

DEMENTIA



DR.PHILIP JOHN M.D. (NIMHANS)
PEEJAYS POLICLINIC,
CHILD GUIDANCE CLINIC
VALANJAMBALAM, COCHIN – 16
S.INDIA

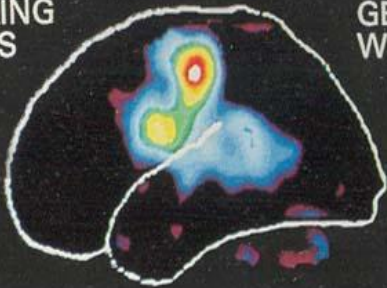
MIND & ITS FUNCTIONS: ORGANIC PERSPECTIVE

MIND-BODY DUALISM

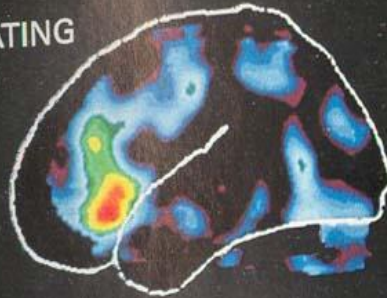
- Dichotomy: Visible Vs Invisible
- Exponentially grown technology.
- EEG, CT, MRI, PET, SPECT, fMRI, MRS etc...
- **Peep into live brain cells** through these ‘Windows’.
- ‘Think & Feel’ inside the Brain.

MIND:ORGANIC PERSEPECTIVE

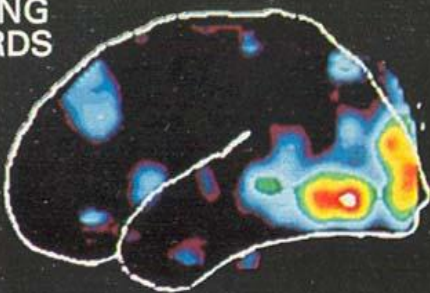
SPEAKING
WORDS



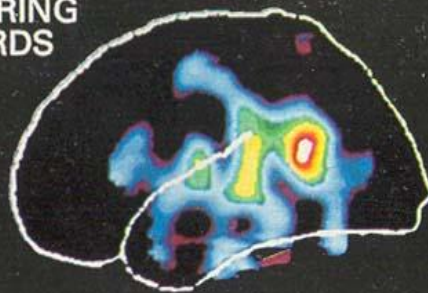
GENERATING
WORDS



SEEING
WORDS



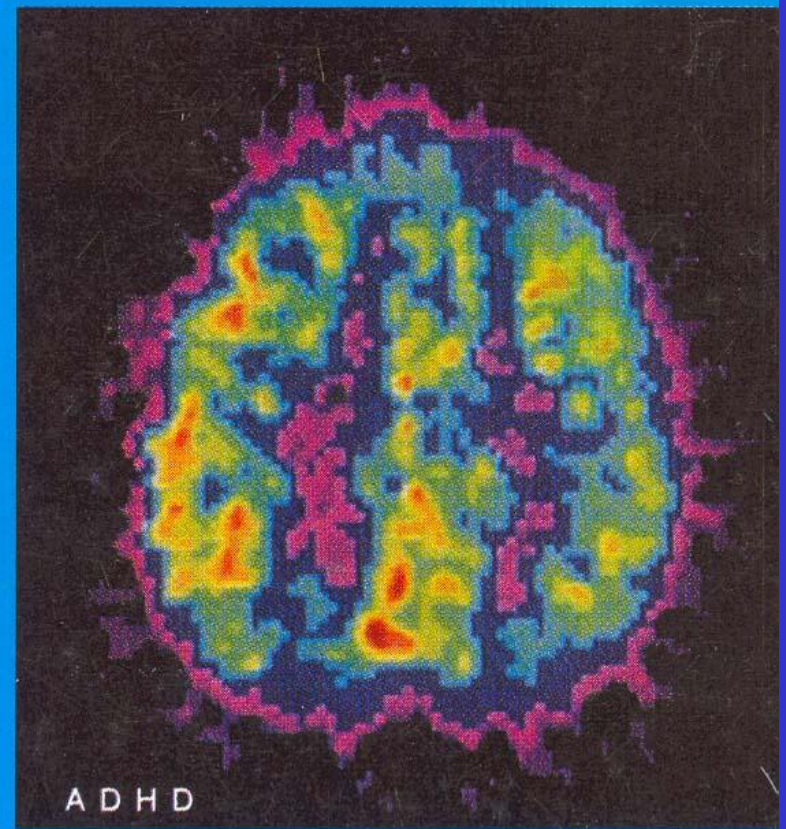
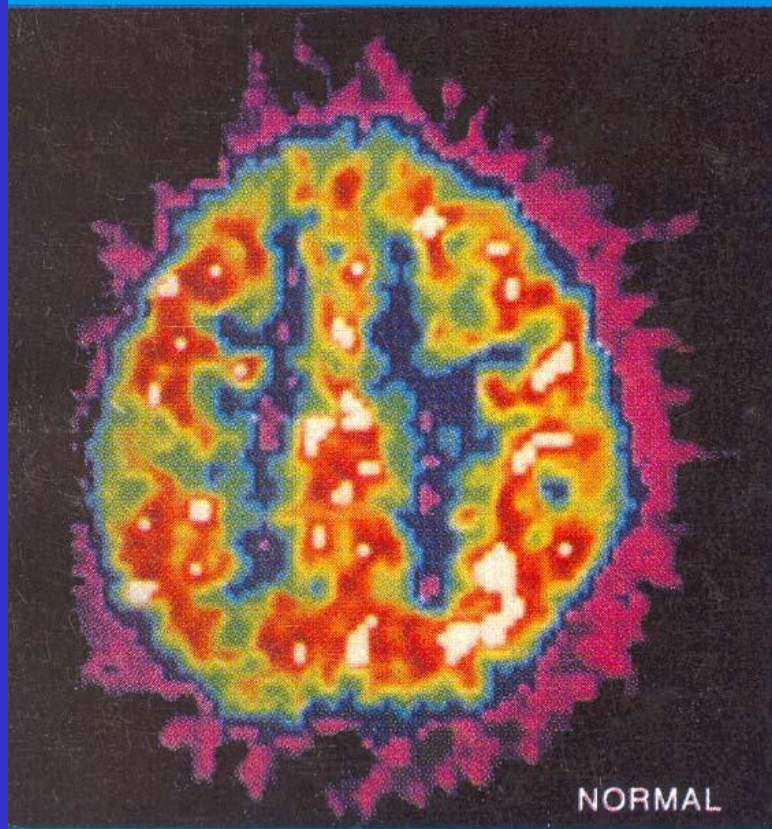
HEARING
WORDS



MAPPING THE BRAIN

Hot colours mark the areas working on various Tasks in these PET scans which highlight increased metabolism in the most active cells.

MIND:ORGANIC PERSEPECTIVE



MIND & ITS FUNCTIONS: ORGANIC PERSPECTIVE

- Mind's Functions: Consciousness, Personality, Intelligence, Thinking, Feeling, Learning, Speaking, Reading, Writing, etc.....
- Each carried out by specific Bio-chemicals in the designated areas of the brain.
- 'Mind Generated by the Brain'.

There are separate areas in the brain for specific activities.

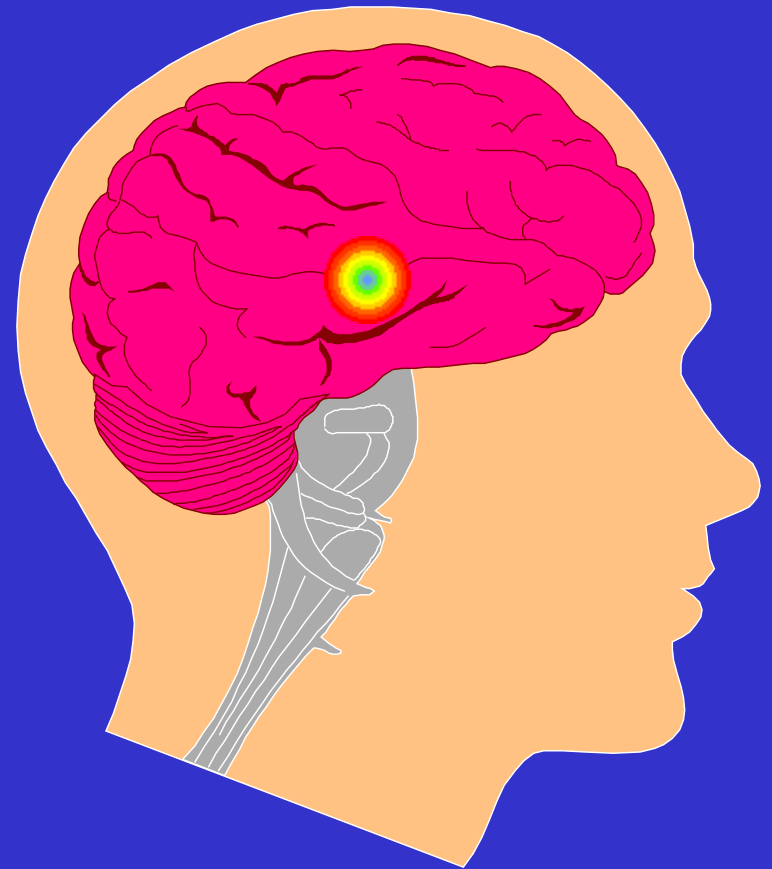
Almost like various offices in an organization or institution which do only specified tasks.



