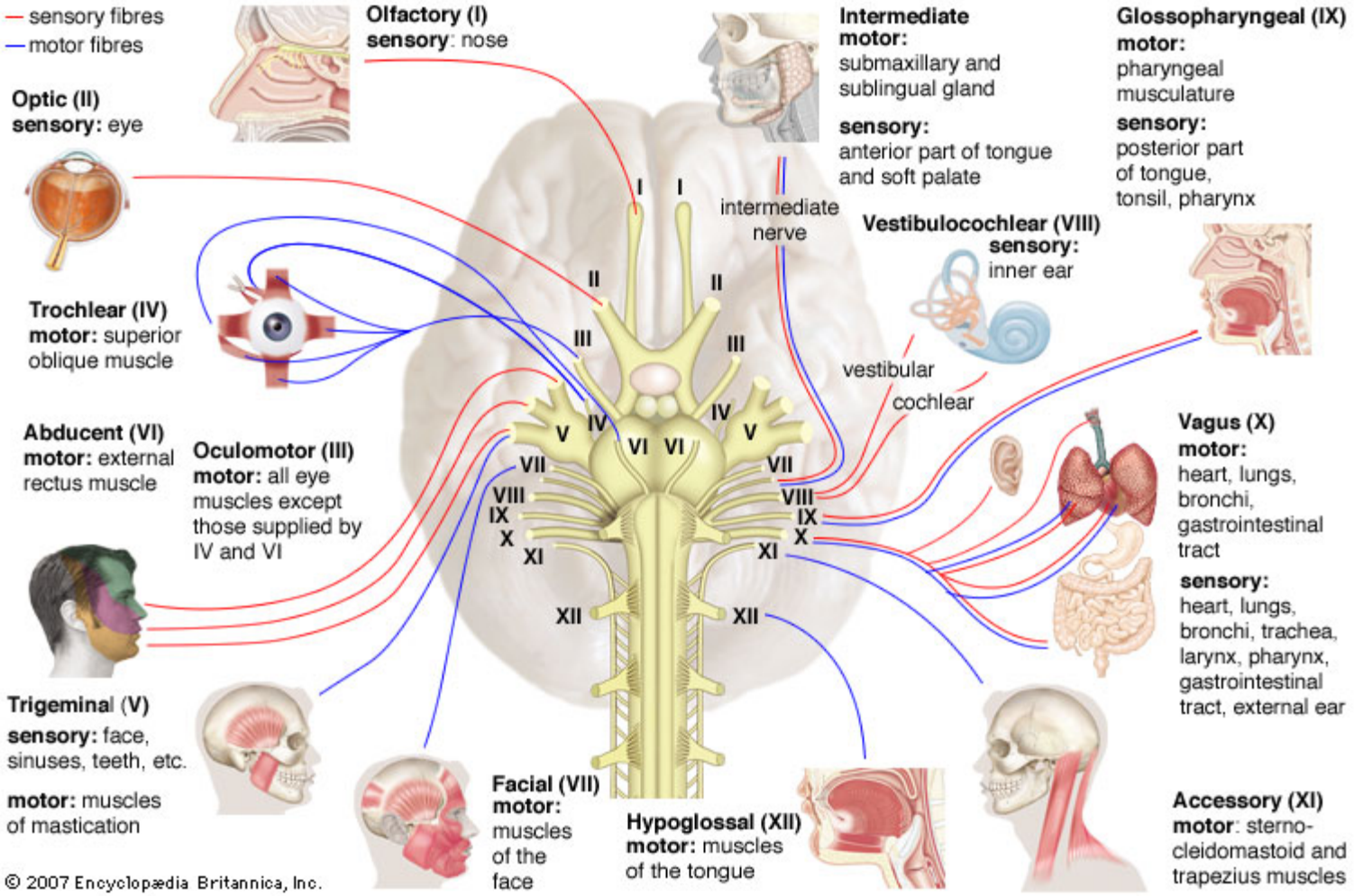
But at today's situation it is not possible to avoid such a working patter ,you can Stick to a regular sleep-wake schedule as much as you can. Use blackout blinds or heavy curtains to block sunlight when you sleep during the day. "Sunlight is a potent stimulator of the circadian rhythm. "Even if your eyes are closed, the sunlight coming into the room tells your brain that it's daytime. Yet your body is exhausted and you're trying to sleep. That discrepancy ... is not a healthy thing for the body to be exposed to. but of no choice

Cures for Clogged Arteries Through ART Forms

NATYA SASTRA

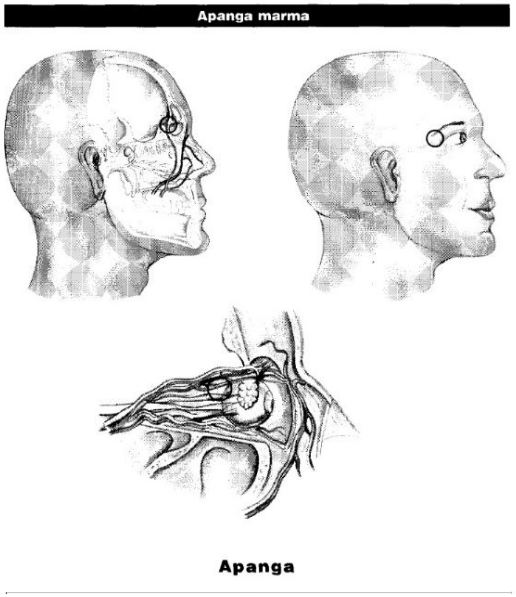

ATHEROSCLEROSIS
NORMAL ARTERY
ARTERY NARROWED BY PLAQUE
BLOOD FLOW
ATHEROSCLEROTIC PLAQUE


Normal coronary artery
Atherosclerosis
Atherosclerosis with blood clot


sensory fibres
motor fibres
Olfactory (I)
sensory: nose
Optic (II)
sensory: eye
Trochlear (IV)
motor: superior oblique muscle
Abducent (VI)
motor: external rectus muscle
Oculomotor (III)
motor: all eye muscles except those supplied by IV and VI
Trigeminal (V)
sensory: face, sinuses, teeth, etc.
motor: muscles of mastication
Facial (VII)
motor: muscles of the face
Intermediate
motor: submaxillary and sublingual gland
sensory: anterior part of tongue and soft palate
intermediate nerve
Vestibulocochlear (VIII)
sensory: inner ear
vestibular
cochlear
Glossopharyngeal (IX)
motor: pharyngeal musculature
sensory: posterior part of tongue, tonsil, pharynx
Vagus (X)
motor: heart, lungs, bronchi, gastrointestinal tract
sensory: heart, lungs, bronchi, trachea, larynx, pharynx, gastrointestinal tract, external ear
Hypoglossal (XII)
motor: muscles of the tongue
Accessory (XI)
motor: sterno-cleidomastoid and trapezius muscles
I
II
III
IV
V
VI
VII
VIII
IX
X
XI
XII
© 2007 Encyclopædia Britannica, Inc.

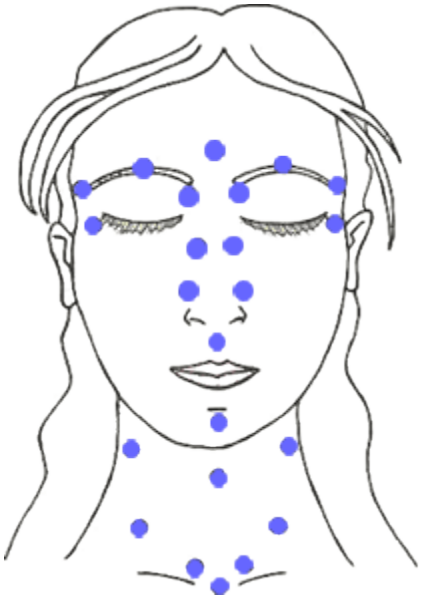
GRIVA BHEDA
DRISHTI BHEDA
PUTA BHEDA
SIRA BHEDA
ADHARA
BHEDA

Thirteen types of Siras(Movement of the head as Abhinaya) are : Akampita, Kampita, Dhuta, Vidhuta, Parivahira, Udvahitaka, Avadhuta, Ancita, Nihancita, Paravrtta, Utksipta, Adhogata, and Lolita.



6. <u>Bhayanaka (fear) :</u> has its principal mood, Bhaya (fright). The eyes opened wide, the eyeballs are moved side ways casting glances right and left, the lips are withdrawn inwards, the nos trils are widened, the cheeks tremble and the neck is turned both sides

ALOKITA DRISHTI



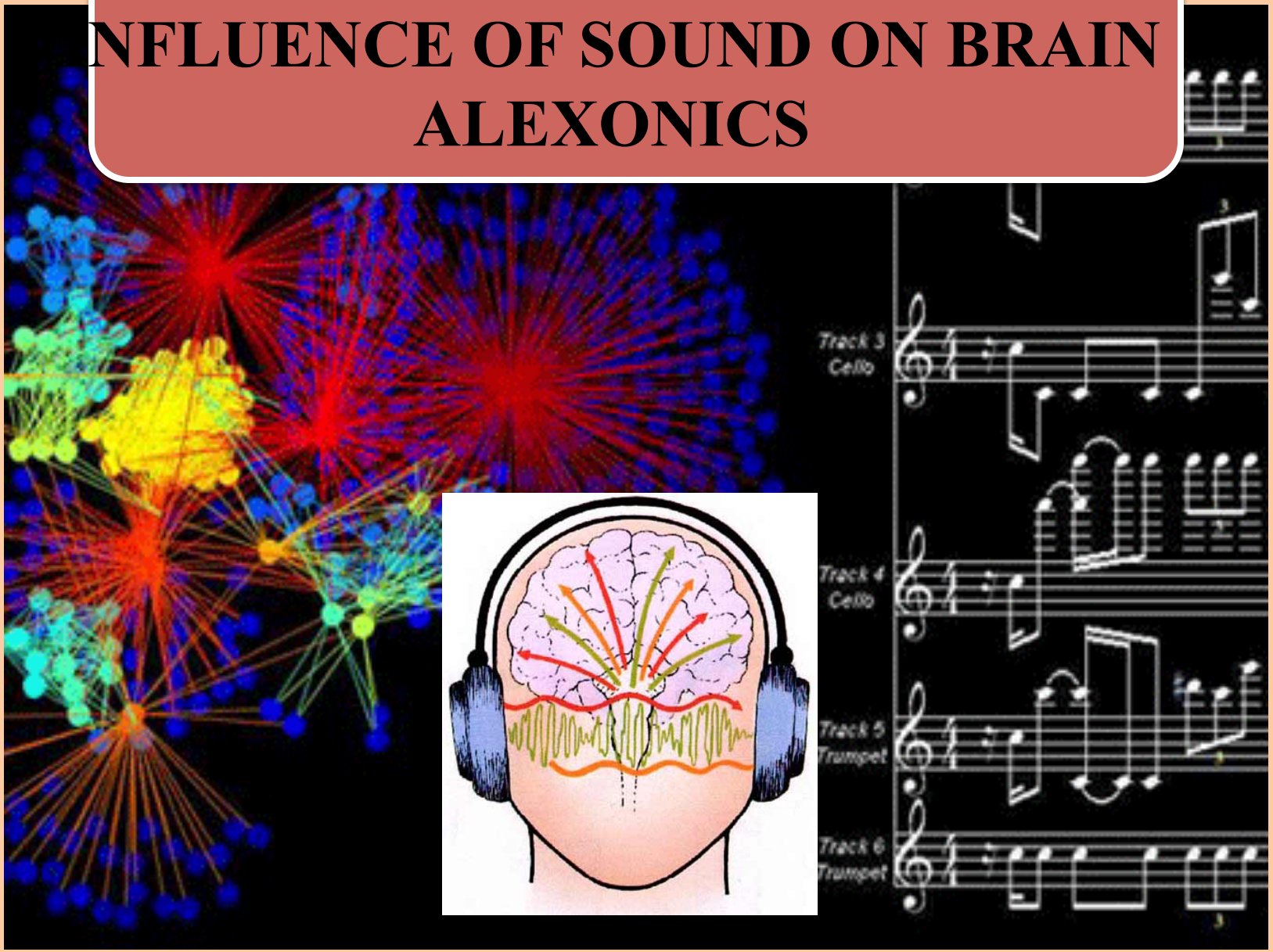
MARMA POINTS

Marma of Head and Neck (Supra clavicular region)

1. Nila/Manya 4 - Right and left common carotid artery or RF Subclavian Artery and internal Jugular veins, vagus between them
2. Matrika 8 - Blood vessels of the neck
3. Krikatika 2 - Atlanto-occipital articulation
4. Vidhura 2 - Posterior auricular ligament/vessels
5. Phana 2 - Kiesselbach's plexus in little's area/ olfactory region of the nose
6. Apanga 2 - Zygomatico-temporal vessels
7. Avarta 2 - Junction of the frontal. Molar and sphenoid bone
8. Utksepa 2 - Temporal muscle and fascia
9. Samkha 2 - Temples
10. Sthapani 1 - Nasal arch of the frontal vein
11. Simanta 5 - Cranial sutures
12. Sringataka 4 - Cavernous and inter-cavernous sinuses
13. Adhipati 1 - Torcular herophili

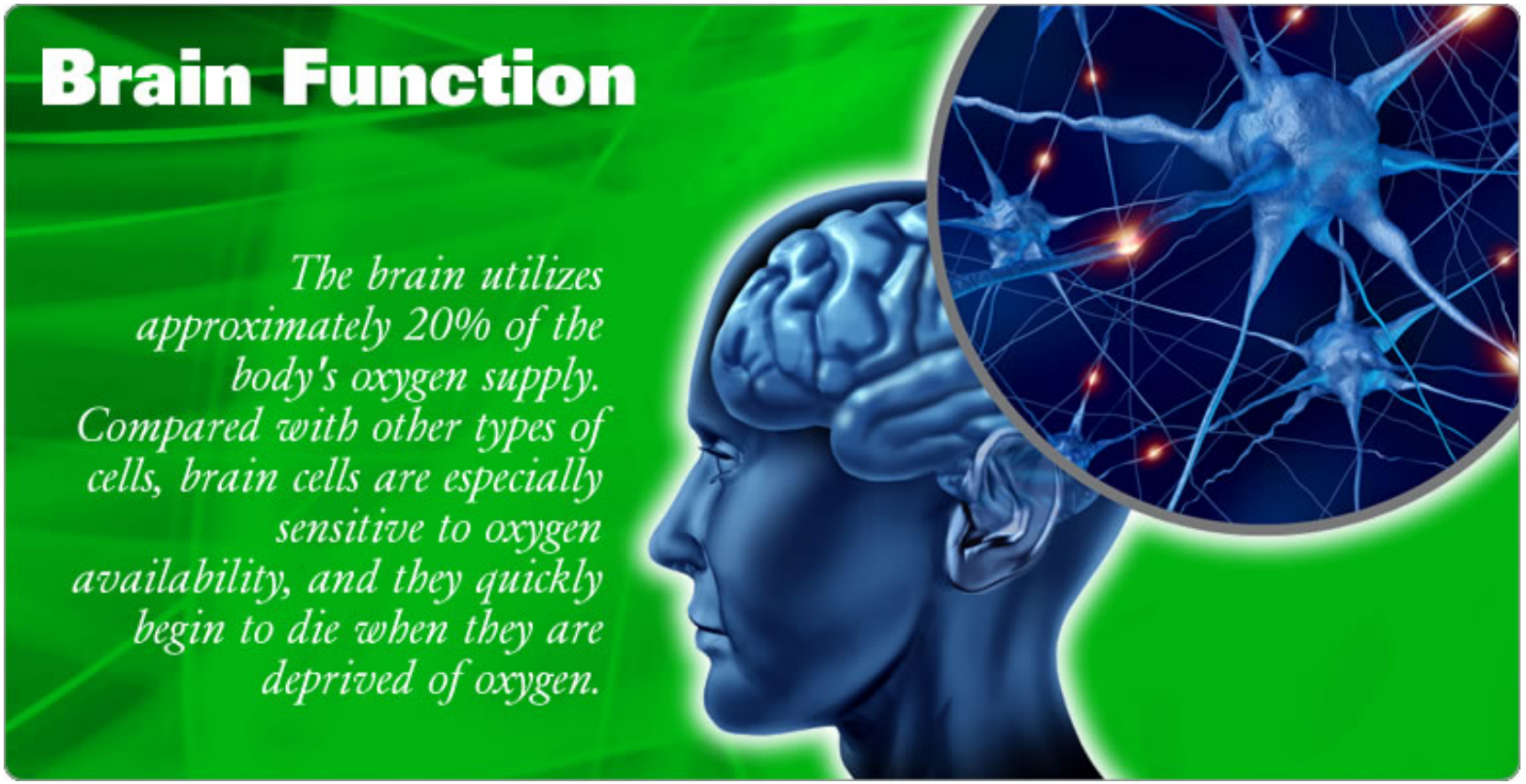
SANGEETHA SASTRA

NFLUENCE OF SOUND ON BRAIN ALEXONICS



DINACHARYA

Oxygen and sugar boost brain power



The brain utilizes approximately 20% of the body's oxygen supply. Compared with other types of cells, brain cells are especially sensitive to hypoxia, and they quickly begin to die when they are deprived of oxygen.

When the brain does not get sufficient oxygen, the following can occur:
Lack of concentration
Poor motor skills
Memory loss
Poor judgment
Light-headedness
Mood swings
Restlessness
Bad Balance

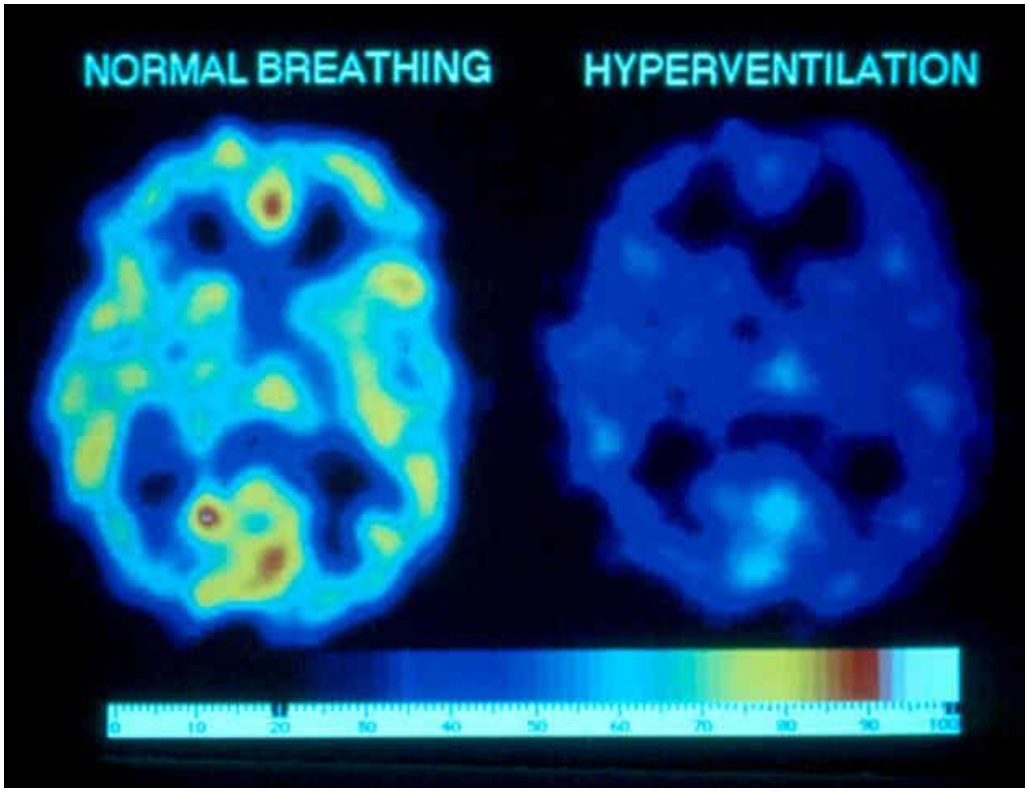
On the average, we lose our ability to carry and transport oxygen by about 1% per year after the age of 20. Knowing this, it's no coincidence that brain function reduces faster as we age. If your bloodstream isn't carrying enough oxygen to your brain, and your brain, as a result, ceases to function at it's optimal efficiency, the potential problems you could encounter are essentially limitless!

The more oxygen you supply to your brain, the better your brain will function.

You can test these ideas practically. If you or anybody else takes 100 deep and fast breaths, you can pass out (or faint) due to ... lack of oxygen in the brain. Why? This picture shows brain oxygenation for normal breathing and after one minute of hyperventilation

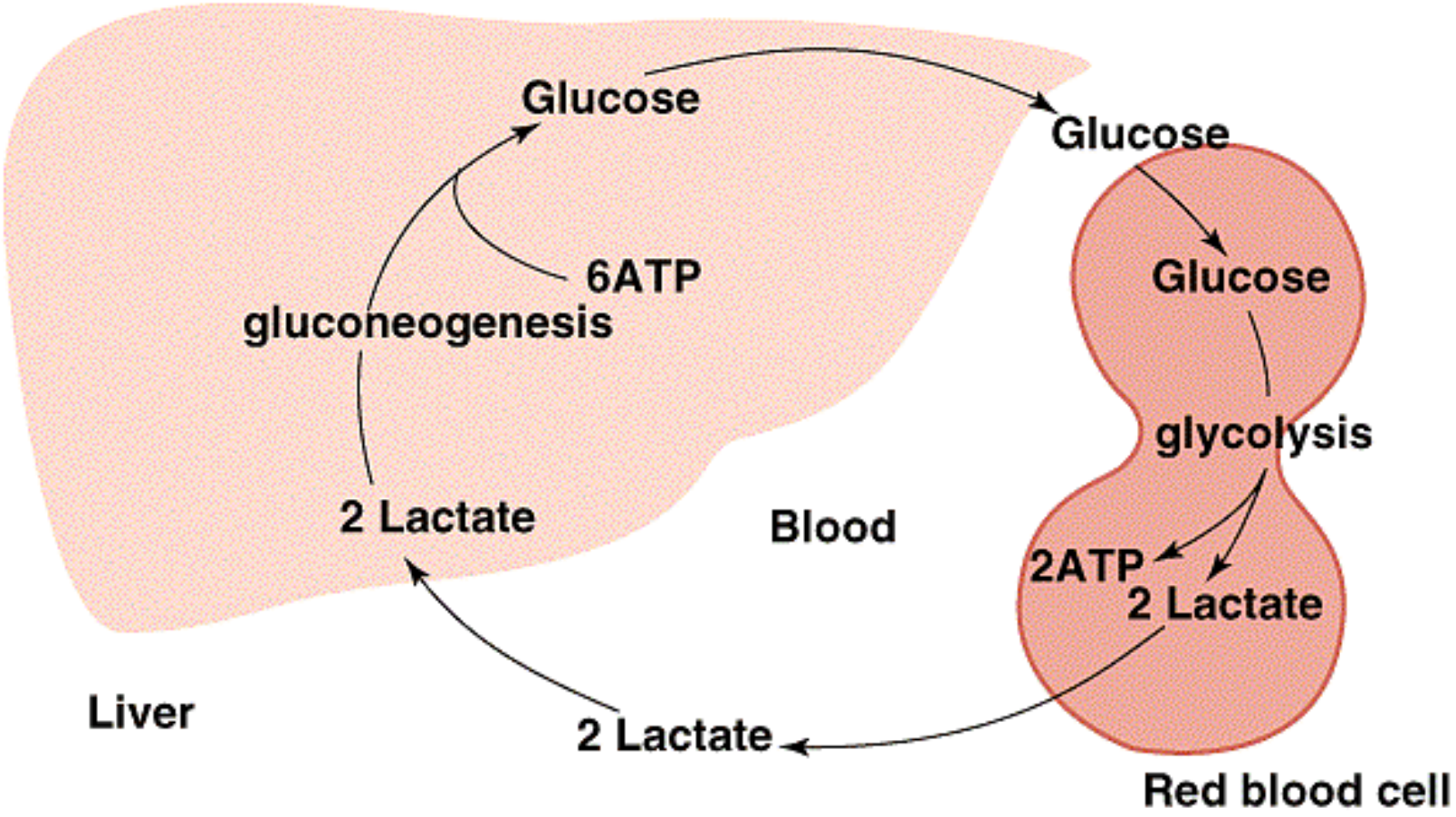
Image. Vasoconstrictive Effects due to Overbreathing. Reduction of O2 Availability by 40 Percent

(Red = most O2, dark blue = least O2)



GLUCONEOGENESIS

Cori cycle


Glucose
Glucose
6ATP
Glucose
gluconeogenesis
glycolysis
2 Lactate
Blood
2ATP
2 Lactate
Liver
2 Lactate
Red blood cell

Carbohydrates and mental health

Carbohydrates include starches, naturally occurring and refined sugars, and dietary fiber. Foods rich in starches and dietary fiber include grain products like breads, rice, pasta and cereals, especially whole-grain products; fruits; and vegetables, especially starchy vegetables like potatoes. Foods rich in refined sugars include cakes, cookies, desserts, candy, and soft drinks.

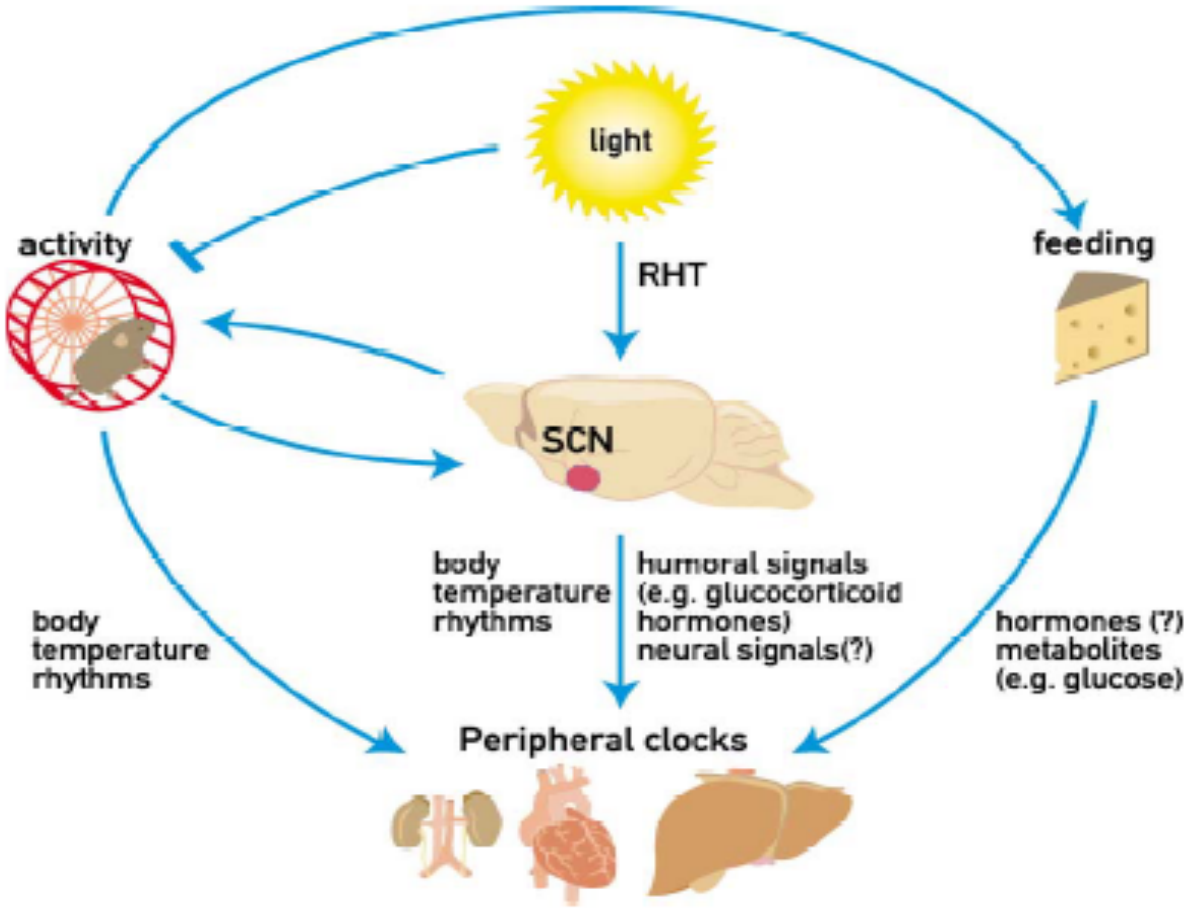
Carbohydrates significantly affect mood and behavior. Eating a meal high in carbohydrates triggers release of a hormone called insulin in the body. Insulin helps let blood sugar into cells where it can be used for energy, but insulin also has other effects in the body. As insulin levels rise, more tryptophan enters the brain. Tryptophan is an amino acid, or a building block of protein, that affects levels of neurotransmitters in the brain. As more tryptophan enters the brain, more of the neurotransmitter serotonin is produced. Higher serotonin levels in the brain enhance mood and have a sedating effect, promoting sleepiness. This effect is partly responsible for the drowsiness some people experience after a large meal.

Some researchers claim that a high sugar intake causes hyperactivity in children. Although carefully controlled studies do not support this conclusion, high sugar intake is associated with dental problems. Further, foods high in refined sugars are often low in other nutrients, making it prudent to limit their use.

Poor Sleep Linked To Alzheimer's Disease, Cognitive Decline

Alzheimer's disease: synaptic dysfunction

Organization of Circadian Clock



Why Sleep?

Functions of sleep include:

- Energy conservation.
- Restoration of the brain and body.
- Memory consolidation.

All animals produce endogenous circadian rhythms, internal mechanisms that operate on an approximately 24 hour cycle ,Regulates the sleep/ wake cycle ,frequency of eating and drinking, body temperature, secretion of hormones, volume of urination, and sensitivity to drugs

The suprachiasmatic nucleus (SCN) is part of the hypothalamus and the main control center of the circadian rhythms of sleep and temperature.Damage to the SCN results in less consistent body rhythms that are no longer synchronized to environmental patterns of light and dark
The SCN regulates the pineal gland, an endocrine gland located posterior to the thalamus.
results in Insomnia ,stress ,epilepsy, Parkinson's disease, Sleep apnea, depression, anxiety or other psychiatric conditions

Working non-traditional hours is more common than you might think. In industrialized nations, up to 20% of workers work either night or rotating shifts, Although not everyone who works odd hours has shift work sleep disorder, a lot can be at stake. People with shift work disorder have higher rates of absenteeism and accidents related to sleepiness than night workers without the disorder..Memory and ability to focus can become impaired, and shift workers who are sleep-deprived often get irritable or depressed.But at at todays situation it is not possible to avoid such a working patter ,you can Stick to a regular sleep-wake schedule as much as you can. Use blackout blinds or heavy curtains to block sunlight when you sleep during the day. "Sunlight is a potent stimulator of the circadian rhythm. "Even if your eyes are closed, the sunlight coming into the room tells your brain that it's daytime. Yet your body is exhausted and you're trying to sleep. That discrepancy ... is not a healthy thing for the body to be exposed to but of no choice

Common Circadian Rhythm Disorders

Jet Lag or Rapid Time Zone Change Syndrome: This syndrome consists of symptoms that include excessive sleepiness and a lack of daytime alertness in people who travel across time zones.

Shift Work Sleep Disorder: This sleep disorder affects people who frequently rotate shifts or work at night.

Delayed Sleep Phase Syndrome (DSPS): This is a disorder of sleep timing. People with DSPS tend to fall asleep very late at night and have difficulty waking up in time for work, school, or social engagements.

Advanced Sleep Phase Syndrome (ASPD): Thisis a disorder in which a person goes to sleep earlier and wakes earlier than desired.ASPD results in symptoms of evening sleepiness, going to bed earlier (for example, between 6 p.m. and 9 p.m.), and waking up earlier than desired (for example, between 1 a.m. and 5 a.m.)

Non 24-Hour Sleep Wake Disorder: This is a disorder in which an individual has a normal sleep pattern, but lives in a 25-hour day. Throughout time, the person's sleep cycle will be affected by inconsistent insomnia that occurs at different times each night. People will sometimes fall asleep at a later time and wake up later, and sometimes fall asleep at an earlier time and wake up earlier.

BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART
Scheme Specific Unique No :
CCRT/SF -3/172/2015

ART FORMS AND ITS IMPACT ON NEUROSCIENCE -*Application of Cognitive Dynamics through art in Alzheimer's and dementia patients*

REPORT -III
IMBACT OF ART IN COGNITIVE DYNAMICS {MUSIC, SWARA YOGA ,NATYA SASTRA ,MARTIAL ARTS}

Artists as the first neurologists

"Of all the colours, the most pleasing are the ones which constitute opponents."

-- Leonardo Da Vinci.

The powerful impact of art therapy on the lives of people

Art is a uniquely human activity associated fundamentally with symbolic and abstract cognition. Its practice in human societies throughout the world, coupled with seeming non-functionality lead to the theory that the localized brain regions and pathways theory links art to multiple neural regions.

We know art stimulates the senses and this realization is a dawn of a new age in the study of art. *The Power of Images* and the colors in it and its psychological and behavioral effects, while creating it and also by observing it.

Color has an effect on memory. We live in a world of color and images and most important trigger of memory. If color can increase arousal, and arousal can increase memory, then it is possible that study of intersection between art and neuroscience from the perspective of a practicing artist.

How the Arts Develop the Brain

ART THERAPY In the 1940s, the artist Adrian Hill coined the term ‘art therapy.” Art therapy has origins in both art and psychotherapy. It is framed as a therapeutic process to enhance well-being (“art as therapy”) and as a psychotherapeutic relationship between therapist and patient. Hill initially used art therapy in people with tuberculosis. It was then used in patients unable to engage in traditional talk therapy and more recently has helped people with cancer and post-traumatic stress disorder. Elderly participants in the arts feel better and less lonely and need fewer medications and doctor visits. While the evidence suggests that art therapy can help many kinds of patients, its efficacy in diseases that directly affect the nervous system is less clear. If psychiatric symptoms arise directly from neural pathology, rather than as a reaction to a devastating illness like cancer, art therapy could help better

What is arts education?

- Movement and Dance
- Music
- Theatre Arts
- Visual Arts

Art as expression. Humanist scholars often empha- size the role of art as a medium for emotional expression. In What is Art? Tolstoy wrote, “art a human activity consisting in this, that one consciously by means of certain external signs, hands on to others feelings he has lived through, and that others are infected by these feelings also experience them”. In Principles of Collingwood asserted that “the artist’s business to express emotions; and the only emotions he express are those which he feels, namely his own”. He also said “art is the com- munity’s medicine for the worst disease of mind, the corruption of consciousness”

Brain Development

Neural Plasticity

- The brain's greatest capacity for change occurs during the early years

Integration

- There needs to be good communication (*integration*) between both sides of the brain

Neural Plasticity
Use It or Lose It

The human brain at birth

6 Years Old

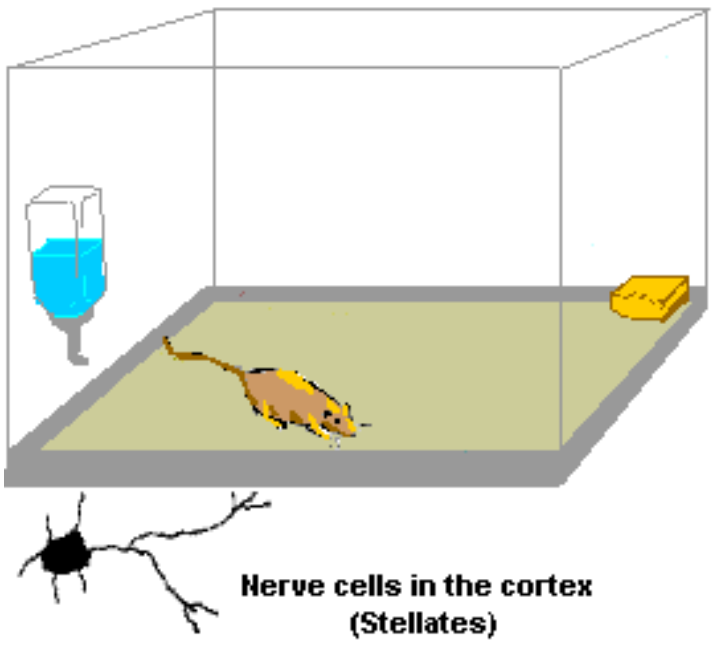
14 Years Old

Learning and Changes in the Brain

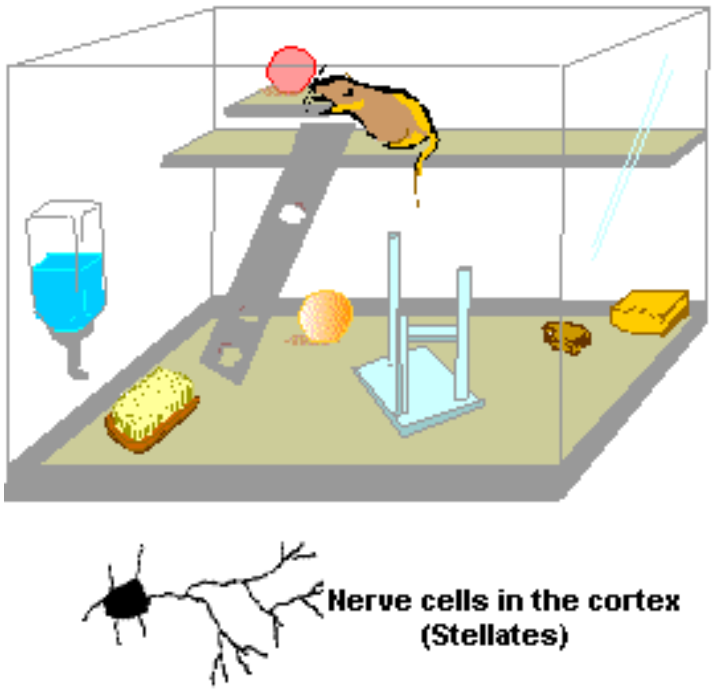
Until recently, neuroscientists believed that once the brain completes its development, its is unable to change, particularly in regard to its neural cells, or neurons. The dogma held that neurons cannot reproduce themselves or change significantly their connection structure to other neurons. The practical consequence for these tenets were that a) lesioned parts of the brain, such as in victims of tumors or stroke, are unable to growth again and regain part of their function; and b) experience and learning may alter the brain's functionality, but not its anatomy.

It seems that neuroscientists were wrong on both counts. Research in the last 10 years shows a strikingly different picture. In response to play, stimulation and experience, there is a growth of neural connections within the brain. Although early pioneers in biobehavioral research, such as Donald Hebb, from Canada, and Jersy Konorski, from Poland, believed that memory probably involved structural changes in the neural circuits, experimental evidence for this notion was lacking.

In experiments carried out in rats by American neuroanatomist Dr. Marian Diamond, she was able to show that animals that were reared in a rich environment -- a cage full of toys and features such as balls, wheels, staircases, ramps, etc., developed a significantly thicker cerebral cortex than rats reared in a poorer environment, without toys, or in isolation. The increased thickness was due not only to a larger number of brain cells, but also there was more extensive branching of their dendrites and of interconnections to other cells.

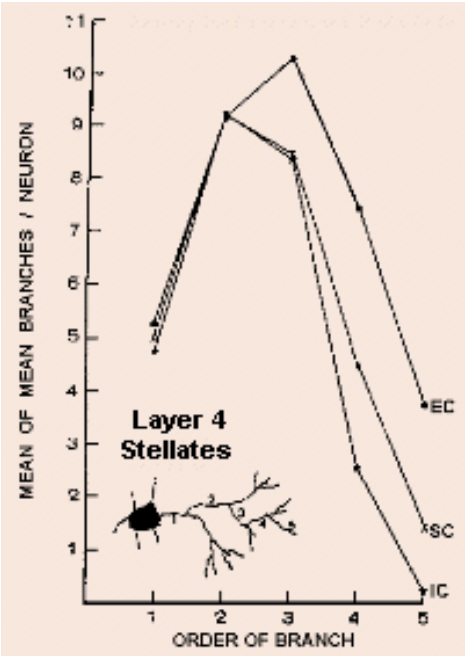


Feature poor environment

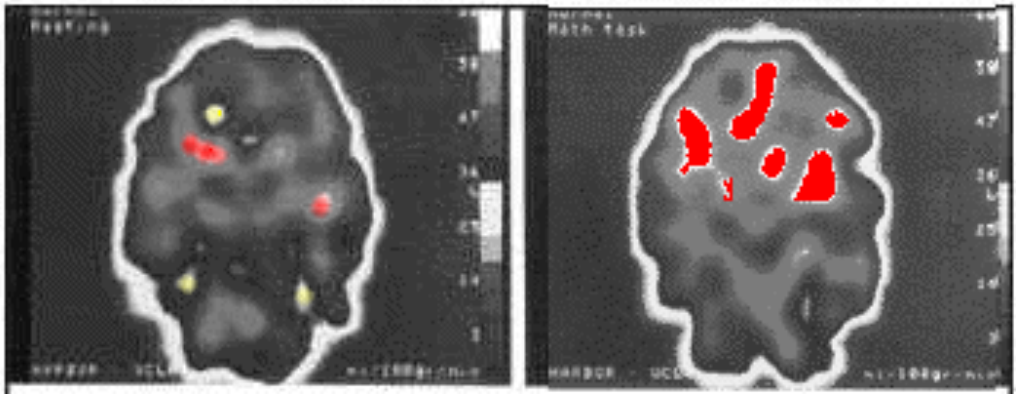


Enriched environmental allowing rats to interact with toys in their cage produces anatomical changes in the cerebral cortex.

The graph on the right shows how the mean number of branches observed in stellate cells, which are found in the fourth layer of the rat's visual cortex, increase more on animals reared on rich environments (curve labelled EC, or enriched condition), than in animals reared together in social groups, but with no toys (SC, or social condition group). SC rats, on the other hand, have more branching in the stellate cells than animals reared isolated, and without toys (IC, or isolated condition group). A larger difference between the groups can be seen on the 4th and 5th level branches. In other words: branches arising from the cell's body do not get increased because of rich sensory, motor and social experience; but branches at the tip of long processes, do. This is evidence that the stellate cells are growing and extending new sub-branches on existing ones, and this is revolutionary knowledge.



The parts of the stellate cells which are growing are the dendrites. It is through the dendrites that a neuron receives nervous impulses from other cells, which are conveyed to the cell's body, and thence to the axon. Therefore, a growth in dendrite branching can only mean that intercommunication processes in the cortex cells have increased and that more dendrites make them more effective in terms of regulating the activity of neural circuits.

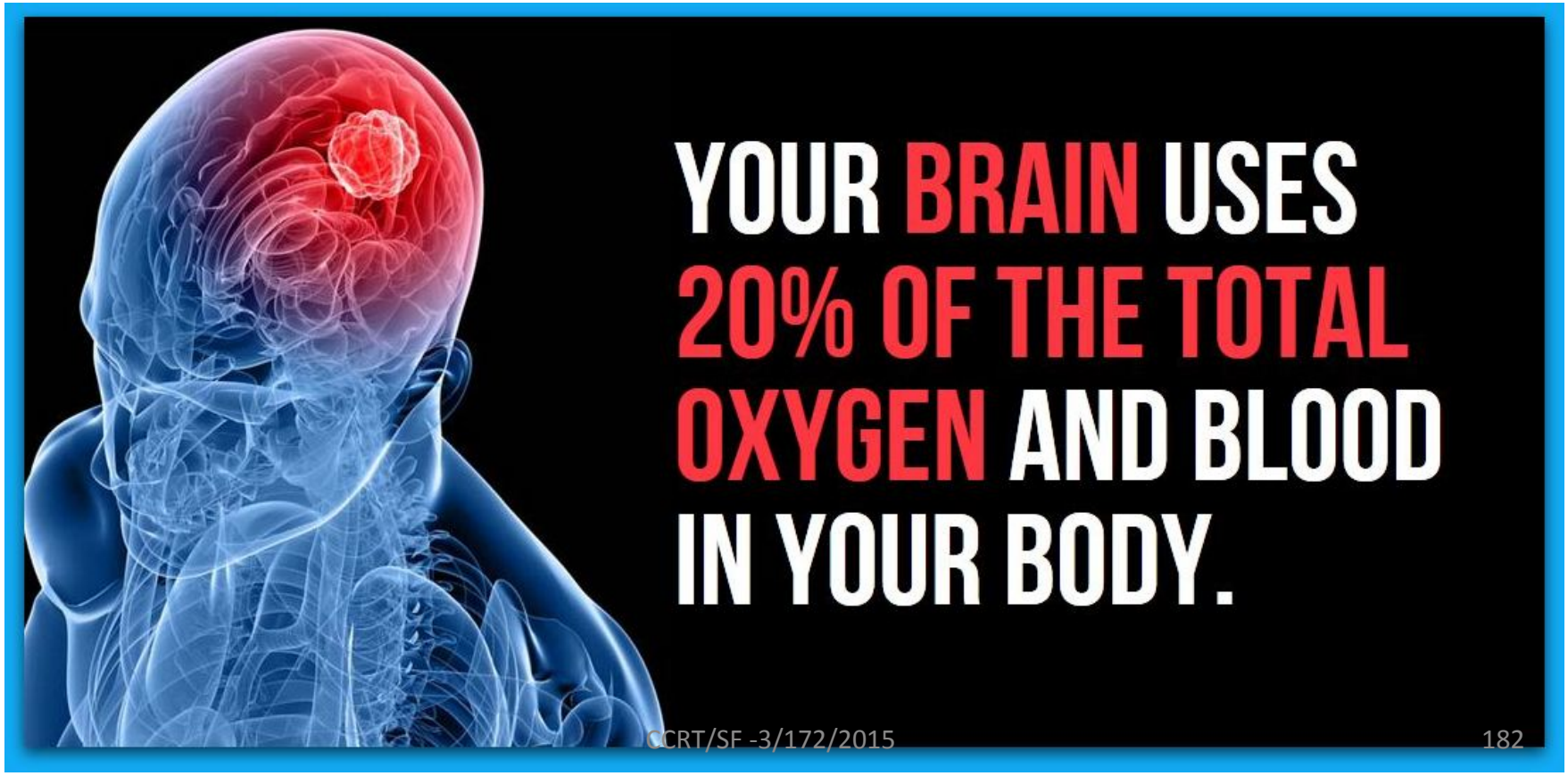


Cerebral Blood Flow (CBF) during a mental activation task. Normal control subject, baseline (left) and mathematical task (right). In this subject, increased perfusion during the mathematicaltask is present in both inferior frontal and left parietal areas. Source: Villanueva-Meyer et. cols. - Alasbimn Journal

Neural growth and regeneration in response to environmental factors no longer appear to be impossible, from what neuroscience has disclosed in experiments with animals and humans. This knowledge, coupled with the discovery of the mechanisms that make this possible will be the gateway to a fantastic future for humankind; a future where we may well be able to manipulate and influence our own mental capacities in unforeseen ways. This has been a long-standing dream of fiction and science alike, and we may be in the threshold to its realization.