Area for Feelings

Office concerned with our

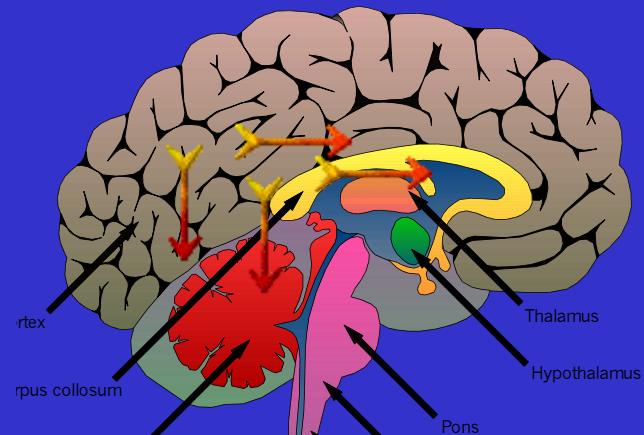
- Emotions
- Thinking
- Patience
- Initiative.



The Areas (Offices) in the Brain work by

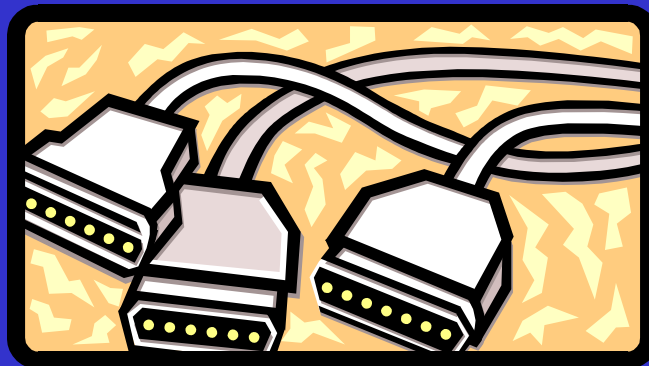
Receiving & Giving various types of information.

This information is passed at the rate of several messages per second.

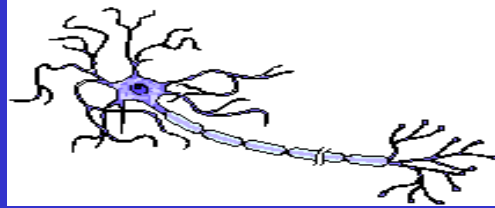


The Brain has

- No Cables or Phone lines
- And yet, the communication is far superior to any artificial manmade method.

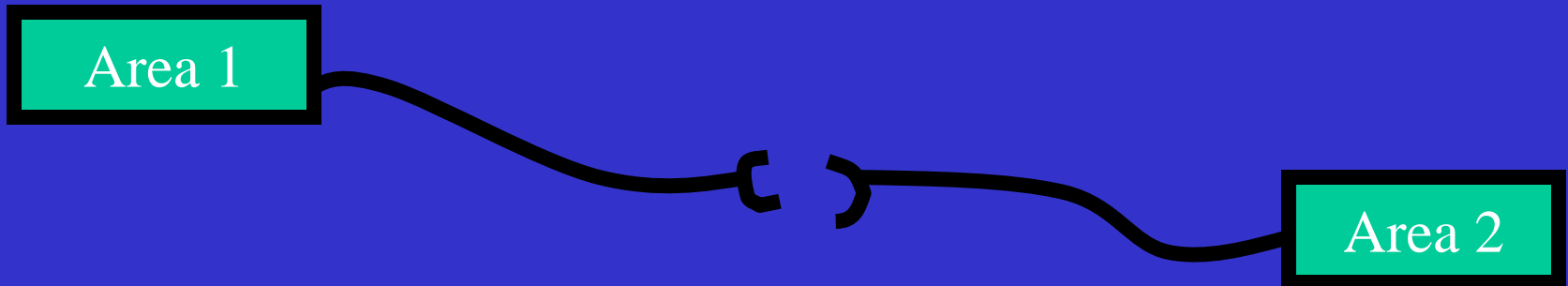


In place of cables/wires,



The Brain has many nerves which are

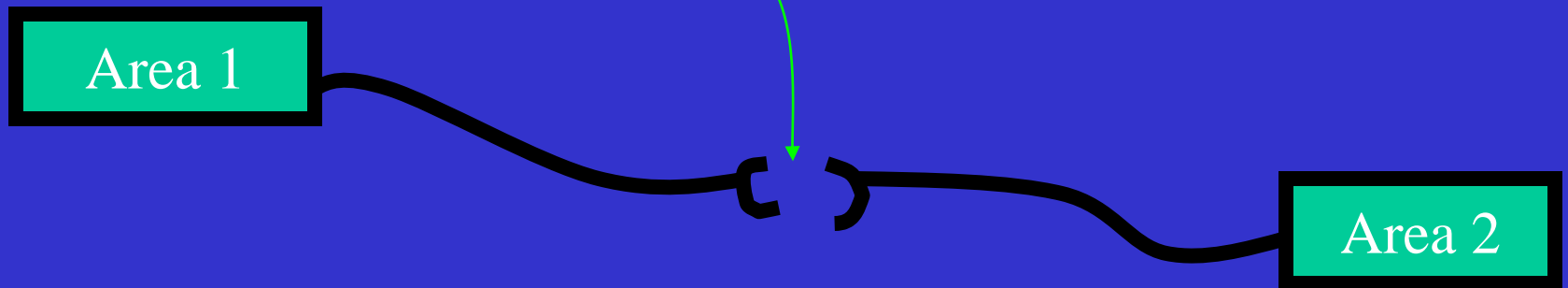
- complexly interconnected and
- serve to transmit messages from one area of the brain to the other.



Between any 2 nerve cells

in the brain, is a small gap which has to be crossed for the message to get across.

(Synapse)



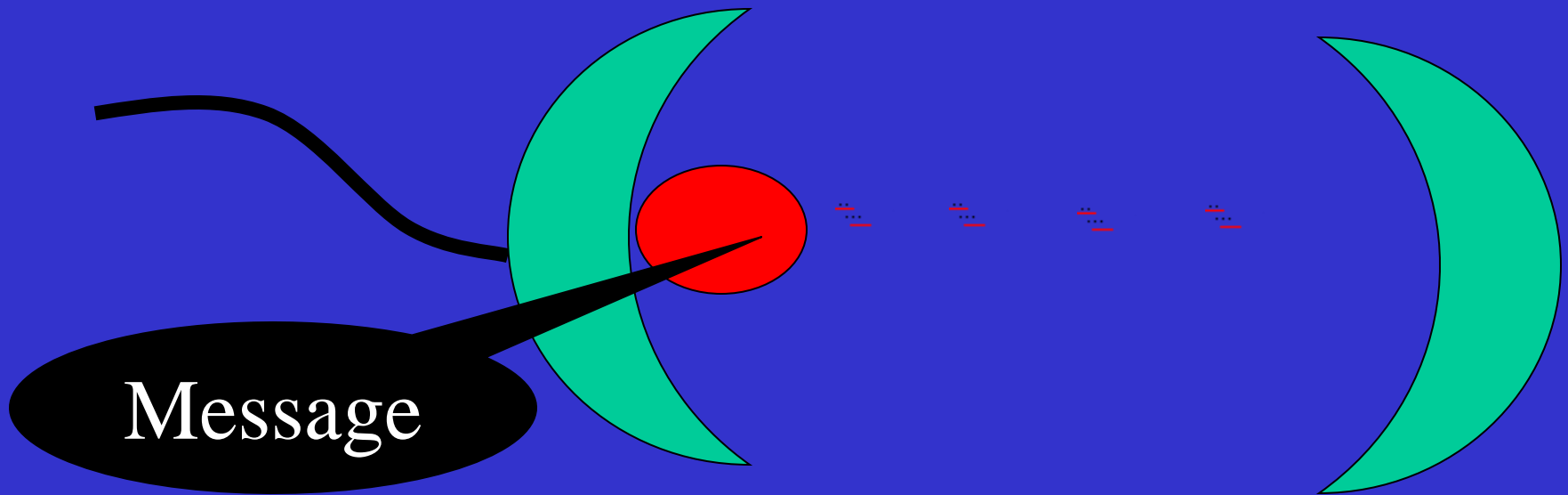
This transfer of message

Is made possible by the release of
chemical droplets from the end of the
1st nerve



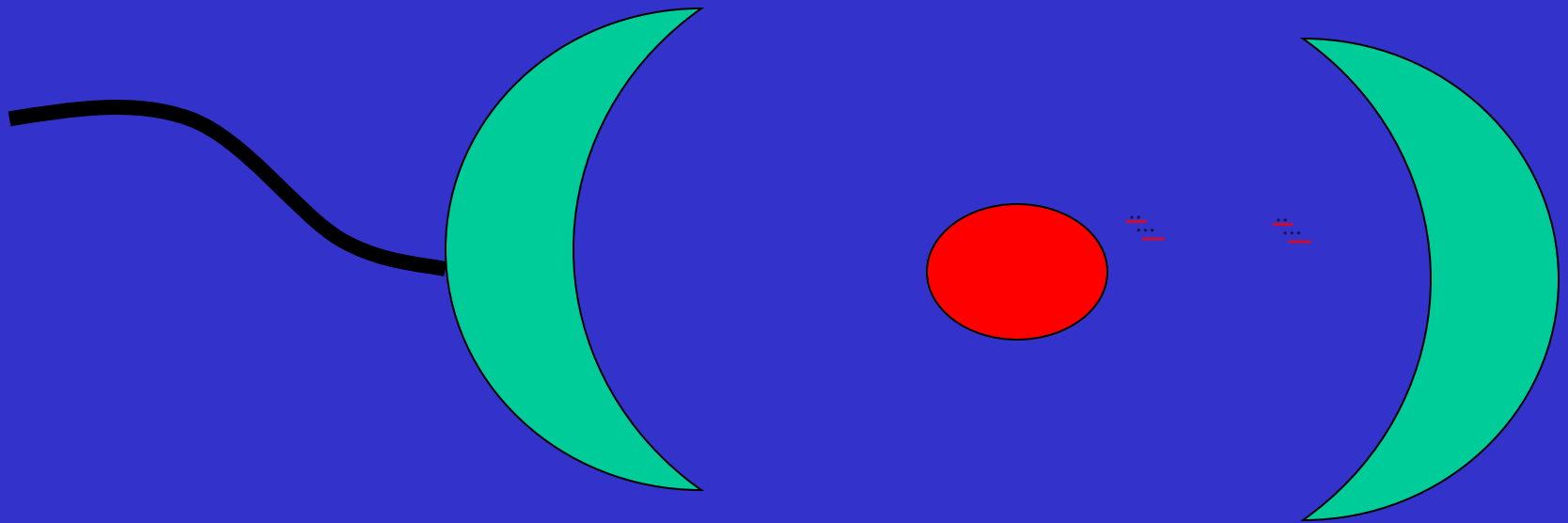
This chemical droplet

Carries in it the information
(message)



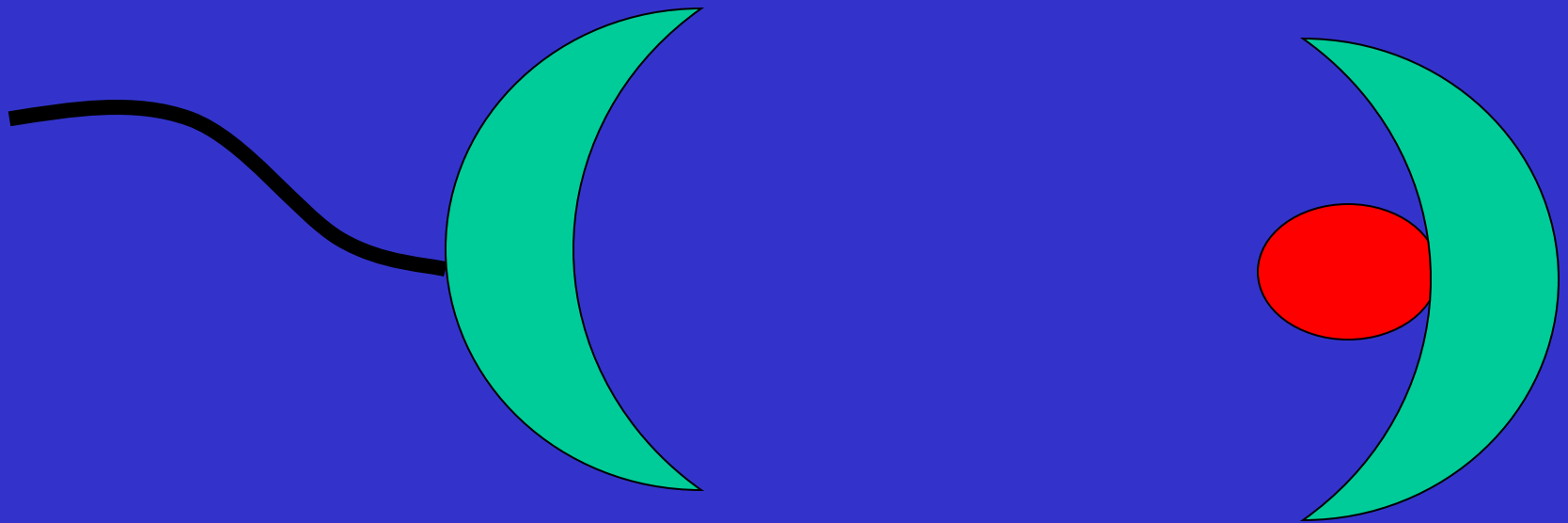
This chemical droplet

swims across the gap to the receiving end of the 2nd nerve.



On reaching the 2nd nerve end

The message is conveyed to the 2nd nerve.



MIND & FUNCTIONS

The mind's functions including the processes of Learning, Reading, Spelling, Writing, Language, etc. are all the result of efficient communication among specific brain areas.

This is the importance of understanding the organic basis of the Mind.

DEMENTIA

- **DEFINITION:**

- **Group of symptoms that can be caused by over 60-70 disorders.**

- **Syndrome : Progressive decline in intellectual functioning severe enough to interfere with person's normal daily activities and social relationships.**

ALZHEIMER'S DISEASE(AD)

- Most common form of dementia.
- The incidence increases with age, very rare among people younger than 60. Affects up to 50 percent of people older than 85, and the risk increases with age.²
- Often confused with the changes of normal aging; Alzheimer's disease is not a normal part of aging.⁴
- In AD, both Short & Long term memory are affected

Vascular Dementia

- **Consequence of Ischaemic or haemorrhagic damage of areas of the brain involved in memory and cognition**
- **May occur suddenly or over a period of time, depending on the extent of the brain damage**
- **The history, course & clinical features help to distinguish AD .**

Vascular Dementia

- **Consequence of Ischaemic or haemorrhagic damage of areas of the brain involved in memory and cognition**
- **May occur suddenly or develop gradually over a period of time depending on the type and extent of the brain damage**

Lewy Body Dementia

– Lewy Body Dementia

- **Episodic confusion with intervals of lucidity with at least one of the following:**
 1. **Visual or auditory hallucinations**
 2. **Mild extrapyramidal symptoms (muscle rigidity, slow movements)**
 - **Repeated unexplained falls**
- **Progresses to severe dementia—found at autopsy.**