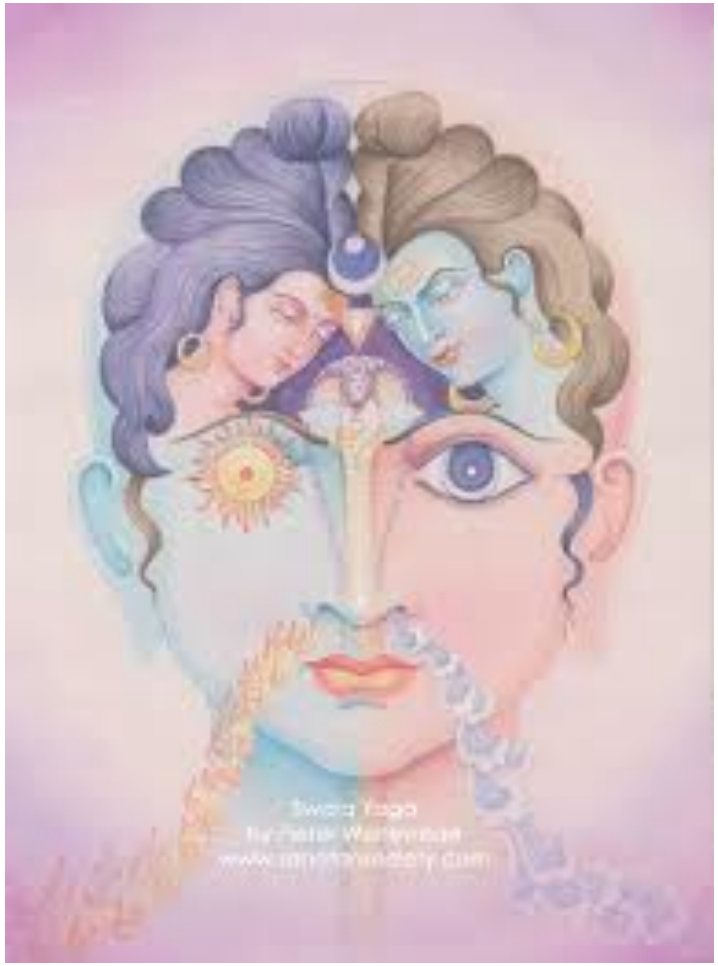
Patients with dementias commonly experience neuropsychiatric symptoms that diminish their quality of life. Phar- macologic treatments for these symptoms are limited in their efficacy. In the absence of near-future prospects for a cure for degenerative dementias, treatments that improve neuropsychiatric symptoms and quality of life are needed. We explore the hypothesis that art therapy is useful in dementia by reviewing the extant literature. With appropriate structure, patients with dementia can produce and appreciate visual art. Case studies and several small trials suggest that art therapy engages attention, provides pleasure, and improves neuropsychiatric symptoms, social behavior, and self-esteem. Whether these benefits generalize beyond the studio remains unknown. We offer a theoretical framework that motivates the use of art therapy and propose that clinical enquiry to establish methods, assess efficacy, and define optimal conditions for the use of art therapy in Alzheimer's and other dementing disorders is timely. Keywords: Alzheimer's disease, art therapy, behavioral neurology, flow theory, frontotemporal dementia, neuropsychiatry

Empowerment By The Currents Of Breath



Introduction to Swara Yoga.

We welcome visitors to this website to a fascinating and relatively unknown yoga - Swara Yoga.
The word SWARA in Sanskrit, means sound or musical note; it also means the continuous flow of air through one nostril. And we all know that YOGA means union. So Swara Yoga is the science which is about the realization of cosmic consciousness, through the awareness or observation, then control or manipulation of the flow of breath in the nostrils.



Swara yoga: the tantric science of brain breathing also termed to be a Phonetical astrology, where swara is etymologically termed to be "sound of one's own breath" and is written as a conversation between shiva and parvati Shiva swarodaya's content.

Epilogue

- Everything in this universe is interconnected. Everything influences each other. The duration of Years, Months, day and night has been fixed by our ancient sages after minutely studying the cosmos.
- Our body itself is a miniature cosmos. It has a particular breath pattern which signifies the condition of our health.
- The current of our breath is intimately connected with our health. Our body has a monthly breath cycle. If our breathing pattern is in accordance to it, it signifies that our health is proper.
- Therefore our breathing pattern is a powerful indicator of our health.
- If our body is harmonized with the cosmos, it will stay fit and enable us to influence our surroundings.
- Materialistic world made up 5 broad elements fire, water, ether, earth and air can beinfluenced by us e.g to make signal green on road when an emergency is there. Similarly, we may get support from cosmic power houses like of Gurudev e
- Therefore harmonizing the currents of our breath is of utmost importance.

Application and achievements

- Diagnosis and control of ailments and disorders in body-mind functions to make body-mind system healthy..
- Attainment of mental peace and calmness.
- Quick Decision making power, Guidance for appropriate time management to initiate important task to get success.
- Awakening of exceptional talent, Supra- mental abilities of speech and hearing, ability to fly in sky and to appear in multiple forms, supernatural potential to disappear any moment from anywhere.
- Obtaining Forecasting abilities.
- Influencing our surroundings the way we want.

The Deep Science Of Swara Yoga

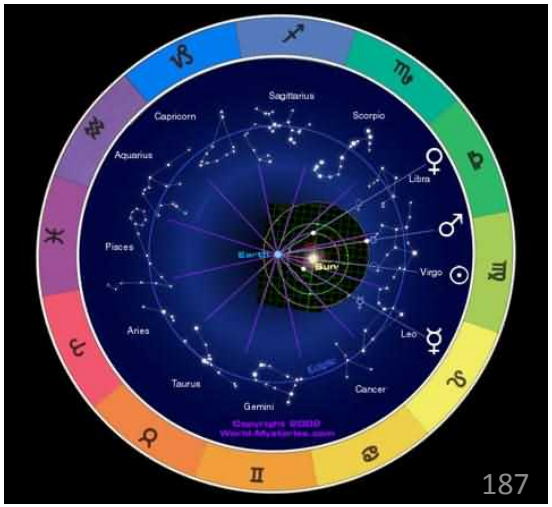
- Swara yoga refers to an independent and complete in itself branch of yoga. It deals with the physiological, psychological and spiritual aspects of the rhythmic notes of breathing and the associated flow of bioelectrical currents and Prana (vital spiritual energy).

- Because of the ease of practicing it and the enormous benefits it provided, it used to be an integral part of the daily exercises of people in the ancient Indian society. Because of its use in forecasting, Swara-Vigyana is also a part of Vedic astrology.

- Swara Yog should not be confused with music.

- Swara-Vigyana – the science of Swara – is a deep science of breathing, bioelectrical signals and geo-magnetism. The apparently simple practices and applications of Swara-Yog are **derived** from the **rare knowledge** of how the cosmic magnetic forces, the positions

of planets, the biological clock, certain metabolic and physiological functions and the mental state, affect the breathing patterns.



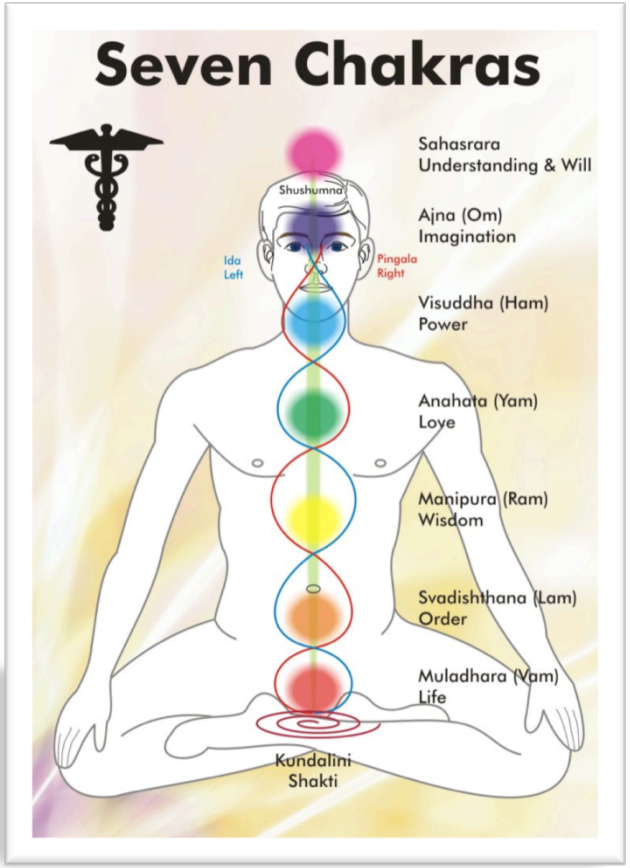
Swara Yoga and Flow Of Vital Energy - Terminology

- **Nadi**:- Channel for flow of vital energy within the body.(72000 nos.)

- Three principal **N**adis- Ida, Pingala and Sushamana are bundled in spiral shaped extrasensory nucleus beneath the navel and spread across the body in different directions.

- Role of Nadis:- activation, transmission, effect and manifestation of the bioelectrical signals and endocrine secretions and interactive functions of the body-mind system.

- The lunar breath current(Ida) in the vibrations of the breathing, through the left nostril, are referred as “Chandra Swara” and the solar currents(Pingala) manifested in the vibrations of breathing through the right nostril are termed as “Surya Swara”.



- If we **pay attention** to our **breathing patterns**, we will notice most of the time we breathe only through **one nostril**, either through the left or through the right. **Both the swara** are active for few moments only at the time of changing of this flow from Ida to Pingala (i.e. left to right) or vice versa that. **This change occurs periodically in about one to three hours** on an average. (Ideally 1 hr)

The movements of the sun and moon and their mutual interaction with the Earth - via planetary forces of attraction, cosmic radiation, electromagnetic waves, etc- continue without pause as per the universal laws of nature. So do the continuous *swaras* through *Ida, Pingla, Sushumna* throughout the life-cycle.

In a healthy state of the body and mind our swaras universally manifest the following patterns around the time of sunrise during a lunar month.

On Lunar Day No.	Brighter Half of the Lunar Month	Darker Half of the Lunar Month
1	*Chandra swara*	*Surya swara*
2	*Chandra swara*	*Surya swara*
3	*Chandra swara*	*Surya swara*
4	*Surya swara*	*Chandra swara*
5	*Surya swara*	*Chandra swara*
6	*Surya swara*	*Chandra swara*
7	*Chandra swara*	*Surya swara*
8	*Chandra swara*	*Surya swara*
9	*Chandra swara*	*Surya swara*
10	*Surya swara*	*Chandra swara*
11	*Surya swara*	*Chandra swara*
12	*Surya swara*	*Chandra swara*
13	*Chandra swara*	*Surya swara*
14	*Chandra swara*	*Surya swara*
15*	*Chandra swara*	*Surya swara*

* This day is popularly called the "Purnima" (*full moon*) for the brighter half and "Amavasya" (dark night or no moon) for the darker half of the lunar month

- We all know that rays of Moon (Chandra) are cool and soothing whereas those of Sun (Surya) are hot and energizing. That is why Chandra Swara corresponds to the calm, stable and happy state of mind which is most suited for thorough and discreet thinking, balanced discussions and quick decision making etc.The Surya- Swara occurs in a relatively excited, active, dynamic, agile state of mind. This is best for courageous efforts and task requiring enthusiasm, force, aggressiveness and alacrity.

- When you are in good and calm mood and having positive thoughts you must be breathing from left nostril.(Experiment)

- On the contrary, negative thoughts, excitement, untoward thinking would be when we are breathing from right nostril. (Experiment)

- Our Rishis had discovered that microcosm is miniature of Macrocosm (Yatha Brahmande Thatha Pinde) : The functions at gross physio-chemical as well as atomic and subtler levels in human body also follow the Laws of nature likewise those followed at Cosmic level, e.g. in planetary motion.

- The **auto-regulated cyclic variation** of swaras is as regulated as dawn of the **day** after the **night**, shift of the Sun from Uttarayan to Dakshinayana and consequent changes in the season from **winter to summer**, etc

- As the sublime force of omnipresent consciousness are also present in the individual self, it could be used by accomplished yogis, in what appear as supernatural effects at the level of microcosm.
- At these moments, the flow of vital energy and Prana is active through the Susumana Nadi. This transition take place at Characteristic timings, e.g. exactly at the moments of Sunset, which are of very significant importance in Yoga and spiritual *Sadhanas*.

- Span of life is depends on breathing pattern. Each one of us is born here with his or her allocated stock of breath.
- If we breathe deeply to consume adequate amount of oxygen at a consistent **pace at a slower** than an average rate we can enjoy a longer and healthier life span.

Animal	Respiration rate (per minute)	Full life Span (in years)
Rabbit	38	8
Monkey	32	10
Dog	26	12
Horse	16	25
Human	13	120
Snake	8	1000
Tortoise	5	2000

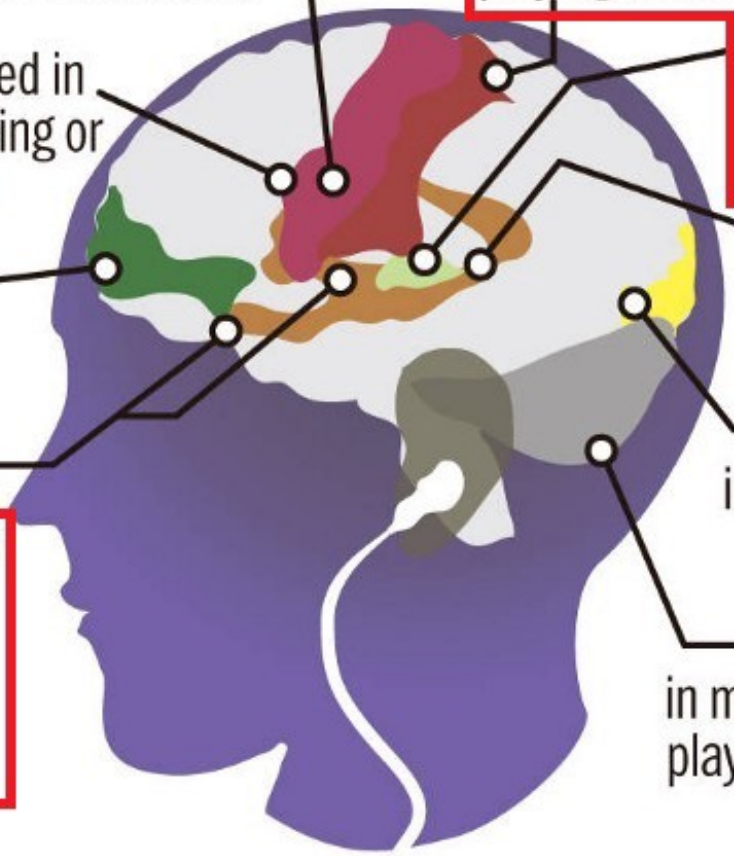
Music & It's Effect On The Brain

Music is the manifestation of the human spirit, similar to language. Its greatest practitioners have conveyed to mankind things not possible to say in any other language. If we do not want these things to remain dead treasures, we must do our utmost to make the greatest possible number of people understand their idiom.

Zoltán Kodály

Music and the brain

Playing and listening to music works several areas of the brain



Corpus callosum: Connects both sides of the brain

Sensory cortex: Controls tactile feedback while playing instruments or dancing

Motor cortex: Involved in movement while dancing or playing an instrument

Auditory cortex: Listens to sounds; perceives and analyzes tones

Prefrontal cortex: Controls behavior, expression and decision-making

Hippocampus: Involved in music memories, experiences and context

Visual cortex: Involved in reading music or looking at your own dance moves

Nucleus accumbens and amygdala: Involved with emotional reactions to music

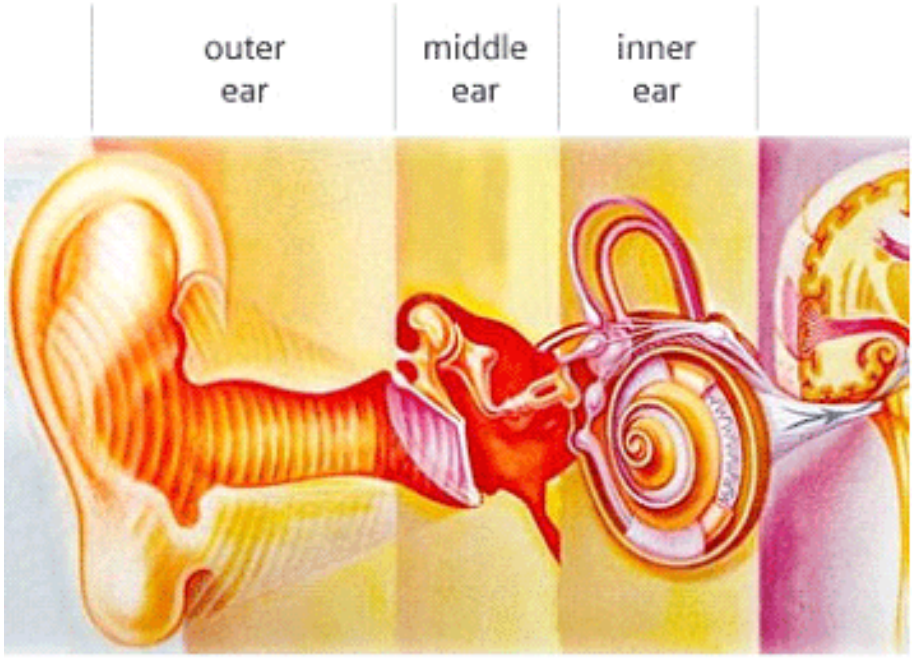
Cerebellum: Involved in movement while dancing or playing an instrument, as well as emotional reactions

SOURCE: Music for Young Children

DESERET NEWS GRAPHIC

How you hear?

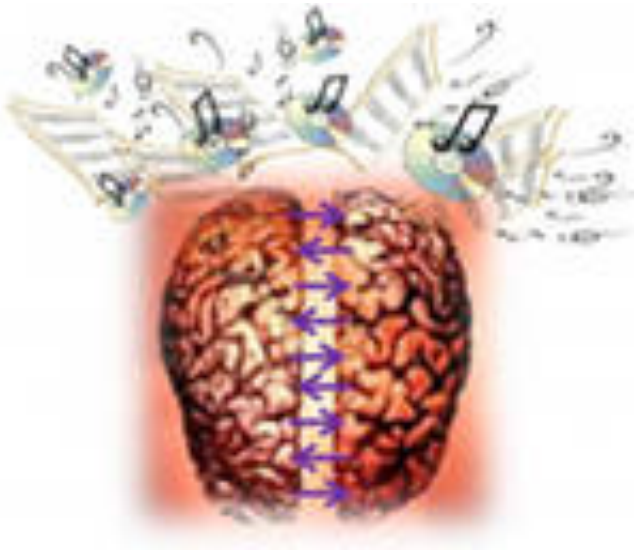
- Sound enters ears and travels along your ear canal
- It sets off a wave of vibrations from your eardrum to the snail-shaped cochlea in your inner ear
- These vibrations stimulate sensory hair cells in your cochlea
- This generates a nerve impulse which travels along your cochlear nerve to your brain
- The temporal lobe processes the sound



Music Stimulates the Brain

Identified by H. Gardner as one of the eight multiple intelligences, **Music Intelligence** is present in every human at birth.

The principle "use it or lose it" is especially true of the brain. Learning becomes permanent when neurons make connections to other neurons. Listening to music stimulates the brain, increasing the neural connections. Music involvement activates more areas of the brain than any other activity.

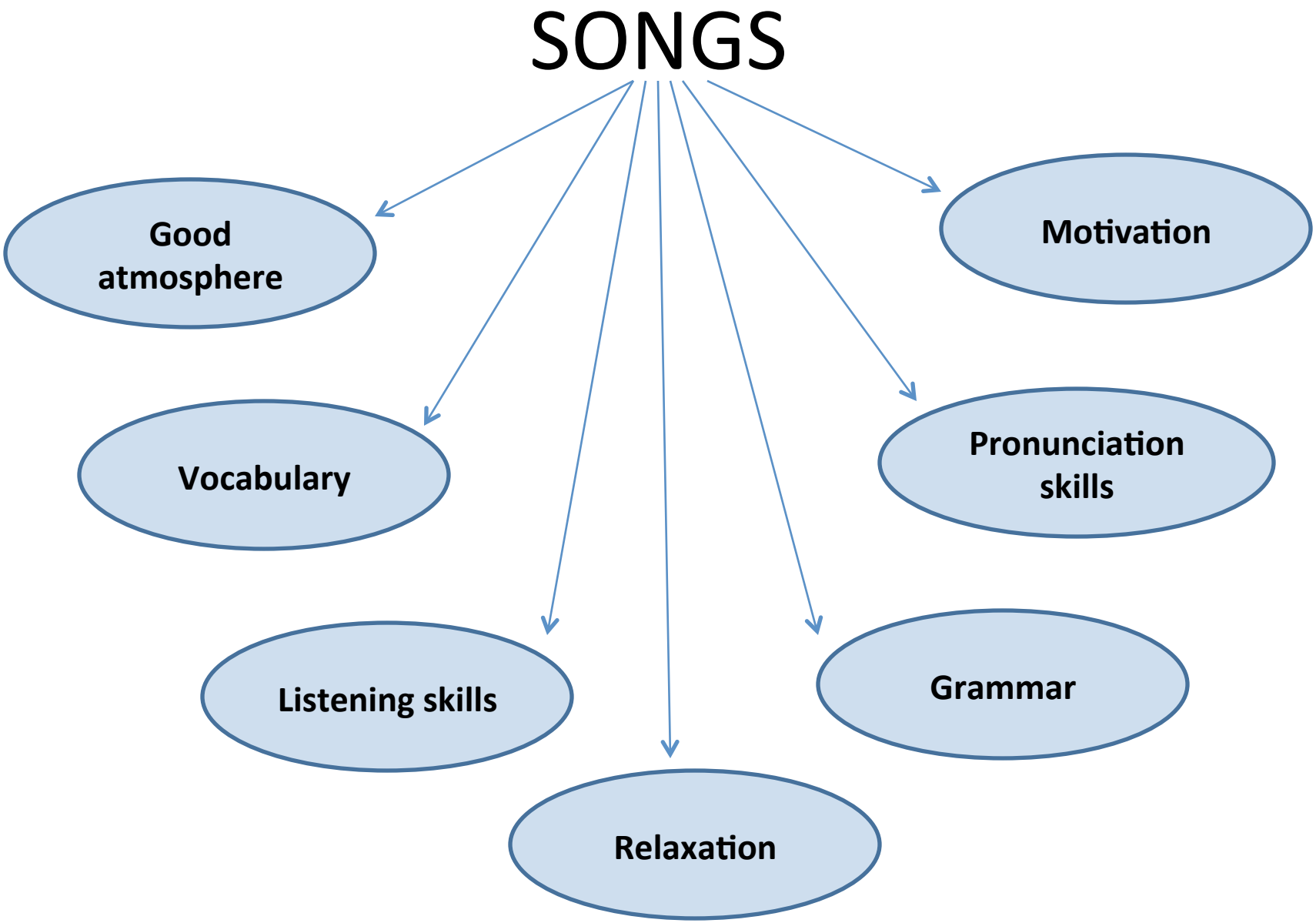


The Best Tool of Teaching

Music is a powerful tool for language learning and retention.

Music supports, strengthens and develops brain cells and builds connections between the brain's two hemispheres. **It allows the individual to use various means, techniques and level of thinking.**

Music helps us move some parts of our brain, which helps us think better.

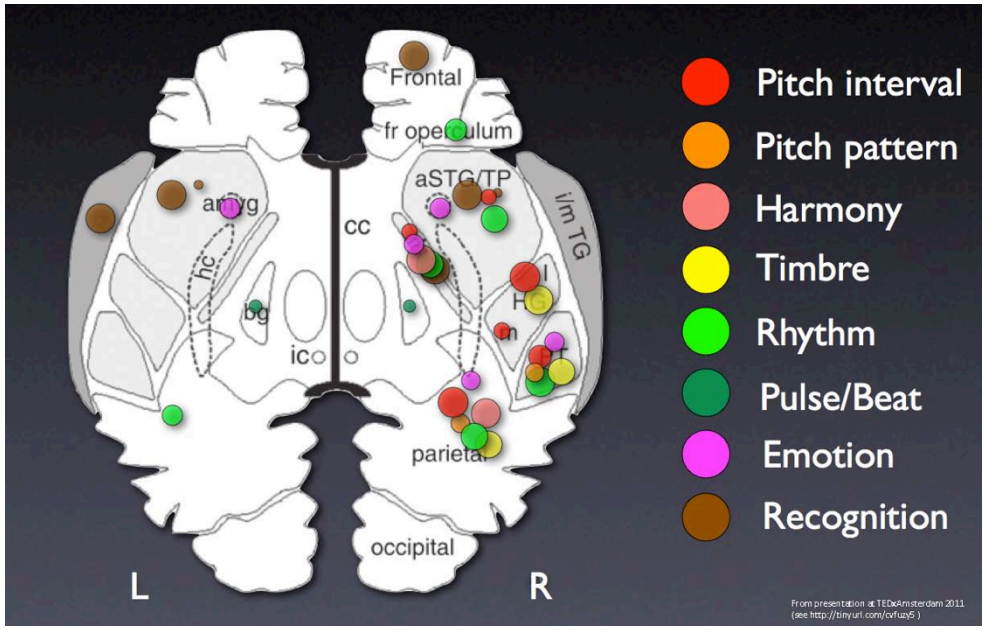

SONGS
Good atmosphere
Motivation
Vocabulary
Pronunciation skills
Listening skills
Grammar
Relaxation

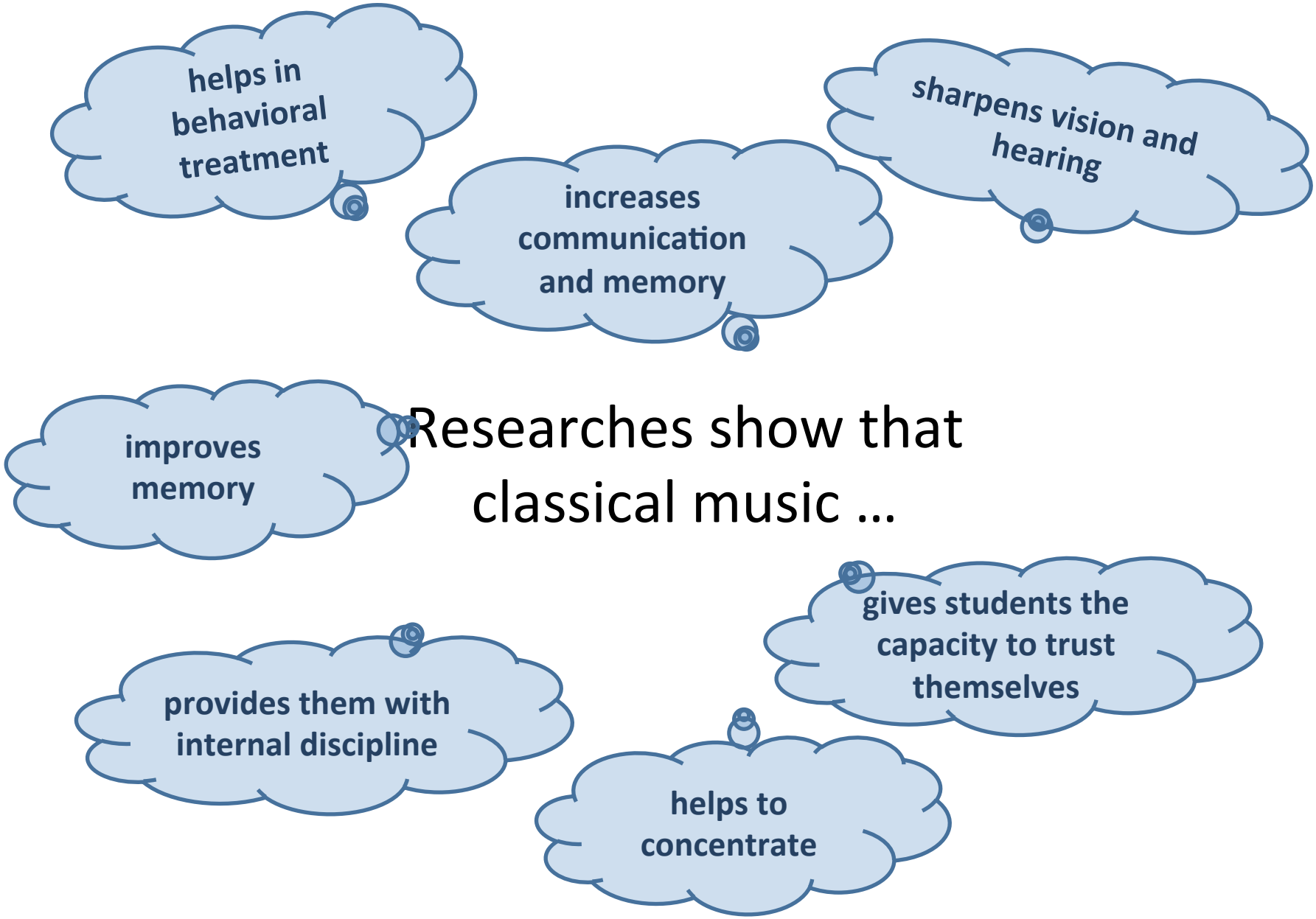
CLASSICAL MUSIC

When we listen to classical music, spatial thinking paths open up and get ready for use. But the effect dies out an hour after we stop listening to music.

Music stimulates the brain centers that deal with thinking, analyzing and planning.

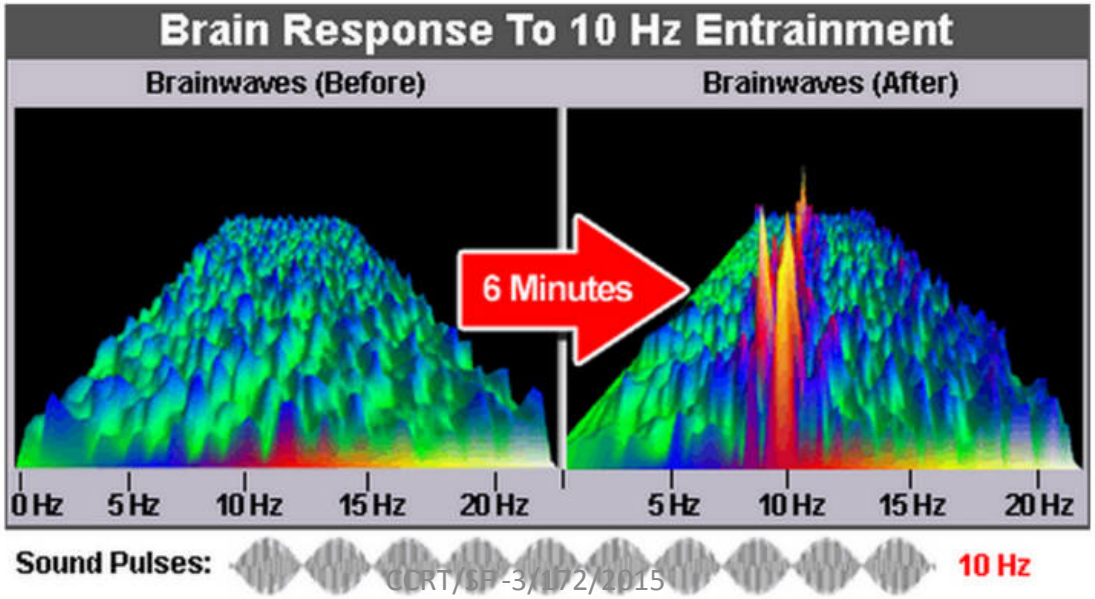
Mozart effect is a set of research results that indicate that listening to Mozart's music may induce a short-term improvement on the performance of certain kinds of mental tasks known as "spatial-temporal reasoning". Popularized versions of the theory, which suggest that "listening to Mozart makes you smarter".




helps in behavioral treatment
increases communication and memory
sharpens vision and hearing
improves memory
Researches show that classical music …
gives students the capacity to trust themselves
provides them with internal discipline
helps to concentrate

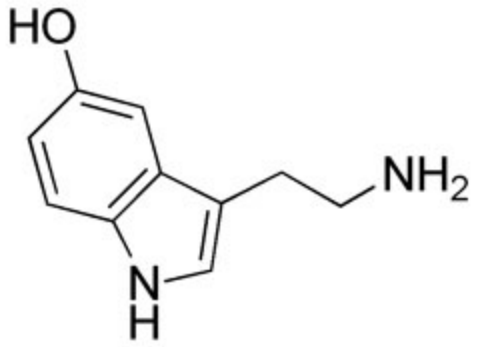
Brain Response to Music

- Right hemisphere of the brain
  - Activated when you ***hear melodies with a variety of pitch and timbre***
  - It also "lights up" when people play music by ear.
- Left hemisphere of the brain
  - "Lights Up" when you learn to ***read music, understand key signature and notation, and follow the sequence of notes.***
  - Significantly, the brain is activated in the same area that is involved in analytical and mathematical thinking.
  - So you can simultaneously stimulate the right and left hemispheres of the brain by playing an instrument or by singing



Serotonin

- A neurotransmitter involved in the transmission of nerve impulses that helps maintaining joyous feelings
- Released when the brain is “positively shocked” and reduces tension



Classical Music Humans

Music can affect the hormone system

- Affects breathing rate and electrical resistance of the skin
- Pupils dilate, blood pressure and heart rate increase
- Allows the brain to concentrate more easily and assimilate more information in less time

Music simultaneously stimulates the left and right hemispheres of the brain

- Boosts learning and information intake therefore augmenting cognitive skills
- Learning may be increased five-fold

Mozart effect

- Complex music improves performance of spatial-temporal reasoning and short-term memory
- Mozart's concerto from the "baroque" period with 60 beats per minute affects the amplitude and frequency of brain waves
- Children who have taken music lessons experience advantages in cognitive skills

Classical Music
Melody & Rhythm

- Melody is the essence that boosts creative reasoning
- Rhythm synchronizes these emotions with vital patterns
  - We all have a rhythm, and were exposed to rhythm in the uterus as well – through heartbeat, breathing, ect

How do melody and rhythm work together?

- Rhythm – body's vital rhythms become in sync and produce the proper mood for increased cognitive and creative capabilities
- Melody – stimulates thoughts and resolutions to develop more paths of choice, increasing options and potential solutions
- Melody and rhythm act in synergy with the brain to "open" the auditory and sensorial channels that conduct to the brain, thereby benefiting your cerebral skills

Musical Miracles?

- Aid for ADD and Autism?
  - Usually, an autistic child has much trouble tying their shoes. However, with the aid of music, the child can achieve this goal faster! That's because there is a rhythm to coordinate the action to
  - Music can cause brain waves to show the same affect as those on ADD medicines such as Ritalin or Adderall
- Music with strong beats will cause the brain to resonate to the same rhythm
- Slow beats help calm brainwaves (associated with hypnotic state)
- Rhythmic therapy has improved cognitive function in elderly people by increasing blood flow

MUSIC COULD BE THE FUTURE OF THERAPY!

Dance

Music, Rhythm, and Trance State

History of Indian Dance

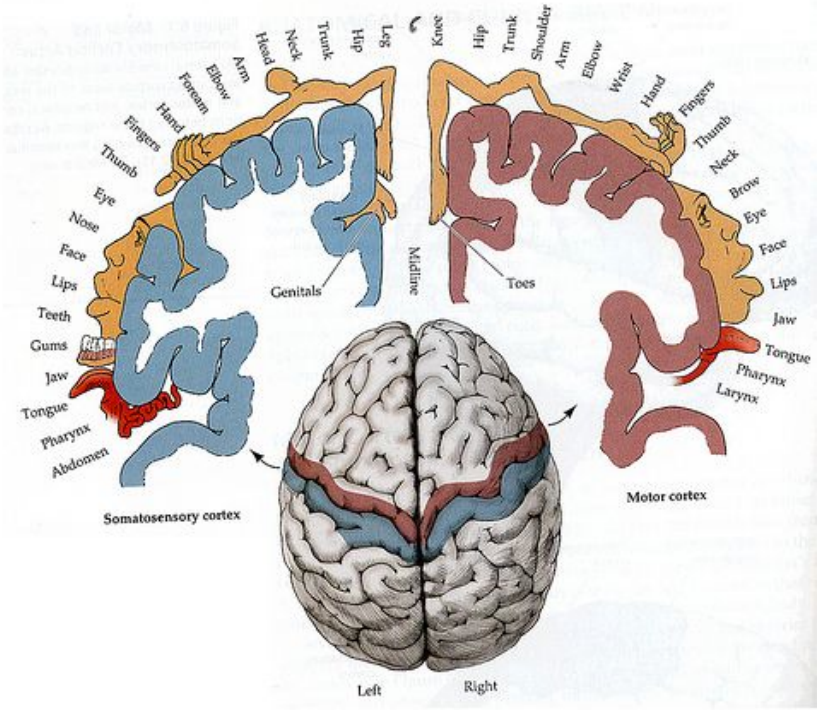
Dance in India comprises numerous styles of dances, generally classified as classical or folk. As with other aspects of Indian culture, different forms of dances originated in different parts of India, developed according to the local traditions and also imbibed elements from other parts of the country.
The origins of dance in India go back into the ancient times. The Vedas integrate rituals with performance arts, such as a dramatic play, where not only praises to gods were recited or sung, but the dialogues were part of a dramatic representation and discussion of spiritual themes.

The criteria for being considered as classical is the style's adherence to the guidelines laid down in Natyashastra, which explains the Indian art of acting. The Sangeet Natak Akademi currently confers classical status on eight Indian classical dance styles: Bharatanatyam (Tamil Nadu), Kathak (North, West and Central India), Kathakali (Kerala), Kuchipudi (Andhra Pradesh), Odissi (Odissa), Manipuri (Manipur), Mohiniyattam (Kerala), and Sattriya (Assam). All classical dances of India have roots in Hindu arts and religious practices.

The tradition of dance has been codified in the Natyashastra and a performance is considered accomplished if it manages to evoke a rasa (emotion) among the audience by invoking a particular bhava(gesture or facial expression). Classical dance is distinguished from folk dance because it has been regulated by the rules of the Natyashastra and all classical dances are performed only in accordance with them.

Neurophysiology

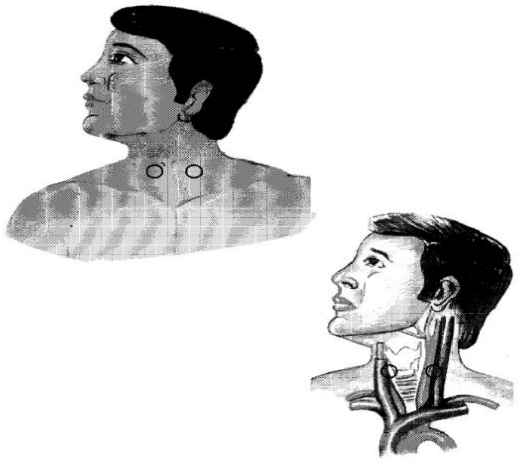
- Human Dance
- Swinging in the Brain
- Eye Movements



- Training of specific types of coordinated movements: arms, hands, legs, shoulders, eyes

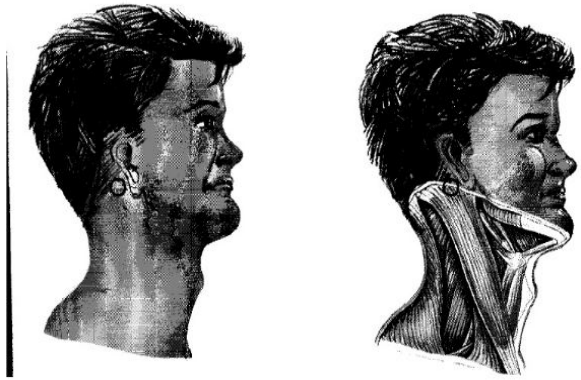
Stimulation of cranial nerves by dance movements