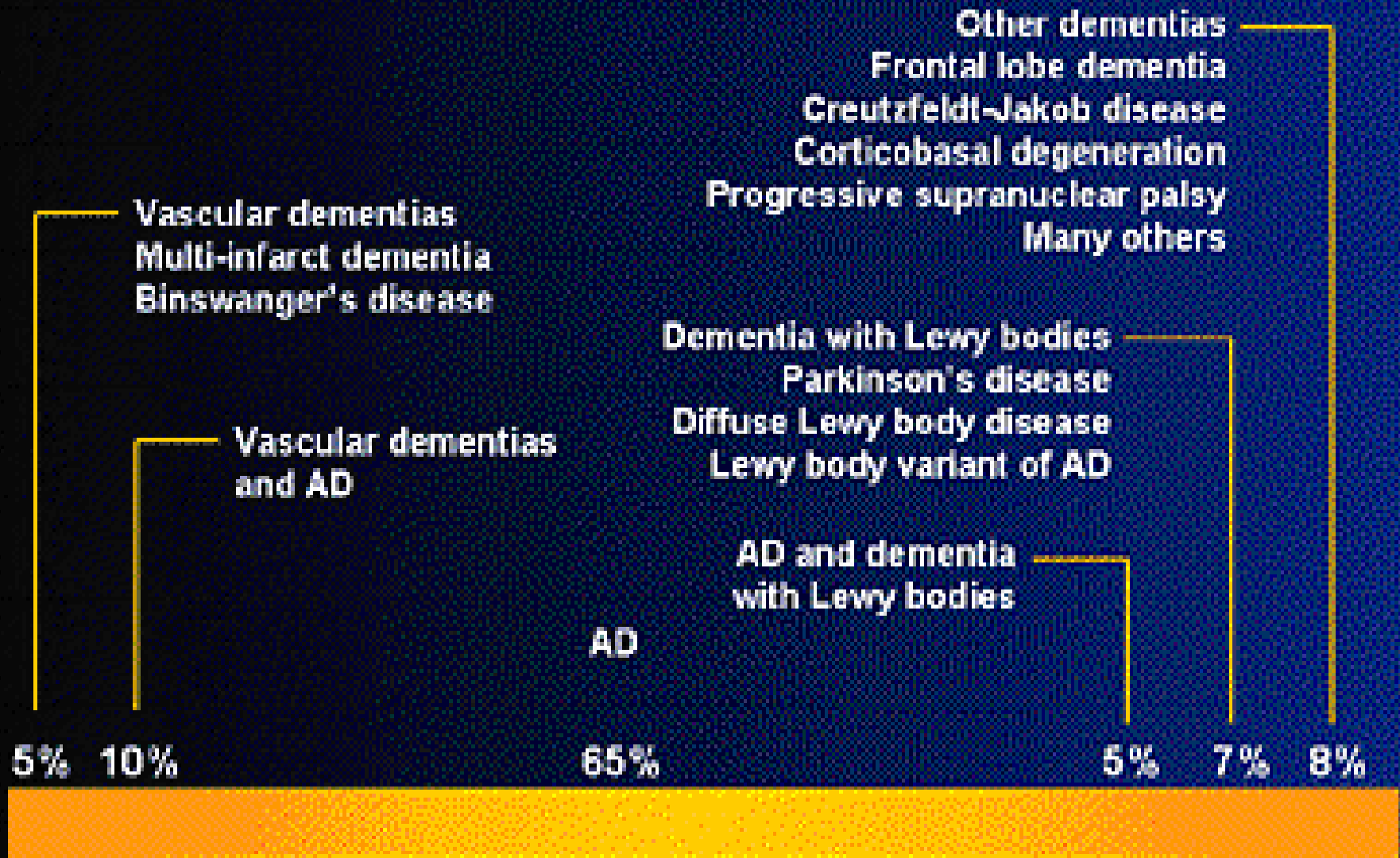
Clinical Criteria for Dementia with Lewy Bodies

- **Fluctuating LOC**
- **Visual hallucinations**
- **Parkinsonism**
 - **unexplained loss of consciousness**
 - **neuroleptic sensitivity**
 - **complex and bizarre delusions**

Frontemporal Dementia (Pick's Disease)

- **Personality changes**
- **Behavioral dis-inhibition.**
- **Loss of social or personal awareness.**
- **Disengagement with apathy**
- **Maintain ability to draw and calculate well into later stages**

Dementia - types



Epidemiology

- **50 –87% of cases of dementia missed**
- **Prevalence of moderate to severe dementia 5% of population \geq 65**
- **Incidence 0.5% of population $>$ 65 years of age**

Course of Dementia

- **Early or Mild – MMSE > 20**
- **Middle or Moderate - MMSE 11- 20**
- **Late or Severe – MMSE < 11**

Risk Factors for Dementia

- **Age**
- **Sex**
- **Genetic Factors**
- **Education**
- **Vascular factors – cholesterol, homocysteine, hypertension**
- **Smoking**
- **Head injury**
- **Alcohol**
- **Thyroid disease**
- **Exposure to electromagnetic fields**

Risk Factors for Dementia - Depression

- **Depression may increase risk of dementia by 2-3 times**
- **Early onset depression - ?? Increased risk of VaD**
- **Late onset depression – more likely that if dementia develops the depression was part of the dementing process**

Behavioural & Psychological Symptoms of Dementia (BPSD)

Symptoms of disturbed perception, thought content, mood or behaviour that frequently occur in patients with dementia”

IPA consensus group (1996)

Clinical Presentations

- Gradually progressive Cognitive impairment
- Personality change
- Word finding difficulties
- Depression
- Confusional episodes & Behavioral disturbances

Differential diagnosis of dementia

- **Normal ageing**
- **Mild cognitive impairment (MCI)**
- **Depression**
- **Reversible medical illness – hypothyroidism, syphilis,**
- **Drugs- Medications**

Normal Forgetfulness vs Early Dementia

Description	Dementia	Normal Elderly
Forgets	Whole experience	Part experience
Forgets words/names	Progressive	Occasional
Delayed recall	Often	Rarely
Follows commands	Gradually unable	Usually able
Ability to use notes, reminders	Gradually unable	Usually able
Follow a story on TV, book	Gradually unable	Retains usual ability
Calculations	Gradually unable	May be slower
Self care	Gradually unable	Usually able

Dementia or Delirium

Dementia

- * Insidious onset with unknown date
- * Slow, gradual, progressive decline
- * Generally irreversible
- * Disorientation late in illness
- * Slight day-to-day variation
- * Less prominent physiological changes
- * Consciousness clouded only in late stage
- * Normal attention span
- * Disturbed sleep-wake cycle; day-night
- * Psychomotor changes late in illness

Delirium

- * Abrupt, precise onset, known date
- * Acute illness, lasting days or weeks
- * Usually reversible
- * Disorientation early in illness
- * Variable, hour by hour
- * Prominent physiological changes
- * Fluctuating levels of consciousness
- * Short attention span
- * Disturbed sleep-wake cycle; hour-to-hour variation
- * Marked early psychomotor changes

OR

Assessment

- **Dementia vs pseudodementia**
- **Acute vs Chronic**
- **Global vs Focal**
- **Irreversible vs Reversible dementia**
- **Deficits & Comorbid problems**

Examination

Physical examination

- **Examine for reversible risk factors for vascular dementia.**
- **Examine for Parkinsonian features**