Nila marma

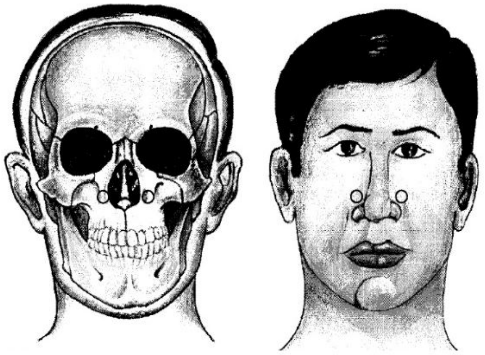


Nila

Vidhura marma



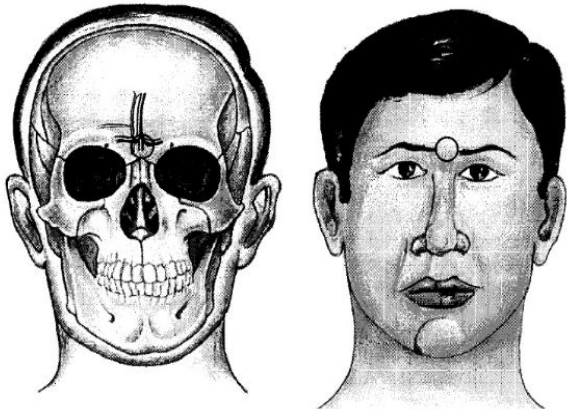
Phana marma



Phana

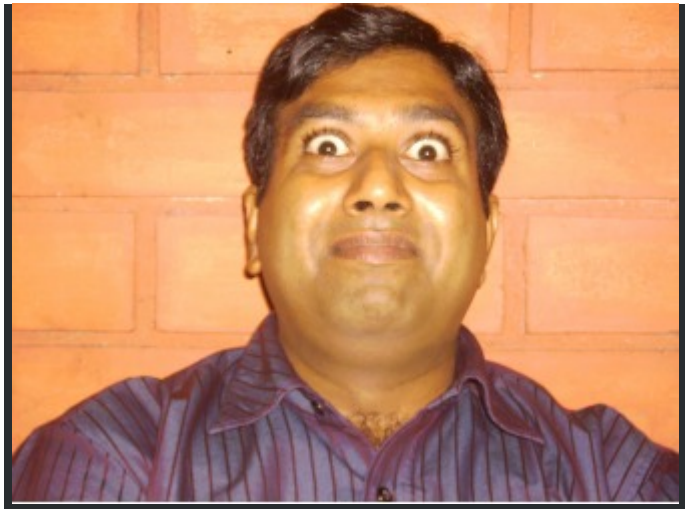
Description

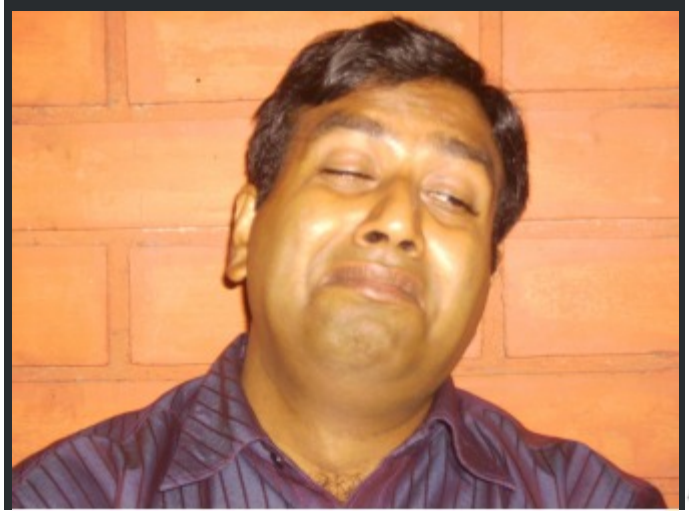
Sthapani marma

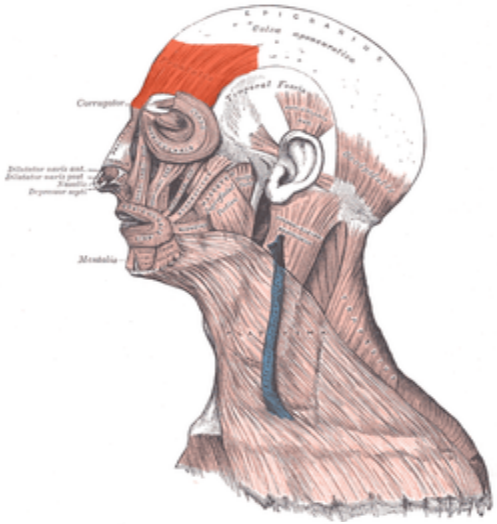


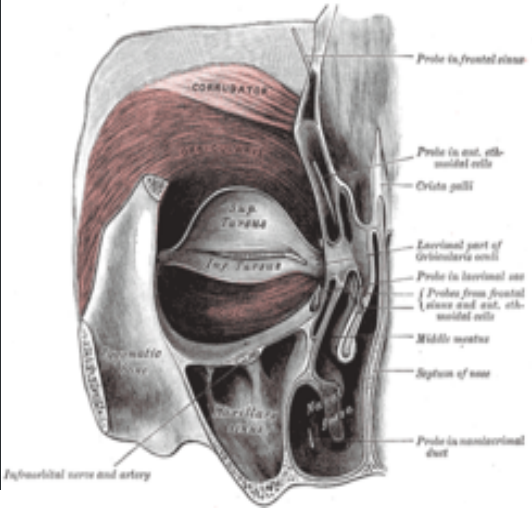
Sthapani

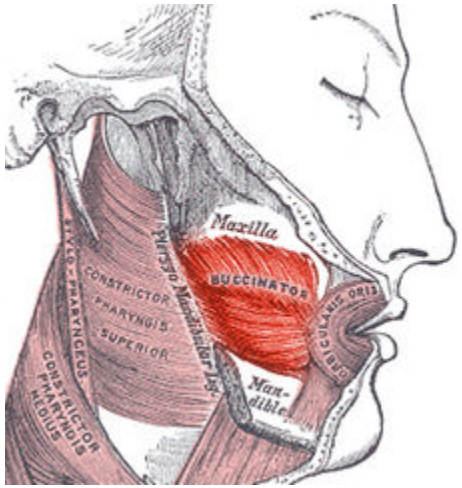
NINE IMPORNTANT EXPRESSIONS





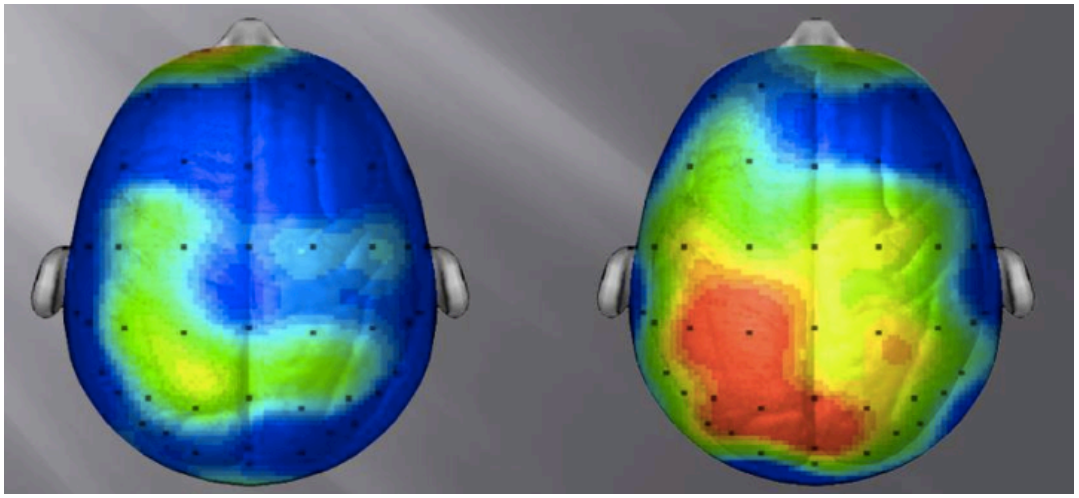






Interacting network of brain areas during patterned rhythmic dance movement.

- bilateral motor
- somatosensory and premotor areas
- right supplementary motor area
- right frontal operculum
- left medial superior parietal cortex
- superior temporal regions
- right cingulate motor area
- basal ganglia
- bilateral anterior vermal
- and posterior-lateral cerebellum



Behavior and Dance

- Sequence learning and Sensorimotor coordination during tapping task
- Perceptual and motor systems are coupled across multiple levels of processing.
  - simple coupling :: foot-tap
  - complex :: dance
- Metric Condition:
  - requires perception and production
- Non-metric Condition
  - require explicit memory

- "rhythmic properties of a piece of music entrain neural oscillators that facilitate synchronization of both perception and action with the underlying beat in music.

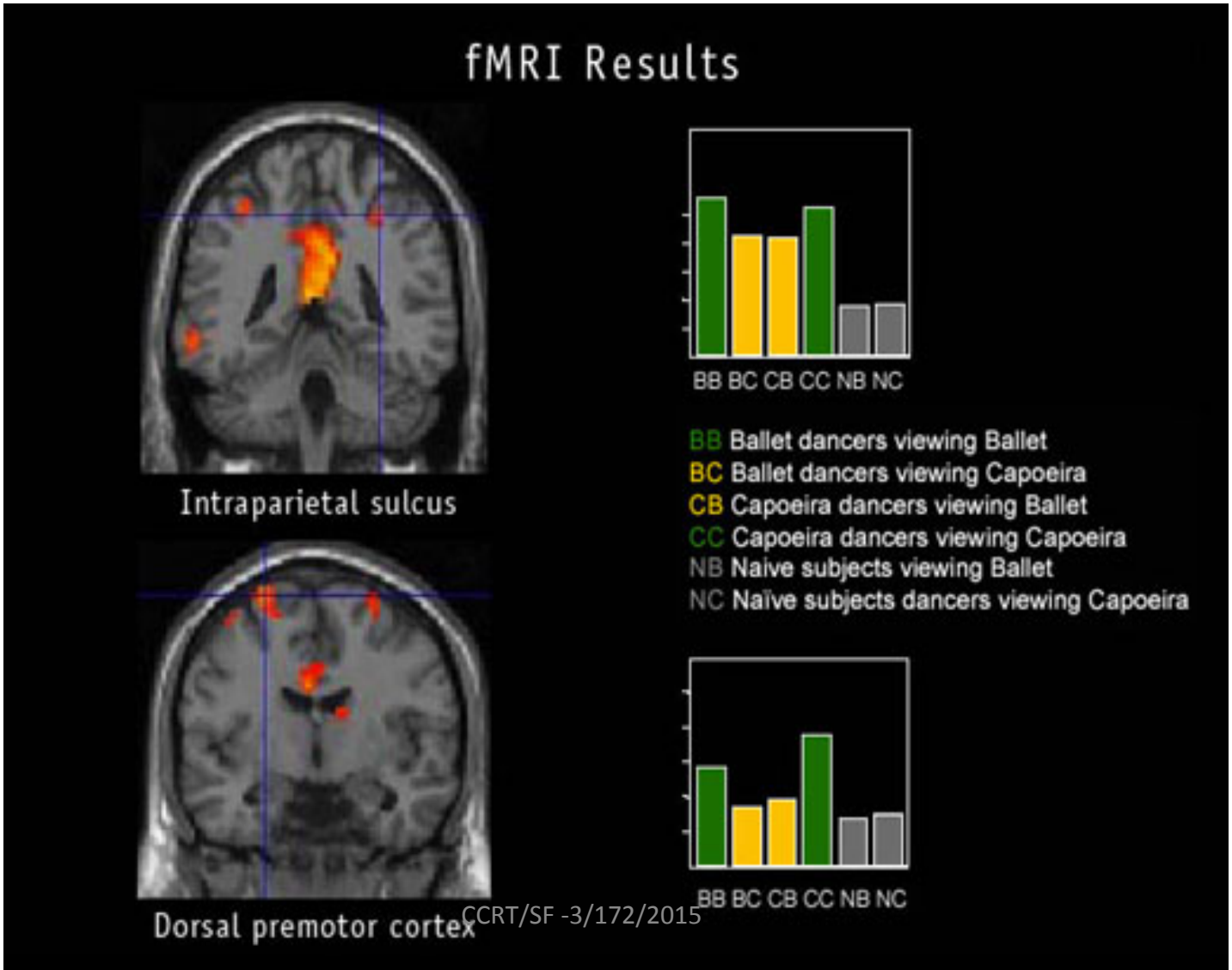
Behavior and Dance:

… and sequencing

- Serial Reaction Task (SRT)
    - Outside temporal context
    - Explicit memory

- Attention dynamically allocated to salient moments in time
- Attentional processes are embodied
- Attention and timing are interwoven, involved in sensorimotor coupling

- MNS and Dance
  - trained dancers showed more activity of MNS to known dances when compared to non-dancers - Daniel Glaser



Mind-Body Connection

- Rhythm
  - "People moving in the same rhythm with the same spatial configuration become identified with one another. Gradually they assume a common expression, moving with the same dynamic qualities (effort synchrony), in comparable areas of space (spatial synchrony), to the same rhythm (rhythmic synchrony. In this way the group achieves a sense of solidarity."

Mind-Body connection

- Effects of rhythmic sounds on the brain
  - Beat &Tempo
    - Pulse rate, galvanic skin response, and blood pressure stabilize to match external tempi.
    - Respiration and metabolism accelerate.
- Rhythmic Movements
  - An inherited biological response regulated by internal rhythmic generators and reactive to external rhythmic factors

MARTIAL ARTS

Martial arts training at peak performance levels is the best way to prevent disease, as well as to stimulate positive changes in the body's natural healing systems.

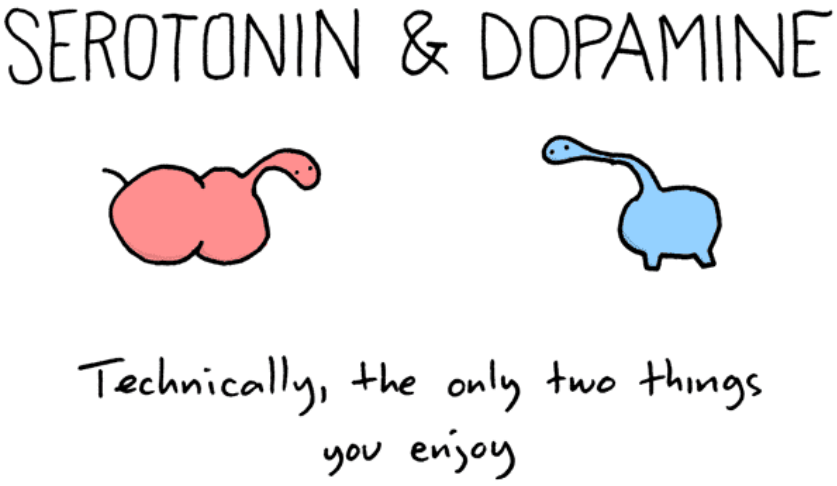
After about three weeks of true martial arts training, a wide range of physiological changes take place. Practitioners will exhibit improvements in blood sugar, blood pressures, blood lipids, brain neurotransmitter balance, blood supply to muscles, and capacity of somatic muscles and the liver to store carbohydrate in the form of glycogen, calcium metabolism and other basic parameters. The changes are not mutually exclusive; interactions among systems and their functions are the rule.

These changes translate into better functioning of the body and brain, and overall risk reduction for such diseases as hypertension, type 2 diabetes, coronary heart disease, chronic respiratory disease, osteoporosis, obesity, anxiety states, mild to moderate mental depression, chronic fatigue, and breast and colon cancers. An increase in breathing exercises and forms training helped me recover from type 2 diabetes and I am no longer insulin dependent because of it.


Feed all Four
Exercise, physical activity, and nutrition. Treat your body right.
BODY
Increase your mental agility. Read, problem-solve; challenge yourself.
MIND
SPIRIT
Relax. Meditate. Trust in something bigger than yourself.
EMOTIONS
Handling your emotions. Learn new tools. Raise your emotional intelligence.
Go into each room every day

Dance and martial arts training brings about remarkable changes in brain chemistry. The concentrations of various neurotransmitters that are responsible for facilitation or inhibition of nerve impulse transmission in the central nervous system -- acetylcholine, norepinephrine, serotonin, dopamine, gamma amino butyric acid (GABA), glutamic acid, endorphins and others -- are changed so that a new balance is attained. The clinical signs and symptoms that ensue are easier to record than the actual neurotransmitter levels, and many studies are in agreement on the emotional, behavioral and physiological changes that accompany dance and martial arts training.

Among the early changes seen when individuals engage in such training program are mood elevation, heightened energy levels, enhanced self-confidence and self-esteem, lower anxiety levels, resistance to depression and improved coping ability. Changes in blood pressure and heart rate, which are, to a large extent, mediated by the central nervous system, occur soon afterward. Heart rate is slowed, and hypertensive blood pressure (systolic and diastolic) is reduced toward normal.

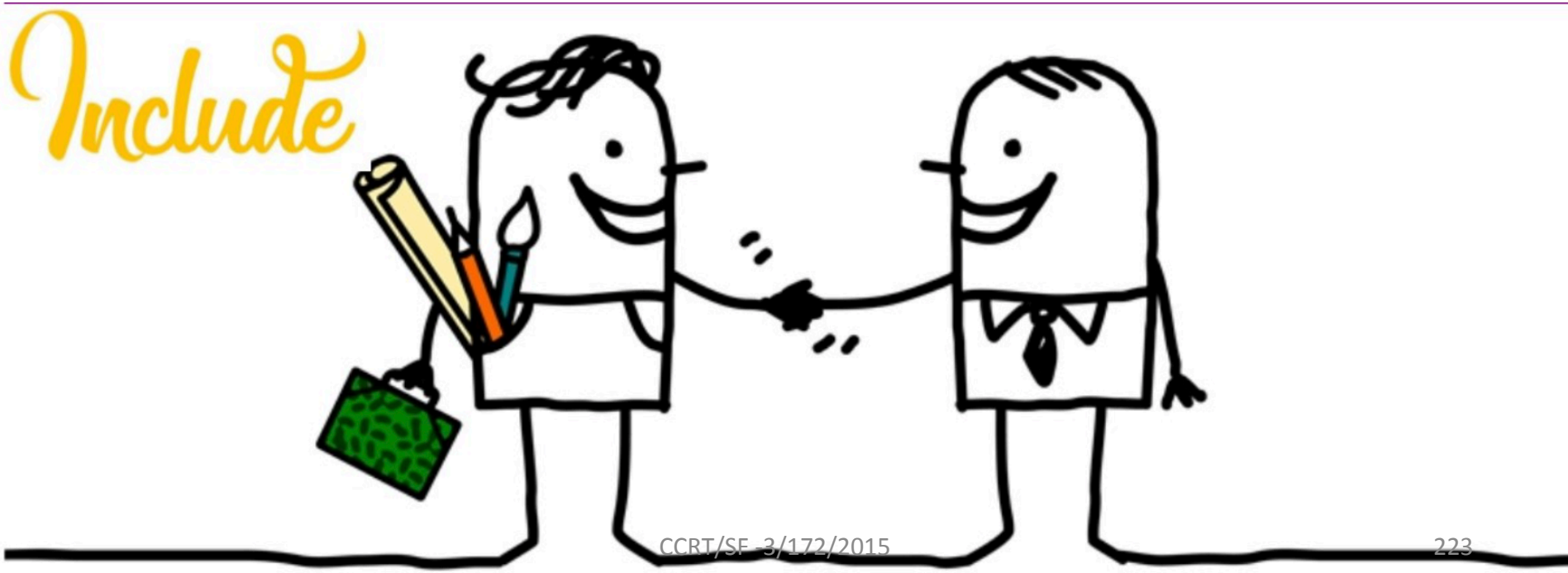


The neurotransmitter connections with training, higher levels of serotonin and dopamine have been recorded. These would account for the mood elevation and antidepressant.. Keep in mind that changes in GABA, endorphins and other neurotransmitters may well contribute to these psychological effects. There have been improvements in the physical capabilities of Parkinson's disease patients following six to eight weeks of Dance and martial arts training. (Dopamine levels are commonly low in people with Parkinson's disease.)

Continuing in the realm of psychological effects, a number of cognitive improvements have been documented in older adults. These include quicker mental reaction time and improved fluid intelligence quotients. It has been proposed that such changes may be the result of improved acetylcholine levels. Acetylcholine is a universal nerve transmission chemical in both the brain and somatic nerves. If acetylcholine is responsible, martial arts exercise should also benefit Alzheimer's disease, which exhibits chronic acetylcholine depletion.

At the base of the brain is the small pineal gland, which releases melatonin, a hormone that influences such widely diverse functions as sleep/wake cycles and immune system integrity. The production of melatonin, related chemically to serotonin, is upset when people travel across several time zones. A marked reduction in sleeping pattern can be achieved by rhythmic body movements

Arts & Health

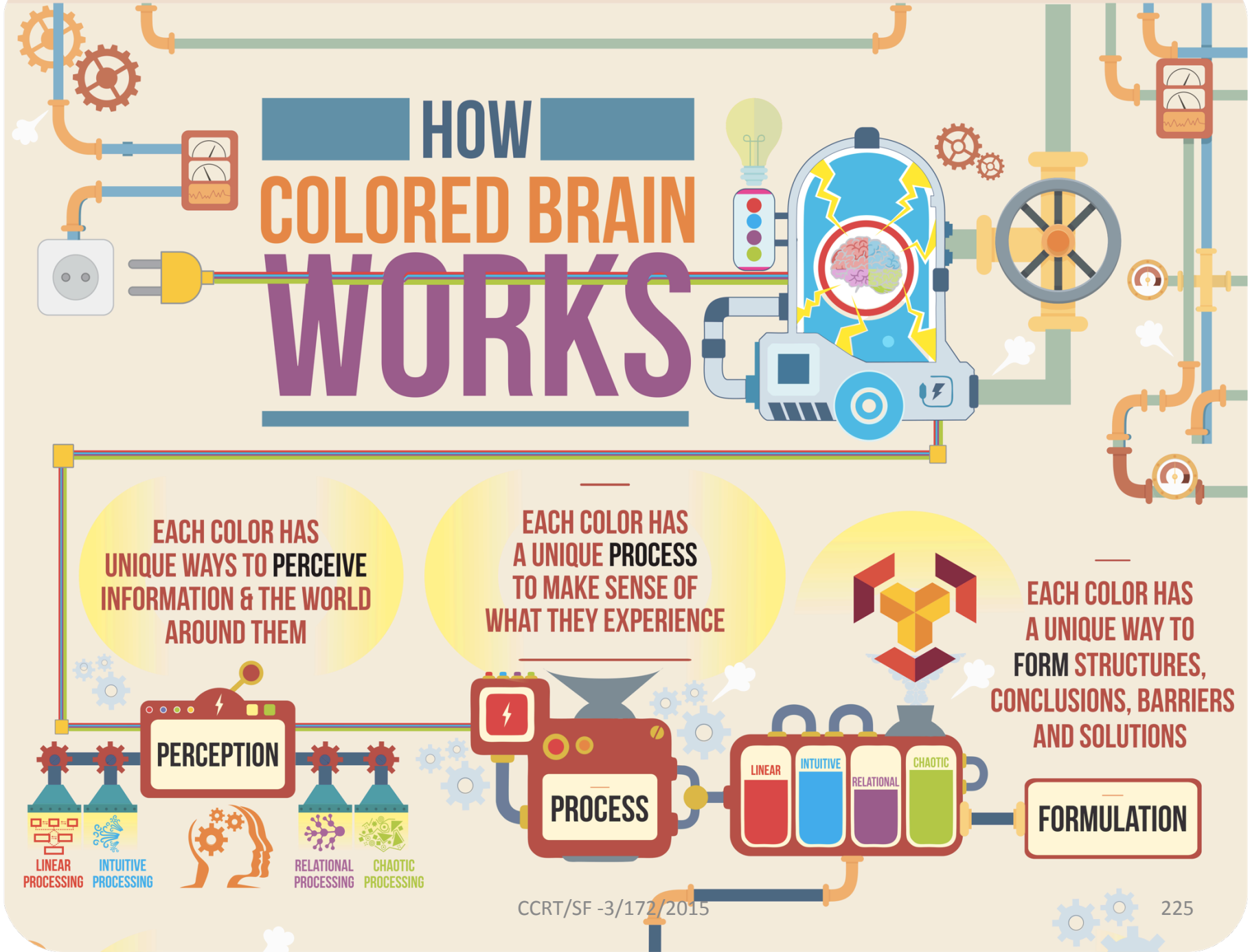


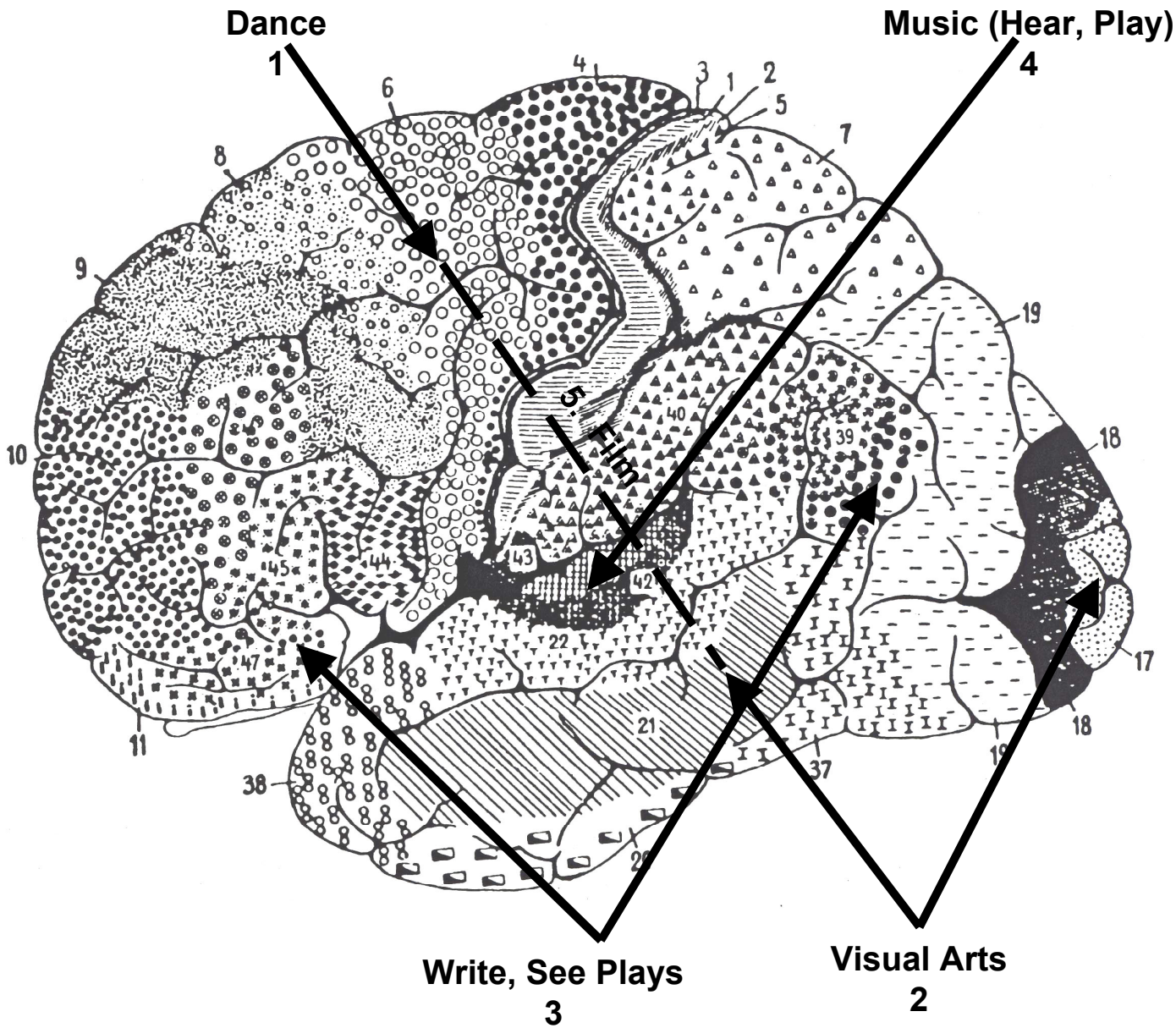
BEENA UNNI KRISHNAN
22/27 ALIKHAN STREET
ST THOMAS MOUNT ALANDUR,CHENNAI -16
SENIOR FELLOWSHIP FOR 2013-2014
VISUAL ART
Scheme Specific Unique No :
CCRT/SF -3/172/2015