Cognitive examination

- **MMSE (Folstein et al)**
- **Clock drawing test**

INVESTIGATIONS

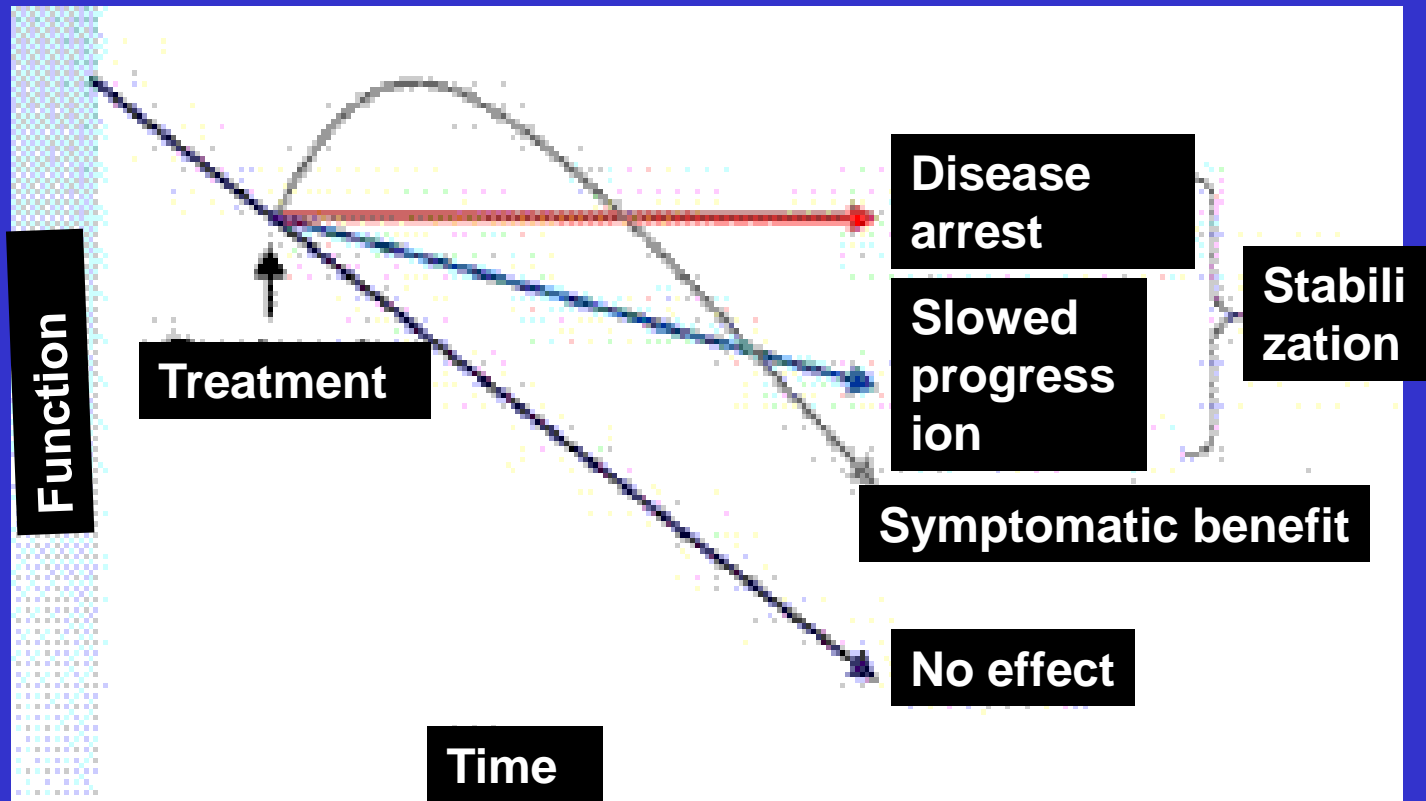
EEG

NEUROIMAGING

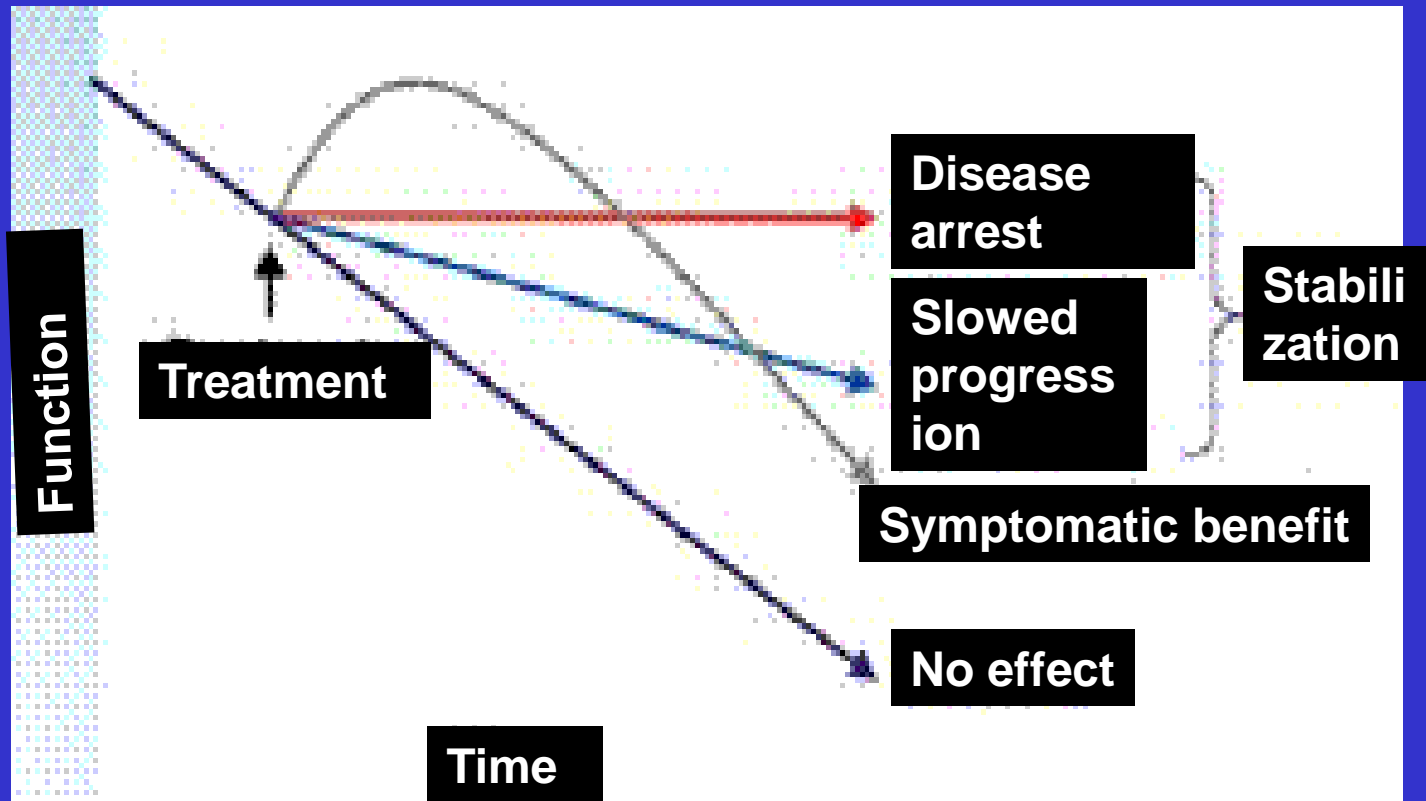
- **Atrophy of the temporal lobe occurs early in AD.**
- **MRI more sensitive than CT**
- **Serial examination helpful**

OTHERS

Dementia - Possible treatment outcomes



Dementia - Possible treatment outcomes



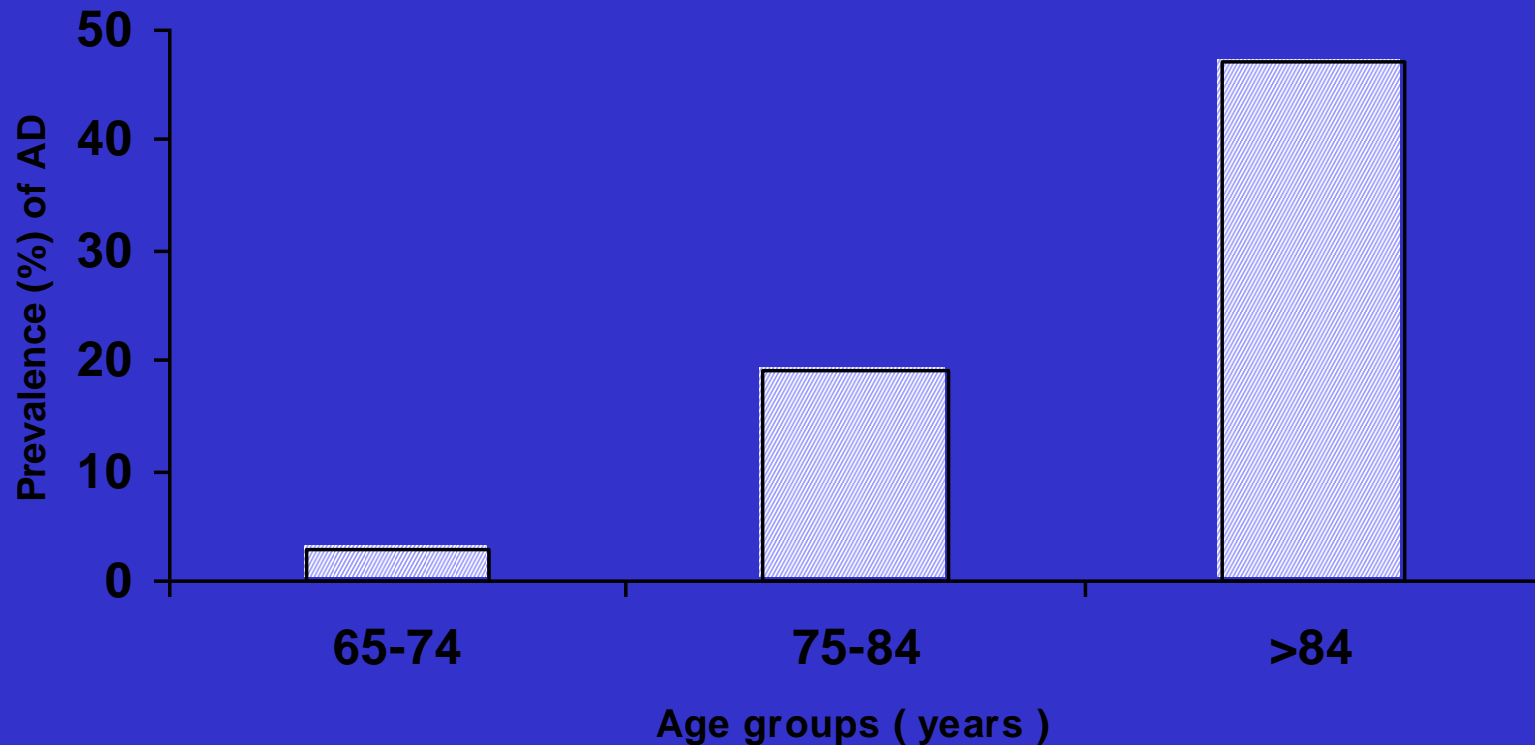
Alzheimer's disease

- **Affects at least 15 million persons throughout the world.^{1,2}**
- **As the disease advances, patients become progressively impaired in both cognitive and functional capacities,^{2,4} and the burden on caregivers increases**
- **Is a progressive illness, which means the disease, and its symptoms, worsen over time.**
- **After Diagnosis, some people may live 10 years or more.**
- **The course of the disease varies from person to person.**

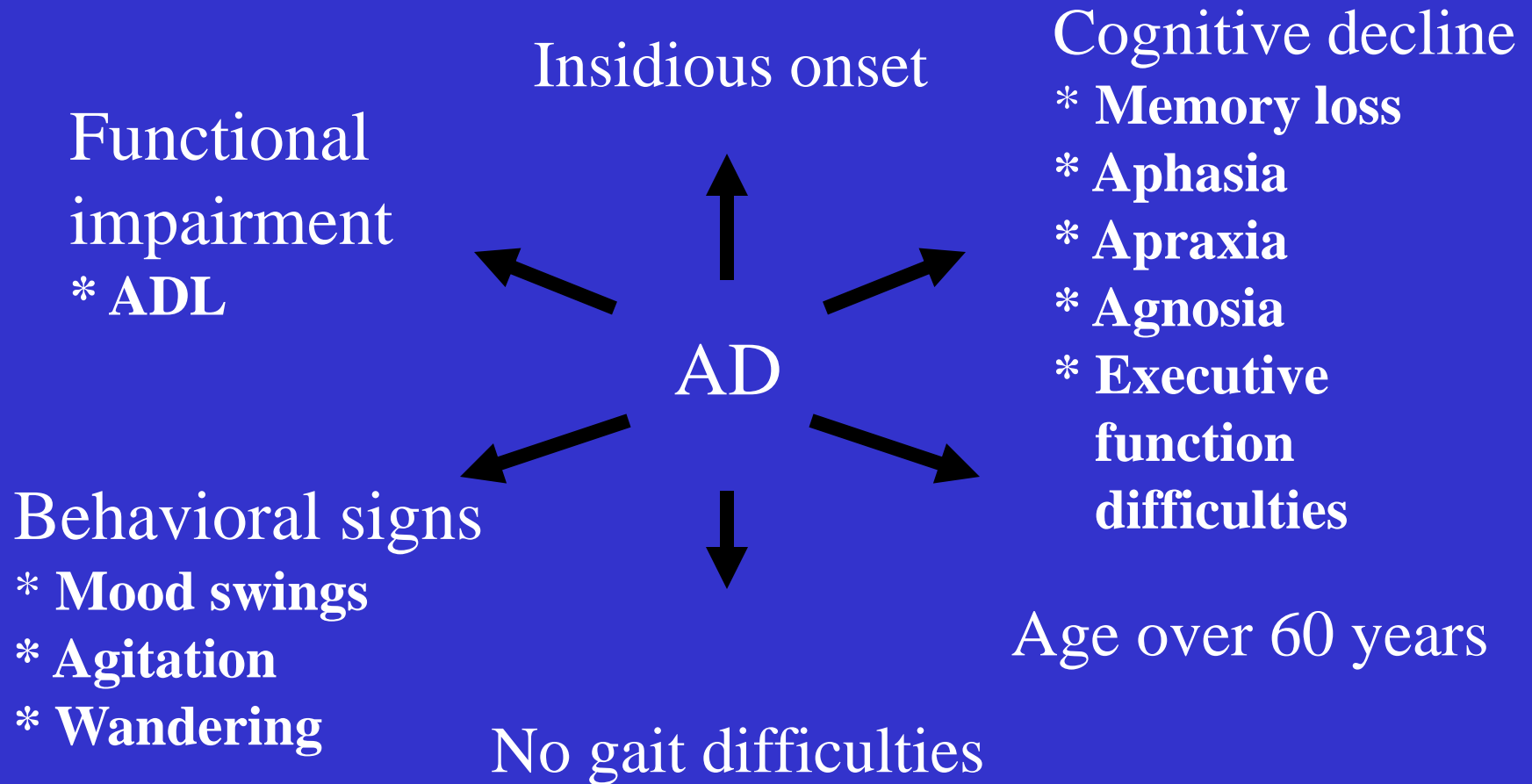
Alzheimer's disease

- **In people with Alzheimer's disease, changes in the brain may begin 10 to 20 years before any visible signs or symptoms appear.**
- **Some regions of the brain may begin to shrink, resulting in memory loss, the first visible sign of Alzheimer's disease.**
- **Over time, Alzheimer's disease progresses through three main stages: mild, moderate, and severe.**

Prevalence of Alzheimer's disease increases sharply with increasing age



Clinical features of AD



Factors that increase the risk for Alzheimer's disease include:

AGE

- **The risk of developing Alzheimer's disease increases with age.**
- **According to the Alzheimer's Association, 10% of all people over the age of 65 have Alzheimer's disease.**
- **~50% of people over 85 have it.**

Factors that increase the risk for Alzheimer's disease include:

- **GENDER** -- Alzheimer's disease affects women more frequently than men.
- **FAMILY HISTORY** -- A clear, inherited pattern of Alzheimer's disease exists for less than 10% of all cases.
- **DOWN SYNDROME** -- People with Down syndrome often develop Alzheimer's disease in their 30s and 40s, although the exact reason is not known.

Symptoms of Alzheimer's Disease

Brain disorder in which nerve cells in the brain die, making it **difficult for the brain's signals to be transmitted** properly.

Has problems with **memory, judgment, and thinking**, making it are hard for the person to take part in **day-to-day life**.

Most patients' symptoms progress slowly over a number of years.

Symptoms cont'd...

- **Impaired memory and thinking** -- The person has difficulty remembering things or learning new information. In the later stages of the disease, long-term memory loss occurs.
- **Disorientation and confusion** -- People with Alzheimer's disease may get lost. They may not recognize previously familiar places and situations. They also may not recognize familiar faces, or know what time of the day it is, or even what year it is.

Symptoms cont'd

- **Misplacing things** -- The person forgets where he or she put things used every day, such as glasses, a hearing aid, keys, etc. They may also put things in strange places, such as leaving their glasses in the refrigerator.
- **Abstract thinking** -- may find certain tasks more difficult than usual. For example, they might forget what the numbers mean and what needs to be done with them.
- **Trouble performing familiar tasks** --

Symptoms cont'd

- **Changes in personality and behavior** -- The person becomes unusually angry, irritable, restless, or quiet.
- **Poor or decreased judgment** -- Leave the house on a cold day without a coat or shoes, or could go to the shop wearing their pajamas.
- **Inability to follow directions** -- The person has difficulty understanding simple commands or directions. The person may get lost easily and **begin to wander**.

Symptoms cont'd

- **Problems with language and communication** –can't recall words, name objects, or the meaning of common words.
- **Impaired visual and spatial skills**- loses spatial abilities (the ability to judge shapes and sizes) and can't arrange items in a certain order.
- **Loss of motivation or initiative**-- The person may become very passive.
- **Loss of normal sleep patterns** -- sleep during the day and be wide-awake at night.

Stage I: Mild Alzheimer's disease

Signs and symptoms of mild AD can include:

- Memory loss and changes in expressive speech
- Confusion about the location of familiar places
- Taking longer to finish routine, daily tasks
- Difficulty with simple math problems and related issues like handling money, paying bills, or balancing a checkbook
- Poor judgment which leads to bad decisions
- Mood and personality changes
- Increased anxiety

Stage II: Moderate Alzheimer's disease

Signs and symptoms of moderate AD can include:

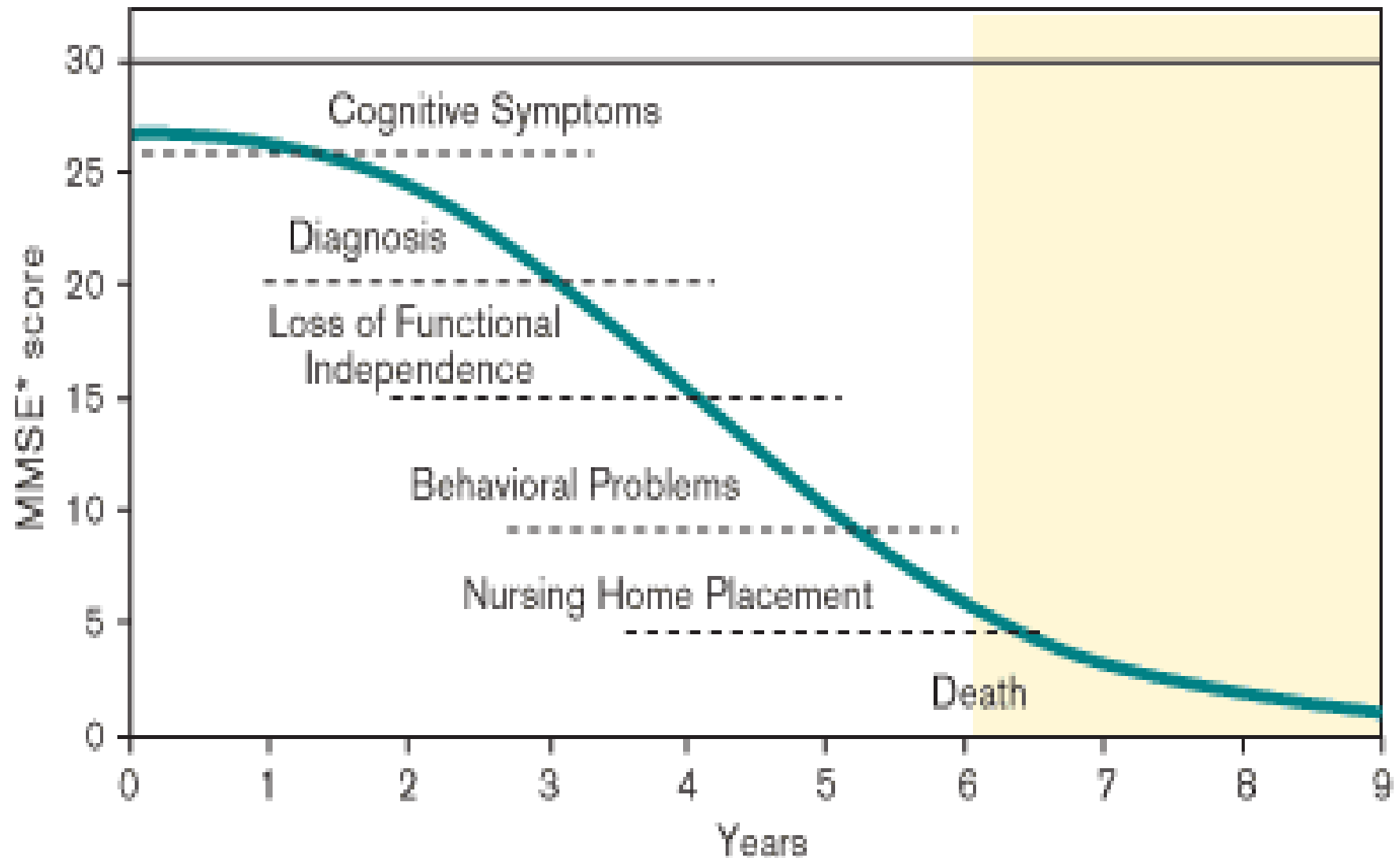
- Increased memory loss
- Shortened attention span
- Difficulty recognizing friends and family
- Problems with language, including speech, reading, comprehension, and writing
- Difficulty organizing thoughts
- Inability to learn new things or cope with unexpected situations
- Restlessness, agitation, anxiety, tearfulness, and wandering, especially in the late afternoon or evening (sometimes called sundowning)
- Repetitive statements or movements
- Hallucinations, delusions, suspiciousness, or paranoia
- Loss of impulse control (for example, sloppy table manners, undressing at inappropriate times or inappropriate places, vulgar language)

Stage III: Severe Alzheimer's disease

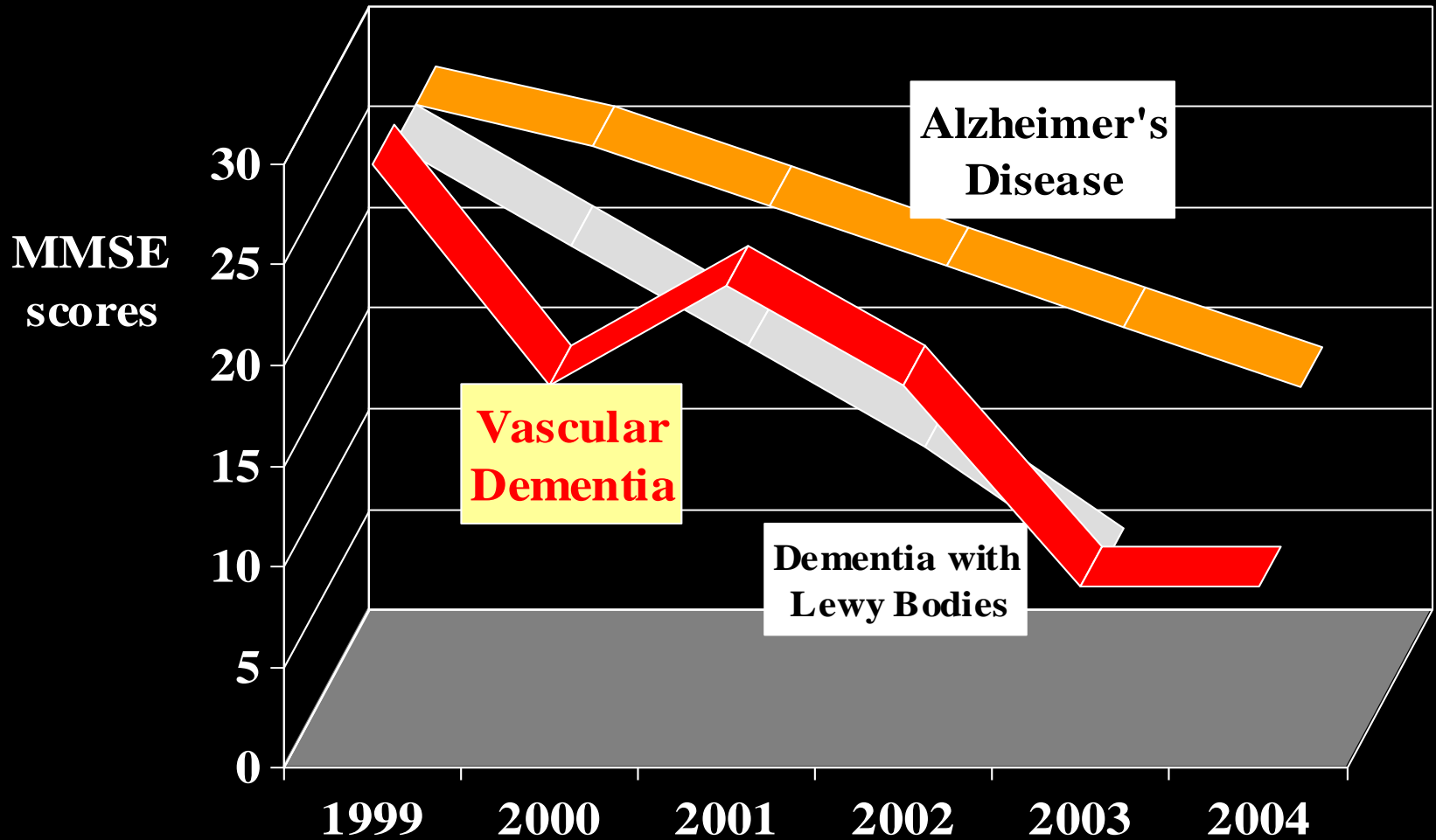
Signs of severe Alzheimer's disease may include:

- Complete loss of language and memory
- Weight loss
- Seizures, skin infections, and difficulty swallowing
- Groaning, moaning, or grunting
- Increased sleeping
- Lack of bladder and bowel control
- Loss of physical coordination

Pattern of symptoms over time in AD



Progression of dementia



AD: Impact on Patient

Cognitive impairments	Activities of daily living; unable to:	Behavioural and psychotic symptoms
Memory loss	Maintain their own finances	Depression
Attention deficits	Drive	Confusion
Disorientation in time and place	Keep appointments	Anxiety
Language difficulties	Go out alone	Apathy
Executive dysfunction	Answer the telephone	Restlessness
Impaired perception	Keep themselves clean	Inappropriate behaviour
Praxis	Dress themselves	Fear or panic
	Feed themselves	Delusions
	Use the toilet	Hallucinations