ART FORMS AND ITS IMPACT ON NEUROSCIENCE -*Application of Cognitive Dynamics through art in Alzheimer's and dementia patients*

FOURTH REPORT

IMPACT OF COLOURS - PAINTINGS IN GOGNITIVE DYNAMICS


HOW
COLORED BRAIN
WORKS
EACH COLOR HAS UNIQUE WAYS TO PERCEIVE INFORMATION & THE WORLD AROUND THEM
EACH COLOR HAS A UNIQUE PROCESS TO MAKE SENSE OF WHAT THEY EXPERIENCE
EACH COLOR HAS A UNIQUE WAY TO FORM STRUCTURES, CONCLUSIONS, BARRIERS AND SOLUTIONS
PERCEPTION
LINEAR PROCESSING
INTUITIVE PROCESSING
RELATIONAL PROCESSING
CHAOTIC PROCESSING
PROCESS
LINEAR
INTUITIVE
RELATIONAL
CHAOTIC
FORMULATION


Dance
1
Music (Hear, Play)
4
5. Film
Write, See Plays
3
Visual Arts
2

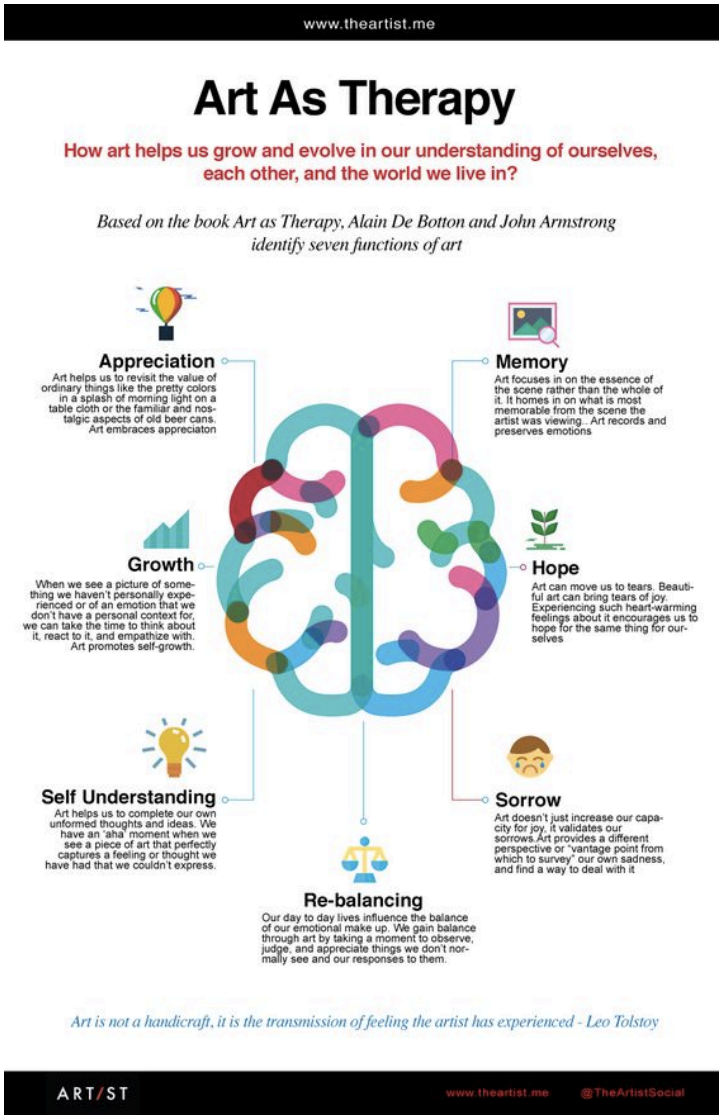
Expressive Arts Therapy promotes human dignity and improves quality of life

It is defined as the use of an art medium in the treatment, rehabilitation, education, and training of persons with physical, mental, and emotional disorders.

Examples include visual art, music, literature, drama, dance & movement, often combined with reminiscence. Benefits of expressive arts therapy have been shown regarding mood, behavior, function, and cognition. Cognitive Dynamics can bring the transforming power of the arts to you\ and people around you

Art Therapy

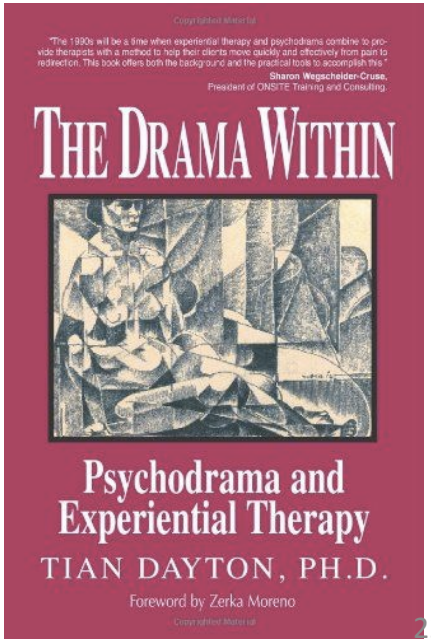
Art therapy is the deliberate use of art-making to address psychological and emotional needs. Its benefits include fostering self-expression, enhancing coping skills, managing stress, and strengthening a sense of self. This translates into improved communication, behavior, and cognition. All of this, plus strengthened relationships, combine to enhance quality of life.



Music Therapy The dramatic positive effects of music therapy have been shown in a substantial body of literature. Benefits include improved cognitive function, social skills, communication and behavior (including reduced agitation and behavioral problems). The sensory and intellectual stimulation of music can heighten quality of life for the patient and care giver.

Drama Therapy

Drama simultaneously engages the human mind and spirit. This form of therapy uses drama/theatre processes and products to achieve symptom relief, emotional and physical integration, and personal growth. It facilitates the client's ability to tell his/her story, solve problems, set goals, express feelings appropriately, extend the depth and breadth of inner experience, improve interpersonal skills and relationships. Cognitive and com- munication skills are maximized, creativity and individuality are fostered; and physical activity is encouraged. Such therapy builds community and strengthens self-esteem.



Biblio/Literary/Poetry Therapy

Just like all of us, cognitively-impaired individuals have a life story and the need to be heard. They also have a need to create. This form of therapy employs the language arts to promote healing and well-being. It encompasses creative writing, storytelling and reminiscing, poetry reading and writing, etc. Benefits include cognitive stimulation, reminiscence and reflection on one's life story, a therapeutic release of life's stressors, and facilitation of meaningful communication between care givers and patients.

Visual Thinking

Our experiences influence both inner visualization and outer seeing. For example, if 10 people paint the same subject, even from the same vantage point, the result will be 10 different images based on their experiences, values, and interests.Creative visual thinking draws from the varied levels of meaning and integrates rational and intuitive capabilities of the brain (left brain vs. right brain)

PERCEPTION AND AWARENESS

To be aware means to b conscious…to know something.

To perceive is to become aware through the senses and to understand through that awareness.

Looking and Seeing

Looking implies taking in what is in front of us in a purely mechanical way: seeing is a more active extension of looking characterized by a higher level of perception.

Aesthetics, Art and Beauty

Aesthetics refers to an awareness of beauty or to that quality in a work of art or other handmade or natural form which evokes an elevated sense of awareness.

Aesthetics should not be confused with the term "good taste" which almost always refers to an established way of seeing. Innovative artists, seeking new ways of seeing, often challenge the established conventions of taste.

The criteria of beauty, as well as art, often are based on culturally accepted standards rather than individual responses or personal intuition.

Leonardo da Vinci.
FIVE GROTESQUE HEADS. C 1490
Pen and brown ink.

Jean-Michel Basquiat.
TOBACCO. 1984.
Acrylic and oil crayon on canvas

Art and Experience

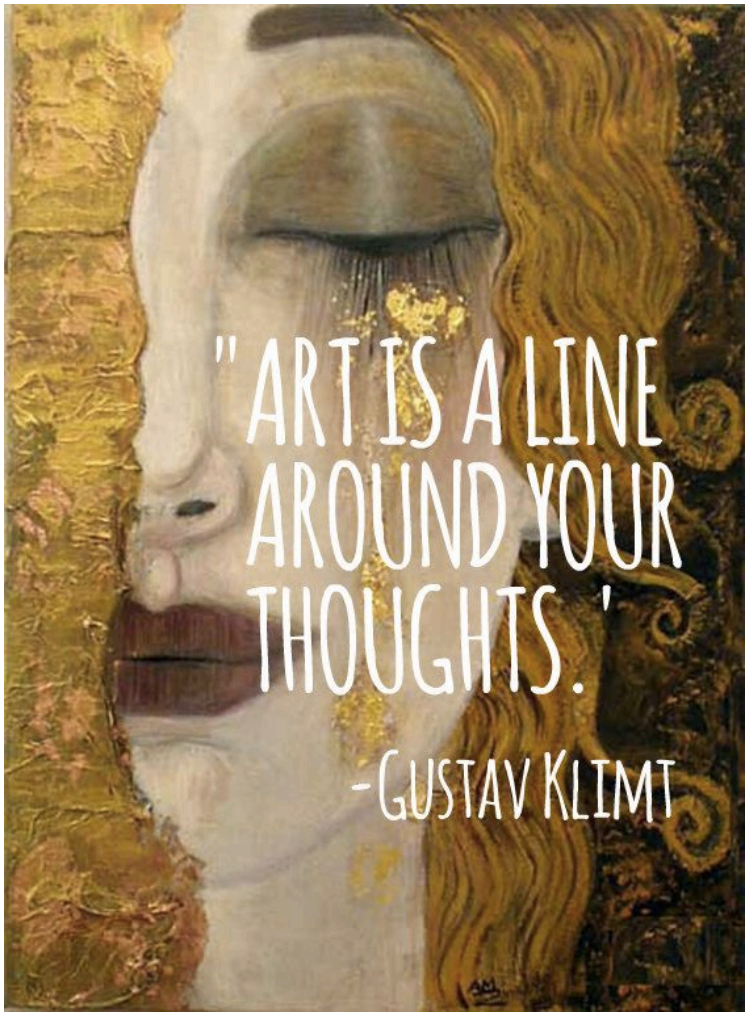
- Art encourages us to experience our lives more vividly by causing us to re-examine our thoughts and renew our feelings.
- The essence of art is the spark of insight and the thrill of discovery - first experienced by the artist creating a work, then built into the work and finally, by the viewer.
- We can easily get caught up in thoughts and emotions that are separated from direct experiences with our surroundings and can adopt dulled, programmed responses to our environments. The best art can shake us out this rut and sharpen our perceptions and bring a new sense of significance and connectedness to our lives.

Creativity

Creativity is as fundamental to experiencing and appreciating art as it is to making art. Insightful seeing is itself a creative act.

Creativity is an attitude and we all have the potential to be creative yet most of us have not been encouraged to develop our creativity.

Creativity through art experiences enhances creative problem solving and communicating in other areas of life. Creative expression helps to develop our abilities to integrate experiences of the outside world with those of our inner selves.



Creativity in Children

Children use a universal visual language. From ages 2 – 6 there are similar stages of mental growth, from mark-making to inventing shapes to symbolizing things seen and imagined.

Until age 6, children usually depict the world in symbolic rather than realistic ways. Their images are more mental constructions than records of visual observation.

Children lose their intuitive sense of design as they begin to look at the world from a conceptual, self-conscious point of view.

“We destroy this capacity above all by making them afraid - afraid of not doing what other people want, of not pleasing, or not making mistakes, of failing, of being wrong. Thus we make them afraid to experiment, afraid to try the difficult and unknown.”

- John Holt, How Children Fail

Untrained and Folk Artists

Those with little or no formal art education who make objects commonly recognized as art.

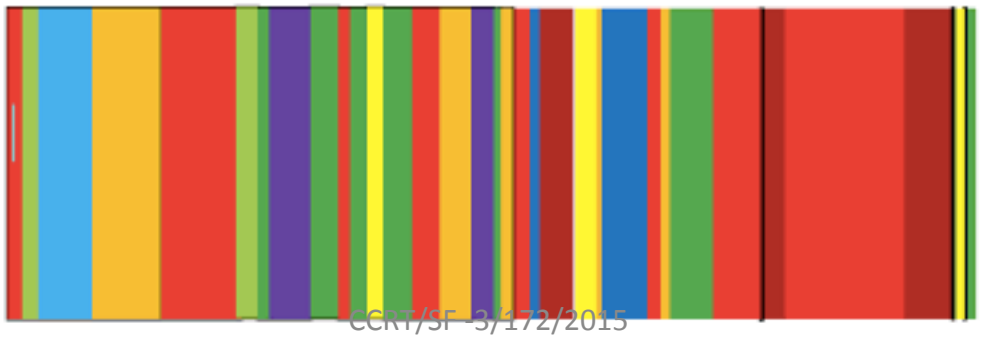
Naïve or outsider artists (untrained artists) are creative individuals who are largely unaware of art history or the art trends and fashions of their times…their art is a personal expression created apart from any conventional practice or style.

Folk artists are artists who are a part of established traditions of style, theme and craftsmanship.

Color

Color is a powerful communication tool and can be used to signal action, influence mood, and even influence physiological reactions.

So how exactly does color work? How is color believed to impact mood and behavior?



What Is Color Psychology?

In 1666, English scientist Sir Isaac Newton discovered that when pure white light passes through a prism, it separates into all of the visible colors. Newton also found that each color is made up of a single wavelength and cannot be separated any further into other colors.

Further experiments demonstrated that light could be combined to form other colors. For example, red light mixed with yellow light creates an orange color. Some colors, such as green and magenta, cancel each other out when mixed and result in a white light.

If you have ever painted, then you have probably noticed how certain colors can be mixed to create other colors.

"Given the prevalence of color, one would expect color psychology to be a well-developed area," researchers Andrew Elliot and Markus Maier have noted.

"Surprisingly, little theoretical or empirical work has been conducted to date on color's influence on psychological functioning, and the work that has been done has been driven mostly by practical concerns, not scientific rigor."

Despite the general lack of research in this area, the concept of color psychology has become a hot topic in marketing, art, design, and other areas.

Much of the evidence in this emerging area is anecdotal at best, but researchers and experts have made a few important discoveries and observations about the psychology of color and the effect it has on moods, feelings, and behaviors.

Of course, your feelings about color are often deeply personal and rooted in your own experience or culture. For example, while the color white is used in many Western countries to represent purity and innocence, it is seen as a symbol of mourning in many Eastern countries.

Whether you know it or not, color has a big impact on how your brain sees the world. Did you know if you're looking at sea green or lemon yellow, your brain feels a different emotion to each? It's because of the impact color has on the brain, which leads to an impact on your feelings and senses.

"Color impacts the brain because it can greatly affect our physiology, since it influences anxiety, pulse, blood flow and arousal

EFFECT OF COLOR ON MEMORY

"A recent study examined differences in peoples' recall of words and memory for colors. Results show that people recall col to a higher degree. When people were asl to recall objects versus color, color memo was significantly greater,"

"Even when people attempted to rememb words or objects, color had the greatest affect on recall,"

Color, as part of the electromagnetic spectrum, is in its purest form energy, a wavelength, which has its own magnetic frequency?

What if I told you that colors can affect neurological pathways in the brain?
And that they can create a biochemical response?

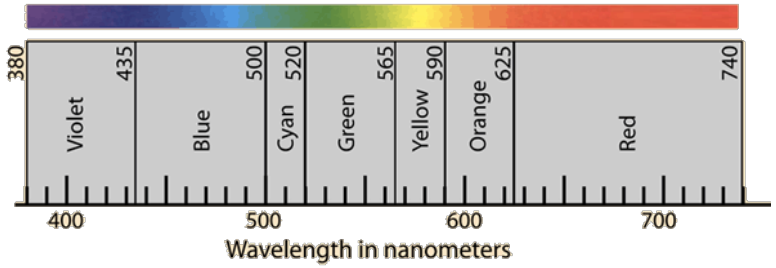
Now, facing that evidence, it's clear that color has been overlooked for far too long. Dr. Robert Gerard recognizes this and has pioneered research, which suggests that every color has a specific wavelength, and each of these affect our body and brain in a different way.

Using the right color, and the correct selection and placement can seriously affect the feelings, attention, and behavior of people when learning. It's time that we leveraged that to our advantage.

Even research with Alzheimer's patients has shown that color cues improve memory and that learners recall images in color more easily than images in black and white –

We take color and its perception for granted, but have you ever thought about how the processing of color takes place in the eyes and brain? It's really pretty fascinating.
Both the eyes and the brain work together in order to translate the things we see out in the world into color images. The eyes contain light receptors that transmit relevant signals to the brain, and this in turn produces internal sensations and perceptions that we know as color.

It's All About Wavelength

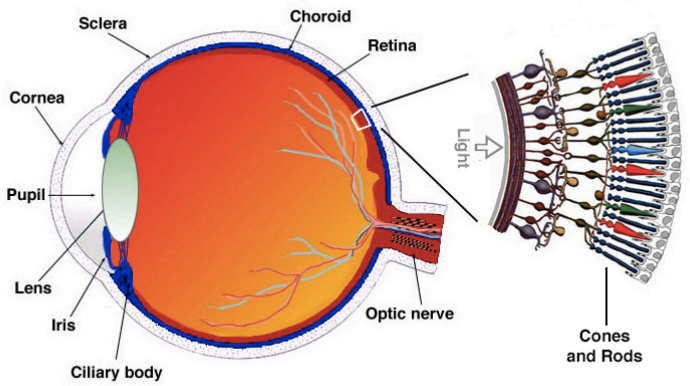


The truth is that color is not actually inherent within any object. Scientists like Isaac Newton noted years ago that the phenomenon of color is not a given; instead, each object's surface both reflects and absorbs all possible color wavelengths. Only the colors that are reflected from the object are the ones that we can perceive.

For example, when we see an object that is yellow in color, it is not that the color yellow is within it; rather, the object's surface is reflecting yellow wavelengths and absorbing all of the other color wavelengths. In the same way, objects that appear black are absorbing all color wavelengths, and white items are actually reflecting all color wavelengths away.
When it comes to light, the primary colors are red, blue and green. Combining equal amounts of these three tones of light results in the color white. Every other color in the spectrum of visible tones are produced by a combination of these three in different measures.

Rods, Cones and the Retina

The retina of the eye is located at the ba
eye's interior and covers about 65 perce
eye. The retina is light sensitive and ever
considered to be a part of the brain. The
literally millions of rods and cones, whicl
sensitive cells. Rods assist with processir
and white information, while the cones a
color perceptions.



There are three types of cones, and most are located in the retina's center. There are around six million cones in the human eye, allowing for the perception or color as well as sharpness. The three types of cones correlate to short, medium or long light wavelengths. They work in partnership with connector nerve cells and send information to the brain so that it can discern and interpret colors.

The rods and cones of the eye process light and make them into nerve impulses. These nerve impulses are then passed along the optic nerve to the brain's cortex where we interpret them as the various colors.

Warm vs. Cool

The eye and brain are able to perceive more variation in warm colors than the cool ranges. The reason for this is that two-thirds of the eye's cones interpret the longer wavelengths of lights such as reds, yellows and oranges.

Interruptions in Color Perception

Around one percent of women and 8 percent of men have some measure of trouble in perceiving color, sometimes called color blindness. Many of these people aren't aware of their issues with perception. Some can still perceive the range of colors, but the information is transmitted differently to their brains.

The most common color perception impairment or color blindness is called "red and green dichromatism," which means that the colors red and green are just about indistinguishable. Other color pair blending is also possible, but it is rare for people to be completely unable to perceive color differences

Color Aids Pattern Recognition

In 2002, researchers discovered that subjects performed five to 10 percent better on standardized pattern recognition tests when they were administered in color rather black and white. The effect also boosted memory over time. The advantage of using color was only demonstrated when the color was “realistic.” When the objects were depicted in random colors, it appeared to have no effect on memory or pattern recognition.

This result suggests that our ability to discern color is linked to our ability to survive in the natural environment. Think about all the different colors of green you would have to recognize if you lived in a jungle. Each shade might indicate food, shelter or danger.

Brain Fills in the Color on Black and White Images of Known Objects

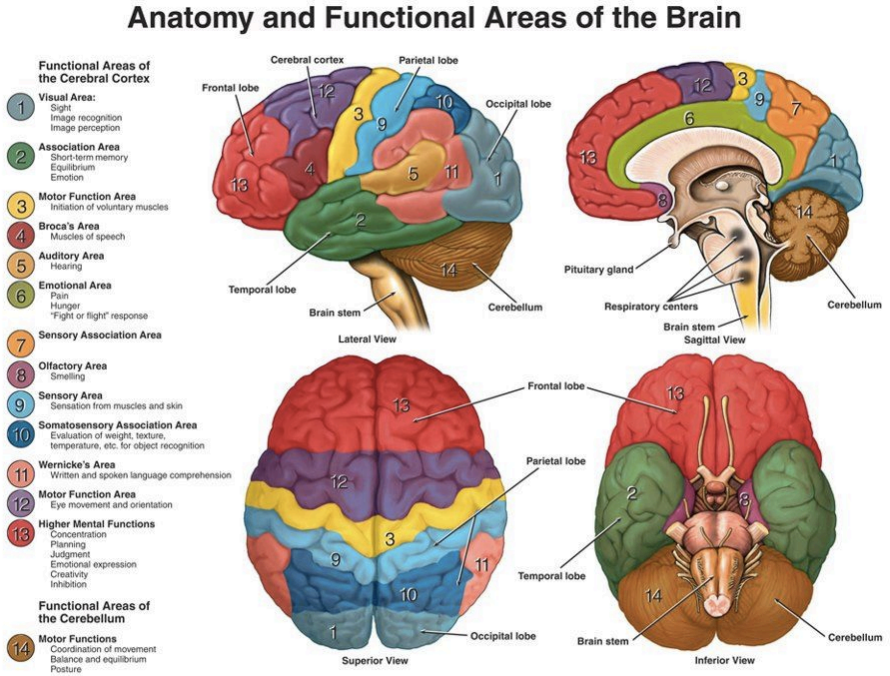
Color May Stimulate Specific Brain Functions

A number of studies on the apparent influence of color on brain performance have some tantalizing results. It is important that remember that these results are derived from observing human subjects under different conditions using color stimuli. These studies did not use an fMRI to watch the brain in action. If you are aware of similar research involving live images of the brain, please let me know. Still, there are some intriguing results:

Blue appears to stimulate creativity and can help you achieve a state of calm relaxation. In excess, it may encourage feelings of depression.

Color Is Processed in Multiple Parts of the Brain

Scientists thought they had identified this region decades ago, when they were able to pinpoint the color processing region in the brains of monkeys. They logically concluded that the human brain processes color in the same way as our nearest living relatives. However, neuroscientists at Harvard medical school used functional magnetic resonance imaging (fMRI) to identify a region adjacent to, but distinctly different from, the color center in the monkey brain. They came to this conclusion by measuring the blood flow to various parts of the brain while subjects viewed colored and black and white images.

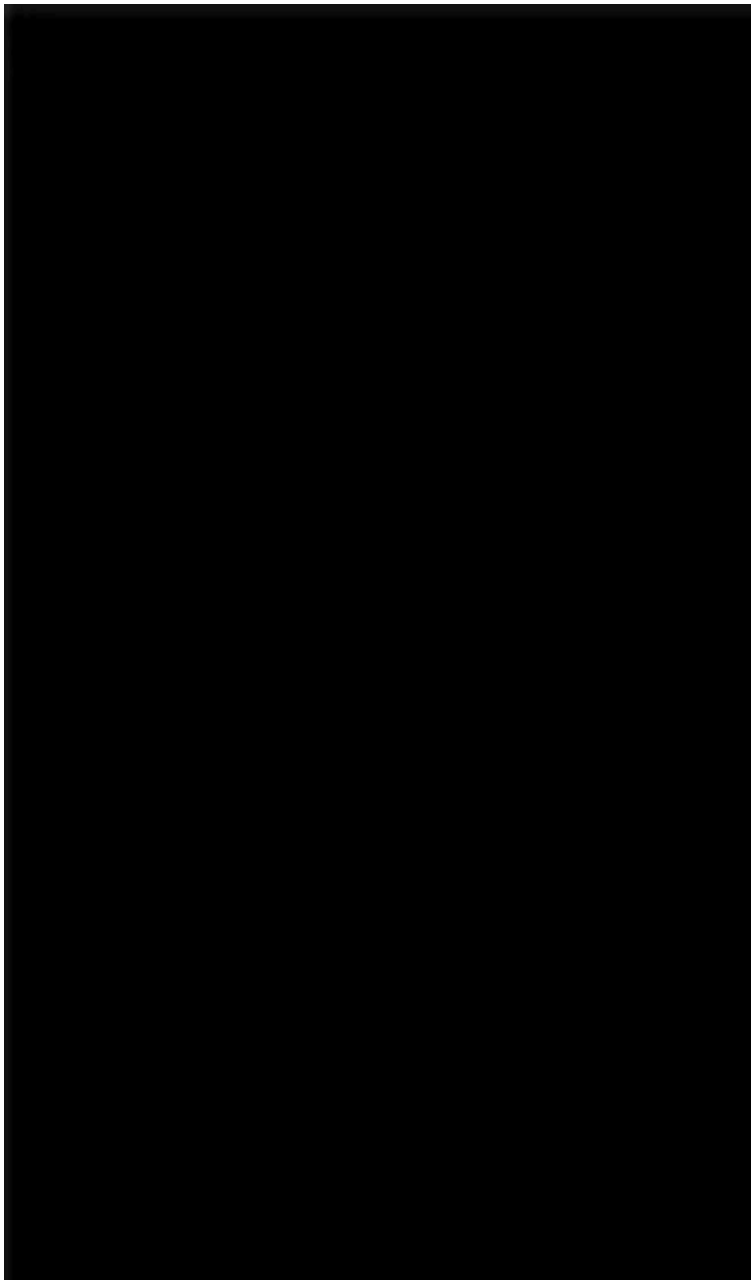


Even more remarkable than the location of the color center is what our brains are doing with this information. From the color center, information travels simultaneously to areas of the brain that are responsible for detecting motion, shapes, edges, and transitions. This happens even with subjects who are color blind. They may not be able to recognize different colors, but their brain still knows how to use this information to gain a more nuanced view of the world.

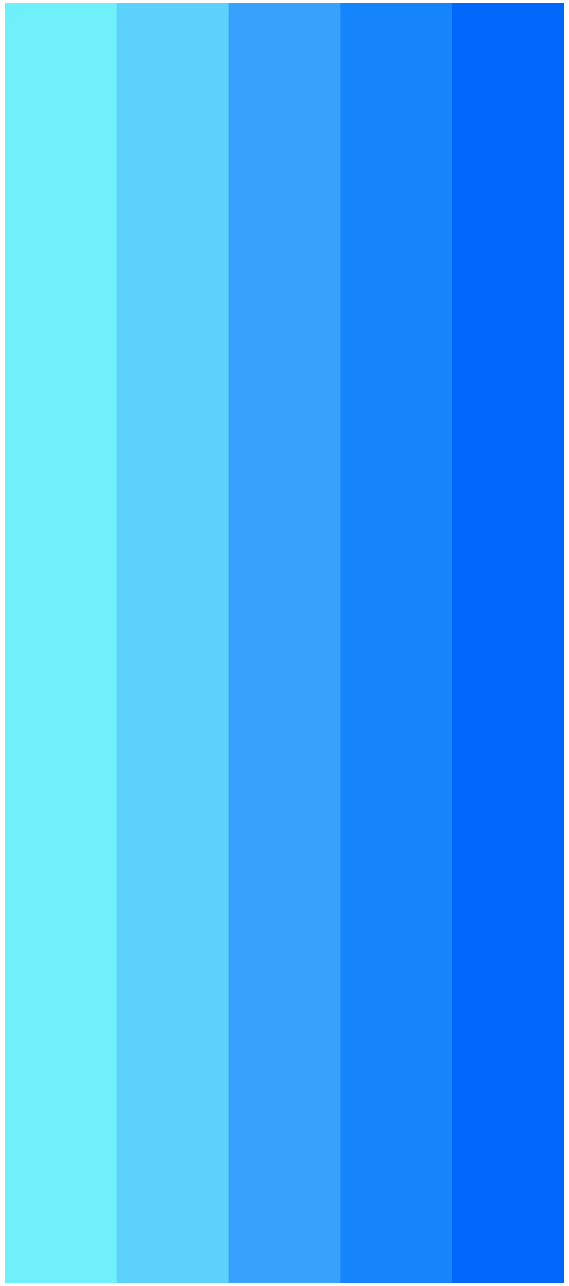
White

It's no surprise that white is associated with a lack of aggression. However, did you know that men who wear white are perceived as more attractive? A 2010 study found that men wearing a simple white T-shirt were seen as being more attractive by women. It is a similar concept to how women are viewed as more attractive when wearing red. White is also the color we associate with cleanliness and purity. This is also why hospitals tend to have white floors and white ceilings. Researchers have also found that white can actually lead to boredom. Spaces that are monochromatically white tend to hold our attention span for a shorter time than colorful areas and tend to prompt us to reflect on our own thoughts, separating ourselves from the environment we're in. This is why researchers suggest making retail stores colorful and interesting, rather than aiming for the sleek, but boring, all-white look.1 Black

Black—the color every teenager over uses to channel all their teen worries. Black is actually the absence of color. We're scared of black when we're kids, but we use it to appear slimmer when we become adults. However, black interacts with our brains in interesting ways that we might not realize. Black environments tend to lead to efficient outcomes, and black clothing tends increase a woman's level of attractiveness and perceived fashionableness. However, black's most interesting effect is that it can make you more aggressive. We tend to associate black with death and evil, and due to this, researchers in a 1988 study concluded that we tend to become aggressive when shown the color black. It has also been found that people were more likely to pay more for products when they were advertised in a way that incorporated the color black heavily, such as in a black-and-white commercial or billboard.



Dark blue creates similar effects to light blue. It has also been found to calm the nerves of those who are exposed to it, but it also has some other bizarre effects on your brain and body. A correlation was found between strong blues and clear thoughts. This correlation was then used in Japan, where blue street lights were installed in hopes of preventing crimes on certain streets as well as suicides at popular railway stations. Encouraging clearer thoughts seems to be working, as no suicide attempts have occurred at a particular station after the installation of the blue lights, and the number of crimes has decreased by nine percent in other blue-illuminated areas. This same logic was used in London, where Blackfriars Bridge was painted blue to reduce the number of people who jump from it.There are numerous studies comparing and contrasting the effects of blue and red, since they seem to act against each other. One particular study found that although red boosts performance on detail-oriented tasks (such as memory retrieval), blue environments caused participants to produce twice as many “creative outputs” as when they were in a red-dominated environment

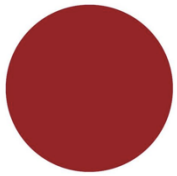


PINK _Once, it was the quintessential baby girl color. Now, it's the color of every frat guy's shorts. Pink is extremely interesting. It has direct, measurable effects on the way people behave. Researchers found these behavior-altering effects in what psychologists call "pink prisons." Surprisingly, they mean exactly that. A 1979 study found these bizarre effects when prisoners were placed in a cell painted bright bubblegum pink. The inmates immediately became less aggressive, and their muscles relaxed. Their feelings of restlessness and frustration also decreased significantly. Today, 20 percent of prisons in Switzerland have at least one pink cell reserved for unruly prisoners.[8]Psychologists also tried to see if the calming effects of pink worked on kids. The San Bernardino County Probation Department in California tried to see if they could replicate the pink prison experiment with children. They found that it only took ten minutes for children placed in the pink cell to stop yelling and banging. They also found that most children even fell asleep in that time frame. Now, the next time you're wondering how to calm down your five-year-old who's yelling in Target because you wouldn't buy them a toy or trying to put the annoying kid you babysit to sleep, think about how some pink paint could make your life a little bit easier.

Purple

Purple is a strange color to analyze. It is a mixture of blue and red, two contrasting colors, in terms of how they affect people. Interestingly enough, purple is not studied as much by color psychologists. One study found that purple made rooms seem colder than what they were, similar to how orange made rooms feel warmer. Purple thus has the opposite effect, tensing muscles instead of relaxing them. Since there is a lack of scholarly articles written about the effects of purple, I will leave you with an interesting fact: Women often list purple as their favorite color, while men often list it as their least favorite

Purple gets our attention and may stimulate sexual attraction.



Red stimulates the adrenal glands and can generate feelings of energy or threat, depending on the intensity of the stimulus. However, when used in conjunction with repetitive or detail-oriented tasks, red also appears to improve focus and performance.

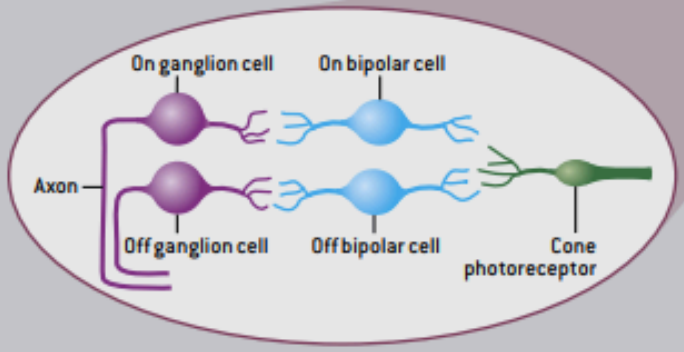
Yellow in small amounts can make us feel happy. However, if overdone it can lead to feelings of stress, which may be why it is so often used as the color for warning messages.

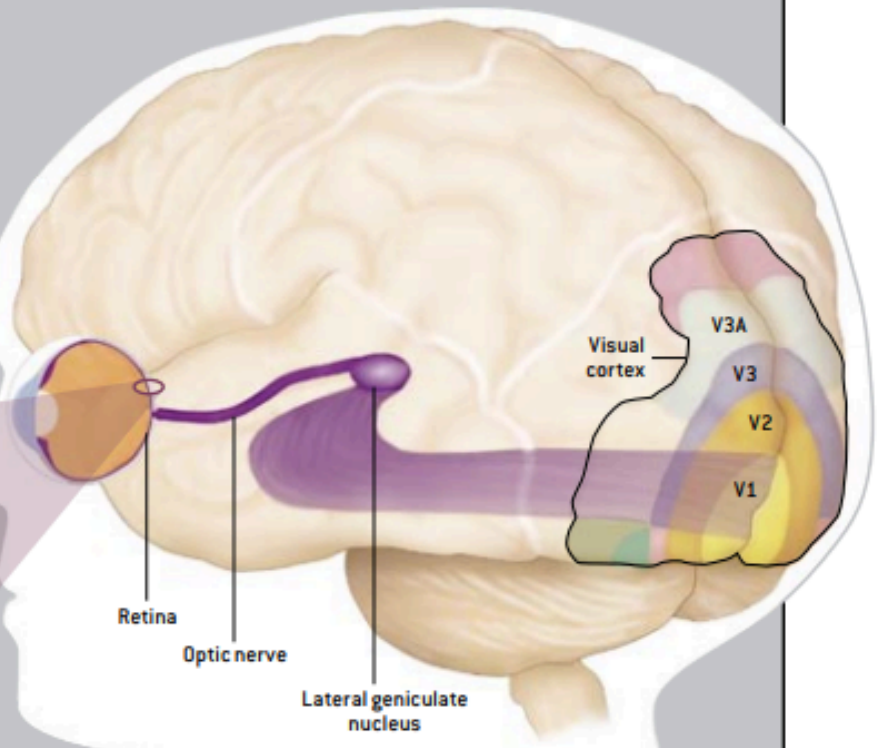
Green appears to be relaxing and may even contribute to physical health, suggesting its use in hospitals.

Orange stimulates critical thinking and memory. It is sometimes suggested that test centers should be painted orange to stimulate performance on exams. Bring along some snacks, though, because it also increases appetite.

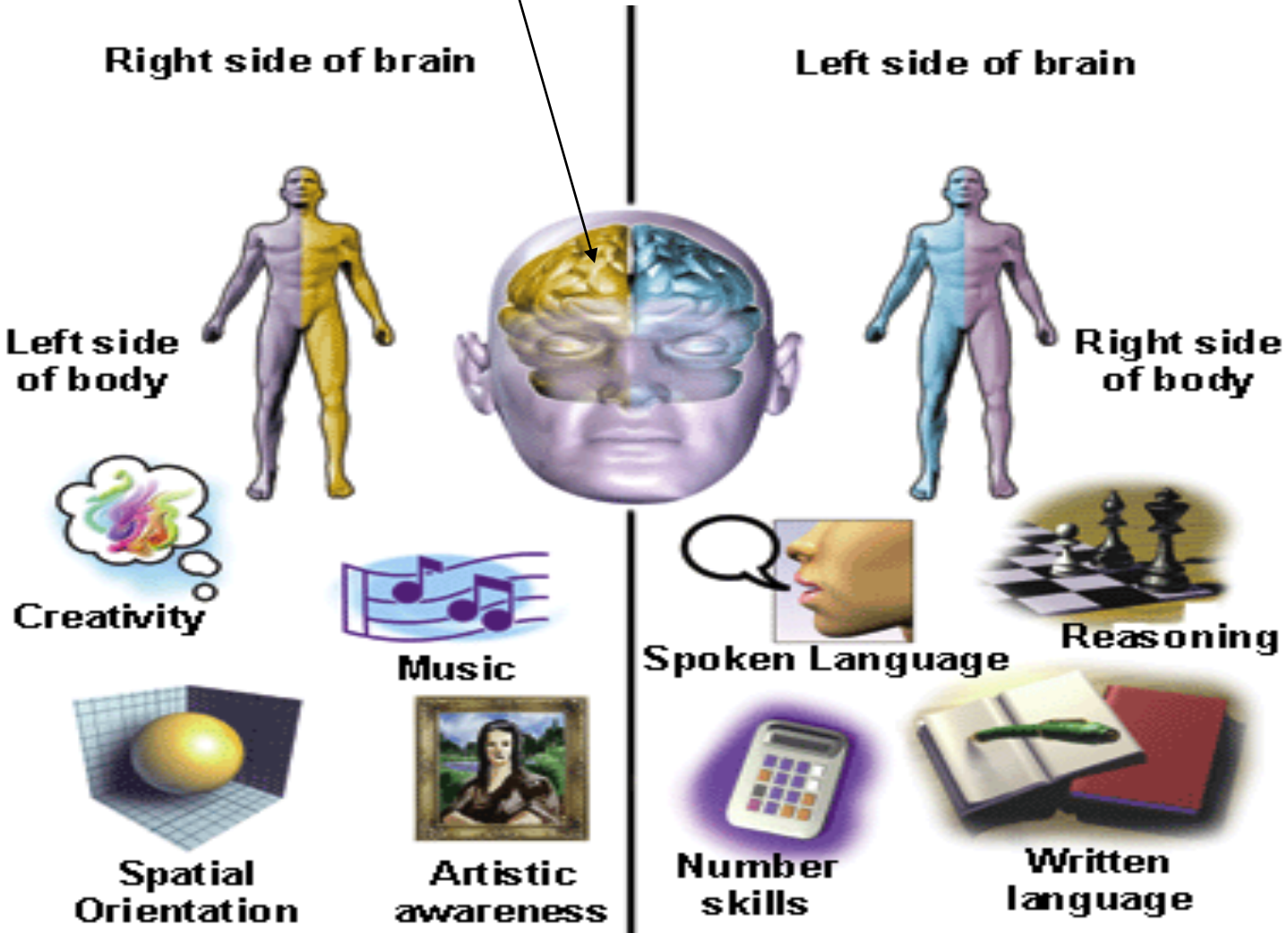
Seeing Color

Perception of color begins with the absorption of light by the cone cells in the retina (*detail below*). A cone photoreceptor responds in only one way, but its activity is conveyed by two different types of neurons, called on and off bipolar cells. The bipolar cells in turn provide input to on and off ganglion cells. The ganglion cell axons relay their signals to the brain, first to the lateral geniculate nucleus and from there to the visual cortex.





Music & arts uses:



ART & BRAIN

Left Hemisphere

- left-brain region for letters and words
- highly verbal
- primarily a sequential learner
- time conscious,
- all-or-none (outcome) oriented,
- prefers logical and analytical thinking,
- Rational language, mathematics, abstraction and reasoning Memory

  stored in a language format
- The strength of connections between brain cells (called "synapses") is altered
- Activity in synapses can strengthen them
- lack of activity can weaken them
- brain activity can produce new synapses

Music & arts uses:

- **Right Hemisphere**
  - right-brain region for notes and musical scores & passages
  - Not easily able to express experiences in verbal form
  - Excellent spatial memory & highly developed sensory (spatial) recall.
  - adapt to synthesis and intuitive processing

- Holistic Functioning: processing multi-sensory input simultaneously to provide "holistic" picture of one's environment.
- Visual spatial skills. Holistic functions (dancing and gymnastics are coordinated by the right hemisphere) Memory is stored in auditory, visual and spatial modalities.

Music & arts:

- Which of these brain systems and processes are heavily used in music, whether in singing, drawing or in playing a musical instrument?
- music arts engages all of these components.
- music performance provides a complete mind/brain "workout"
- This workout should facilitate inter-communications between cells by strengthening synapses, thus improving brain function
- Include-Transfer effects from music to other academic subjects
- The limbic system
  - facilitate or inhibit learning and higher order thinking.
  - Positive emotions can facilitate higher order thinking skills whereas
  - Negative emotions, such as anger, hostility, and fear, can literally downshift the brain to basic survival thinking

Major components of the human brain/mind:

- **Sensory and Perceptual** (e.g., auditory, visual, tactile, kinesthetic)
- **Cognitive**: (e.g., symbolic, linguistic, reading)
- **Planning Movements** (e.g., organizing a sequence of muscle actions)
- **Motor**: (e.g., fine muscle and gross muscle coordination)
- **Feedback/Evaluation** (e.g., hearing if one played the correct notes)
- **Motivational** (e.g., determination to study hard)
- **Learning** (e.g., acquiring new information or a motor skill)
- **Memory** (e.g., long term storage and use of new information and skills)

Triune Brain Theory

Lizard Brain	Mammal Brain	Human Brain
Brain stem & cerebelum	Limbic System	Neocortex
Fight or flight	Emotions, memories, habits	Language, abstract thought, imagination, consciousness
Autopilot	Decisions	Reasons, rationalizes

The Triune Brain in Evolution, Paul MacLean, 1960

Triune brain theory

- suggests that the human brain is really three brains in one
- The smallest part
  - 5% of the brain,
  - the reticular formation
    - the gateway for most sensory input and is devoted to maintaining the operation of automatic body process, such as respiration and heartbeat. It is also the seat of habitual or automatic behavior.

The second part, the limbic system

  - 10% of the brain
  - seat of the emotions, certain kinds of memory, and glandular control

- The largest part, the cerebral cortex
  - 85% of the brain
  - devoted to higher order thinking processes

Utilizing music and art

Music

- can lower stress, boost learning when used 3 different ways:
  - as a carrier - using melody or beat to encode content
  - as arousal - to calm down or energize
  - as a primer - to prepare specific pathways for learning content) impacts the immune system, and is an energy source for the brain

Art:

- provides many learners with avenues of expression and emotional conduits for learning and retaining information
- Is important in technology to aesthetically create pleasing power point presentations and multi-media displays to showcase work
- Multicultural awareness is improved through the study of art. Due to the diverse power of art, some educators think the "arts" should be named as the fourth "R."

Utilizing music and art

- This quality of complexity stimulates brain activity in the frontal lobes and between the right and left hemispheres.
- Knowing how to play an instrument furthers this increase in brain function-
- Research has shown that musicians have much more dense fibers in the corpus callosum than non-musicians, and this allows for much better special intelligence (recognition of abstract and spatial forms and constructs) among other things.
- Musicians further process music equally in both hemispheres, unlike non-musicians who mostly only "hear" music with half their brain.

Utilizing music and art

- Children with music training had significantly better verbal memory than their counterparts without training.
- The longer the training, the better the verbal memory
- The brain physically changes when we learn.

- And that change is most extensive and powerful when emotion is part of the learning.

- The chemicals of emotion (adrenalin, serotonin, and dopamine) act by modification of synapses.

- The modification of synapses is the very root of learning. Changing connections in the brain is learning.

A Creative Therapy: Painting

"Art is the expression of our deepest feelings through the most simple path."
-Albert Einstein-

The benefits of therapeutic painting

Painting on a canvas, a piece of paper or any other surface that lets us express ourselves can be a great way to manifest feelings and thoughts for people that need to communicate and aren't able to do so through any other means. It's a type of alternative and natural therapy that can have many benefits, such as the following:

Improved communication

People who start doing therapeutic painting tend to be shy and withdrawn and have difficulties communicating with their family and even their therapists. However, through painting, shy people manage to unleash their creativity and express feelings and emotions.

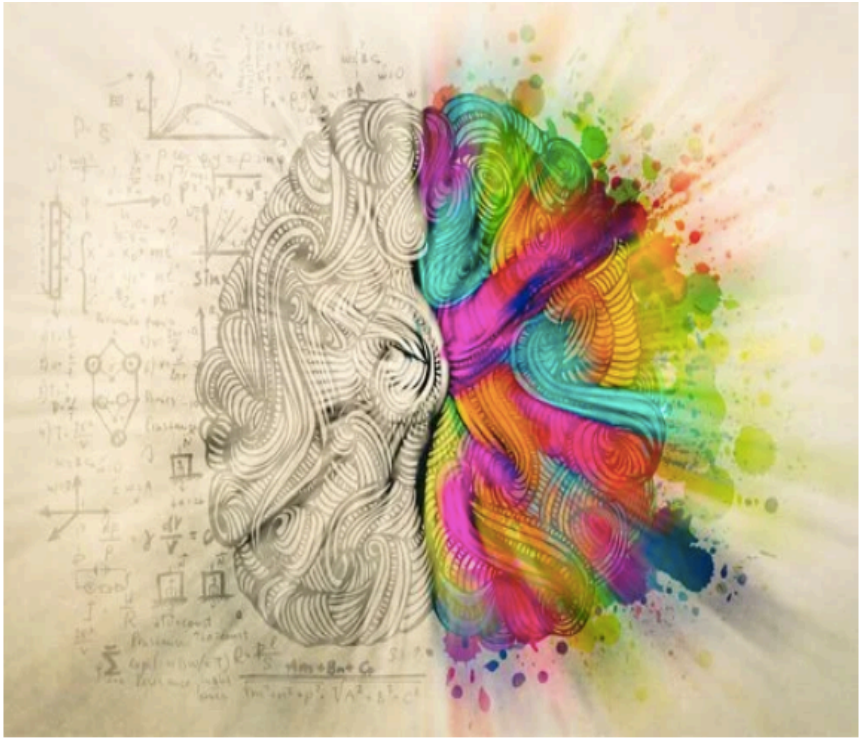
"It's not about painting life, it's about bring your painting to life."
-Paul Cézanne-

Increased self-esteem

When therapeutic painting is performed in a non-competitive, relaxed and pleasant environment, a patient can reach great personals goals, encouraged by the psychotherapist. This will strengthen their self-esteem. This aspect can be important for people with codependency issues, traumas and those who need to strengthen their autonomy and learn to love and value themselves.

Improved motor skills

Just like when we play a musical instrument, through painting and the handling of a paintbrush or a pencil, we learn to regulate our hand movements and to develop cerebral connections related to this ability. In adults, the act of painting can help improve fine motor skills



Brain stimulation

Through drawing and painting, both hemispheres are stimulated within the brain, the left as well as the right. The left is the logical and rational side, while the right side is associated with our creativity and our emotions. It's all about letting our imagination take flight so that our deepest thoughts can also breathe.

Concentration
The dedication to painting, or any other type of artistic creation, requires concentration. Painting is a meticulous job that allows us to forget about our surroundings and simply let's us get carried away. It makes time starts passing without us even noticing.

The state of advance concentration is known as Alpha, and it has been the subject of numerous studies. This is a state in which part of our brain is conscious, and the other brings out our subconscious. This same state can be reached through prayer, meditation or music.

Emotional intelligence
Emotions are a very important part of our creativity. Through painting we can let our emotions flow out and experience happiness, love, empathy and peace. The relaxation obtained through painting helps us achieve a balance between our heart and our mind.

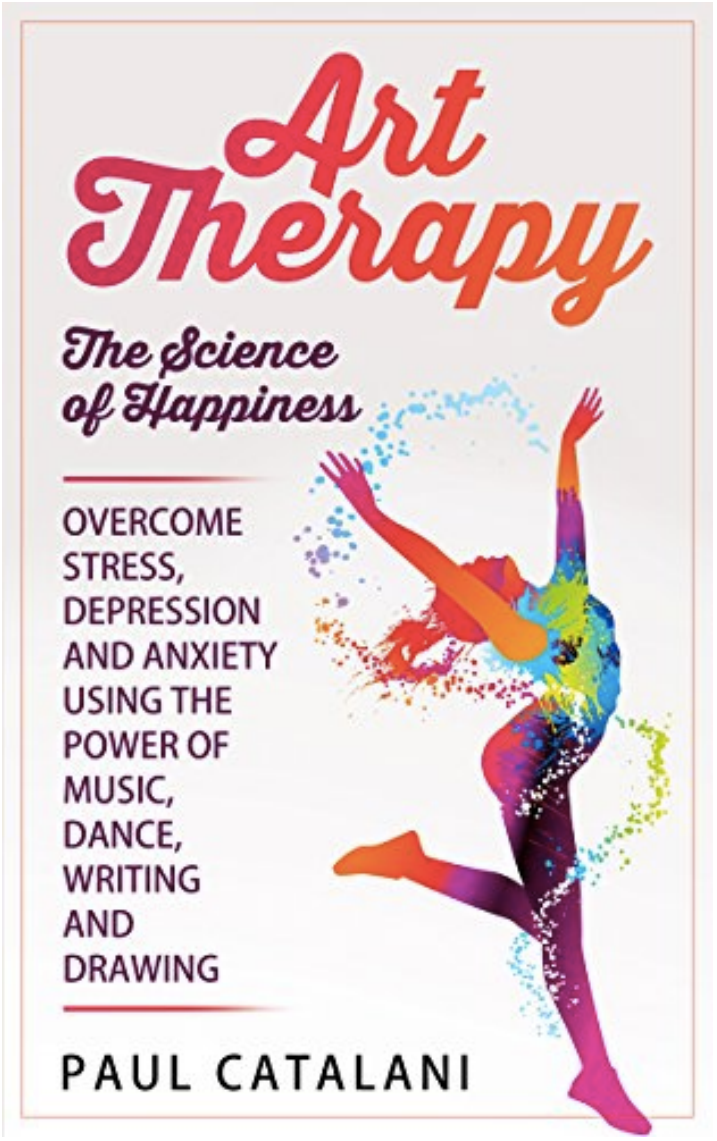
"A true painter is one who is able to paint extraordinary scenes in the middle of an empty desert. A true painter is one who can patiently paint a pear surrounded by the tumults of history."
-Salvador Dalí-

COCLUSION

Art Therapy is an integrative mental health and human services profession that enriches the lives of individuals, families, and communities through active art-making, creative process, applied psychological theory, and human experience within a psychotherapeutic relationship.

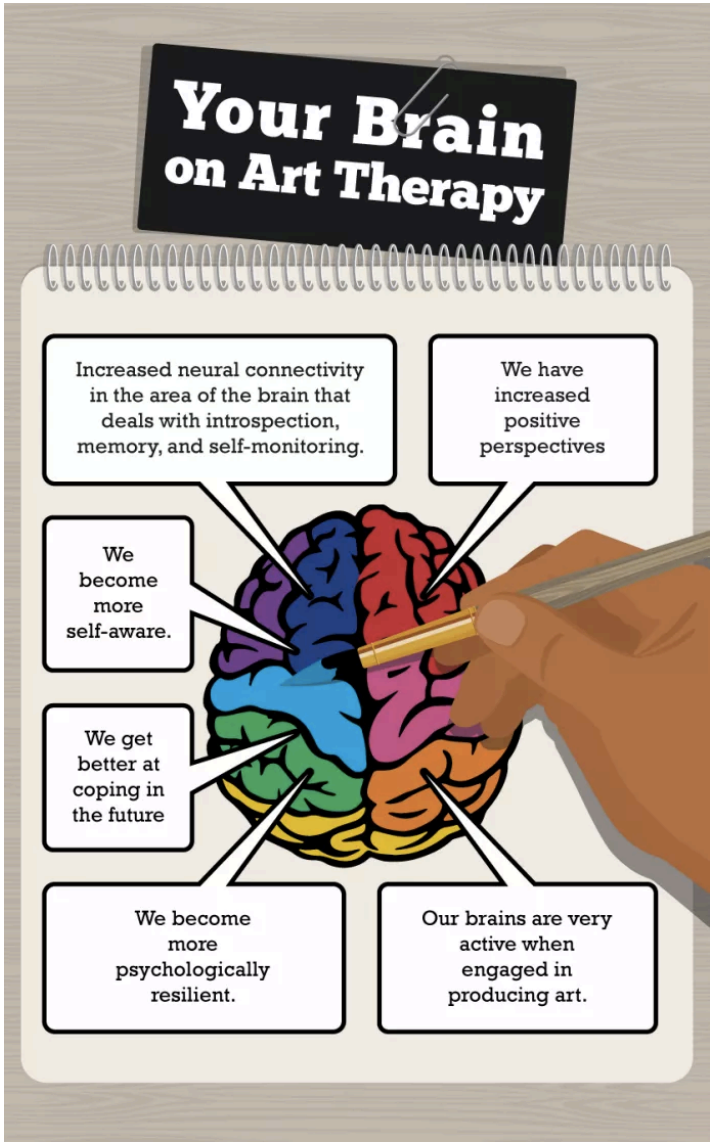
Art Therapy is used to improve cognitive and sensory-motor functions, foster self-esteem and self-awareness, cultivate emotional resilience, promote insight, enhance social skills, reduce and resolve conflicts and distress, and advance societal and ecological change

Any form of art is an excellent cure for General illness.Art and the creative process can aid many illnesses (cancer, heart disease, influenza, etc.). People can escape the emotional effects of illness through art making and many creative methods. Art is an excellent form of expression where lack of expression is an underlying cause for many diseases Art can be a refuge for the intense emotions associated with illness; there are no limits to the imagination in finding creative ways to express emotions.



Engaging in different types of visual art (textiles, card making, collage, pottery, watercolor, acrylics) helps on focusing on positive life experiences, relieving their ongoing preoccupation with any diseases, enhances their self-worth and identity enable them to maintain a social identity that resisted being defined by present physical and mental conditions.

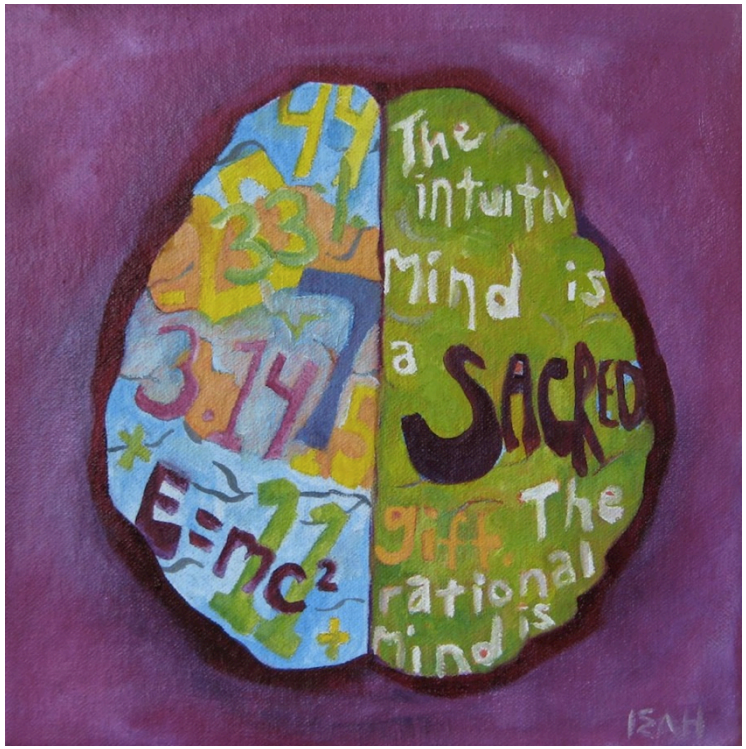
Art therapists have worked with children, adolescents and adults after natural and manmade disasters, encouraging them to make art in response to their experiences. Some suggested strategies for working with victims of disaster include: assessing for distress or post traumatic stress disorder (PTSD), normalizing feelings, modeling coping skills, promoting relaxation skills, establishing a social support network, and increasing a sense of security and stability.

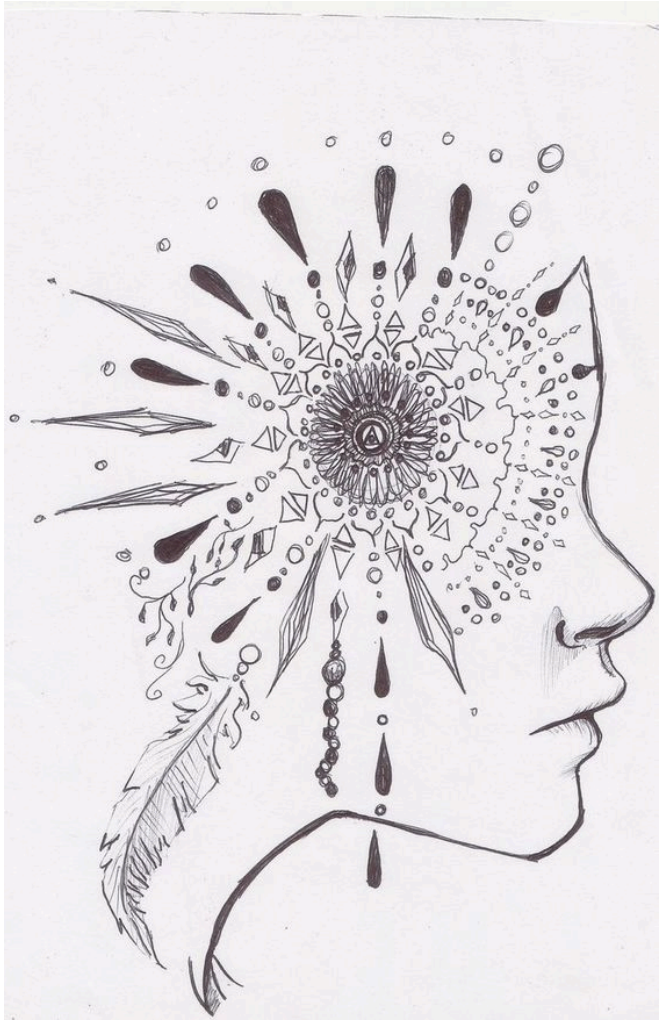


Any mental disorders ,Dementia ,Autism ,Schizophrenia ,involvement in art can give wonderful solutions. The purpose of art therapy is essentially one of healing. Art therapy can be successfully applied to clients with physical, mental or emotional problems, diseases and disorders. Any type of visual art and art medium can be employed within the therapeutic process, including painting, drawing, sculpting, photography, and digital art.

One proposed learning mechanism is through the increased excitation, and as a consequence, strengthening of neuronal connections.

Art therapy should be an important subject in schools as a form of therapy for children because of their creativity and interest in art as a means of expression. Art therapy can benefit children with a variety of issues, such as learning disabilities, speech and language disorders, behavioral disorders, and other emotional disturbances that might be hindering a child's learning . Similar to other psychologists that work in schools, art therapists should be able to diagnose the problems facing their student clients, and individualize treatment and interventions. Art therapists work closely with teachers and parents in order to implement their therapy strategies

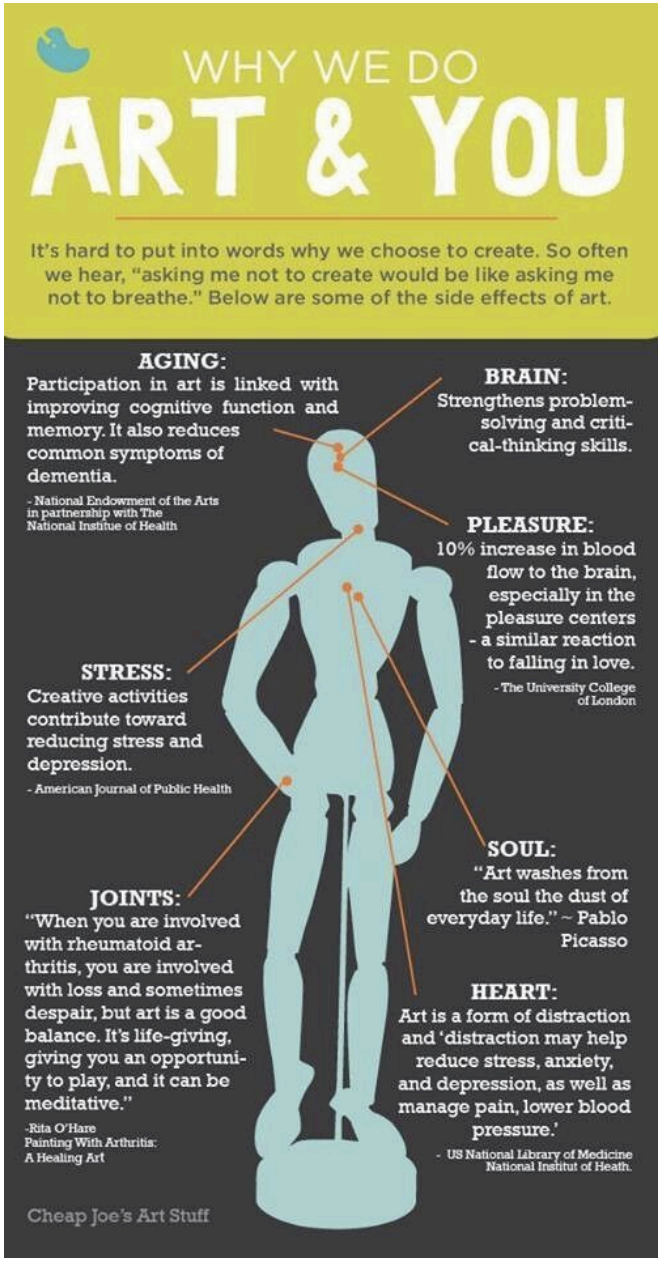




MY SINCERE THANKS

Firstly, I thank Dr.M.M Alex, my mentor, not only for the opportunity to pursue this research but also for his endless patience and guidance throughout the development of this project. I cherish greatly all the moments of joy and hopelessness that we shared in the past years. He has influenced my life tremendously.

I also thank Dr. Deepa (ENT Specialist), Dr. C Senthil Nathan(Ophthalmologist), Dr. K. Sankara Subramanian (Neurologist) and Dr. C Kumar Babu (psychiatrist) to understand the five senses and its neurological connection with the body and mind.



REFERENCES

Chaudhuri, T. A little thinking music.
Arts, Neuroscience, and Learning. New Horizons for Learning.
Edwards, David Art therapy. London:
Wadeson, H., Durkin, J., & Perach, ,Advances in art therapy. New York: John Wiley & Sons.
Wood M. J.; Molassiotis A.; Payne S. "What research evidence is there for the use of art therapy in the management of symptoms in adults with cancer? A systematic review". Psycho-Oncology.
Malchiodi, Cathy A. (The art therapy sourcebook (2nd ed.). New York: McGraw-Hill.
Wadeson, Harriet Art psychotherapy (2nd ed.). Hoboken, N.J.: John Wiley & Sons.
Cowl, Andrielle L.; Gaugler, Joseph E. (2014-10-02). "Efficacy of Creative Arts Therapy in Treatment of Alzheimer's Disease and Dementia: A Systematic Literature Review". Activities, Adaptation & Aging
Chancellor, B; Duncan, A; Chatterjee, A (2014). "Art therapy for Alzheimer's disease and other dementias". Journal of Alzheimer's Disease.
Flaherty, AW (March 2011). "Brain illness and creativity: mechanisms and treatment risks". Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie
Lloyd, J; Ruddy, R; Milnes, D (2005). "Art therapy for schizophrenia or schizophrenia-like illnesses".