IMPACT OF ALZHEIMER'S DISEASE ON THE CAREGIVER

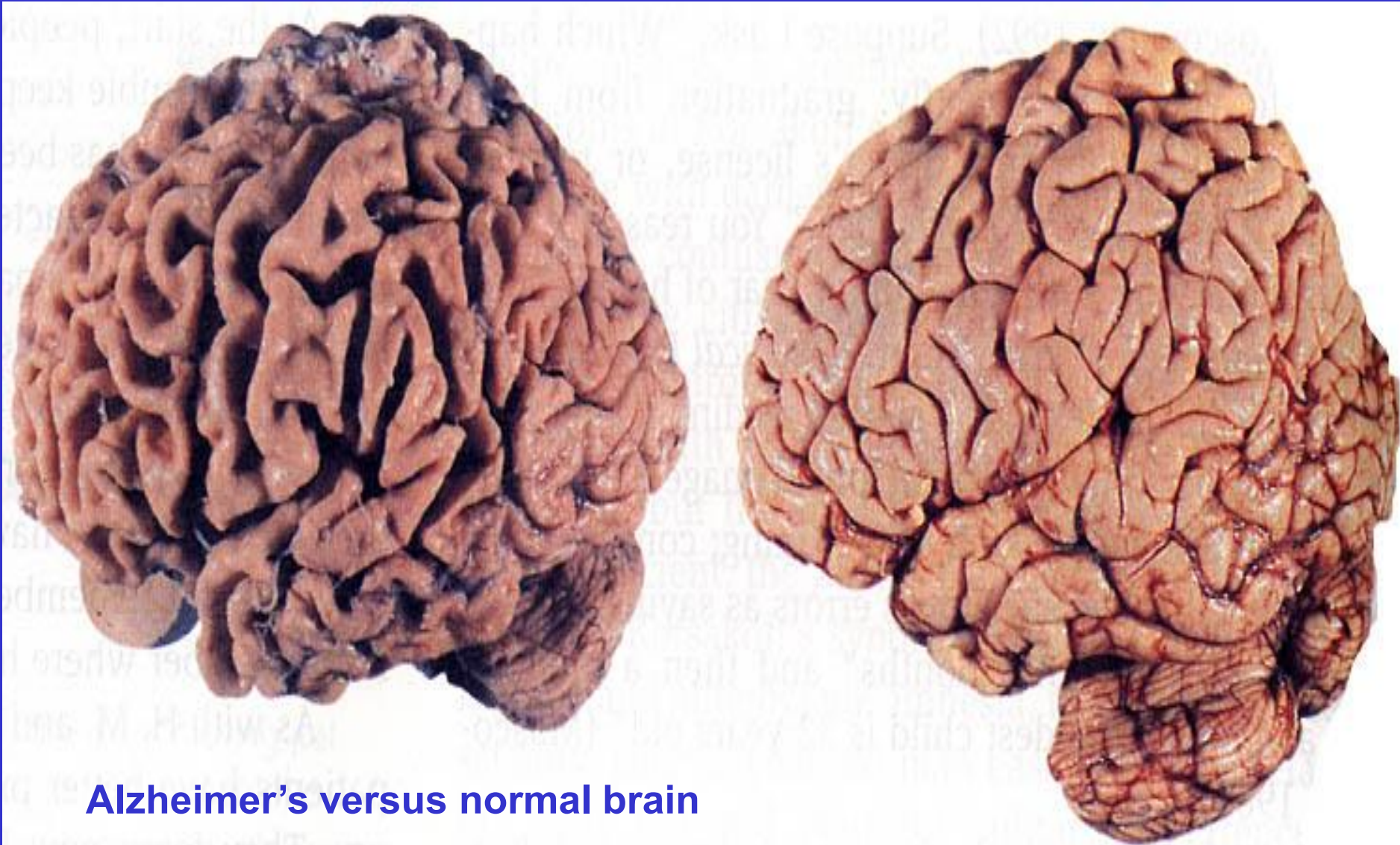
Personal burdens

- Grief
 - less time or themselves
- Anger
 - Increased morbidity
- Resentment
 - Reduced quality of life
- Loneliness and isolation

Economic burdens

- Leaving fulltime employment
- Drug costs associated with increased morbidity
- Adapting homes to cope with Impaired patients

Alzheimer's versus normal brain



Alzheimer's versus normal brain

CEREBRAL ATROPHY



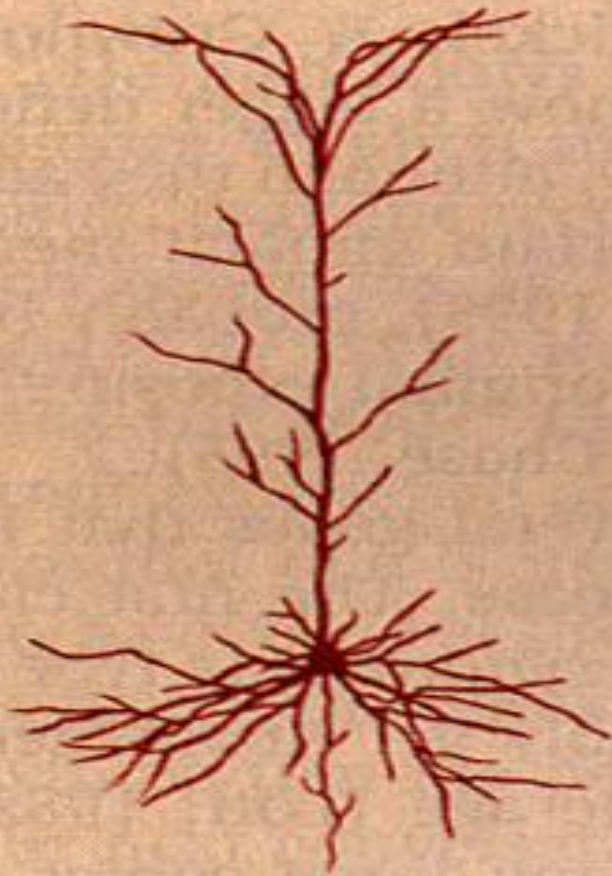
Normal



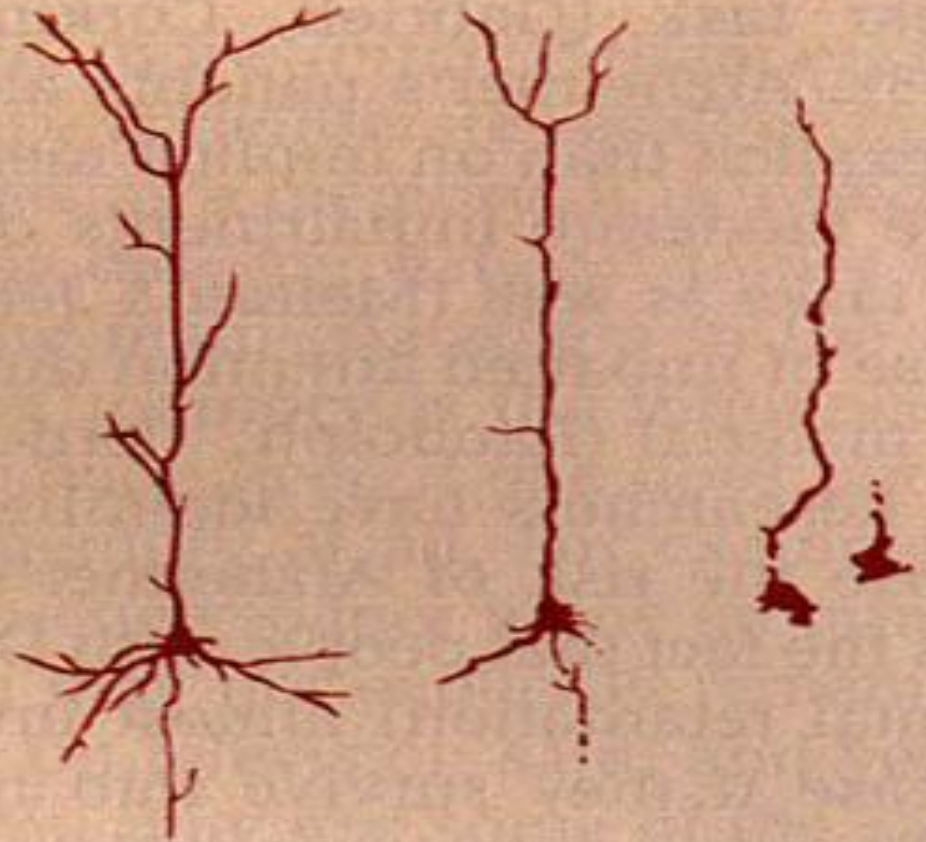
Alzheimer's

From Terry et al. *Alzheimer's Disease*. 1994:179-196.¹¹

NORMAL VERSUS DEGENERATING NEURON



(a)



(b)

Diagnosing AD - neuroimaging, computed (axial) tomography (CT)



Various CT scan reports in AD

- * Normal for the patient's age
- * Generalized cerebral atrophy
- * Small vessel changes, areas of leucoencephalopathy
- * No signs of subdural hematoma
- * Absence of specific areas of cerebral infarctions or evidence of stroke

Neuroimaging

Anatomical findings Alzheimer's

- 1. plaques: clusters of abnormal cells**
- 2. tangles of neurofilaments inside neurons**
- 3. deterioration of dendrites**
- 4. loss of neurons**
- 5. hippocampus is 47% reduced in size (in normals it shrinks 27%).**

Steps to Getting a Diagnosis

- Unfortunately, there is no one diagnostic test that can detect Alzheimer's Disease.
- 80-90% certainty of “probable” Alzheimer's Disease

Theories Regarding Causes of Alzheimer's

- **Changes in Neurotransmitters**
 - **Acetylcholine is decreased--necessary for cognitive functioning.**
- **Changes in Protein Synthesis**
 - **Beta amyloid--may be responsible for forming plaques.**
 - **Tau--major component of neurofibrillary tangles.**

Theories Regarding Causes of Alzheimer's

- Genetic Theories

- Chromosome 21 --Responsible for early-onset Alzheimer's Disease.

- Metabolic Theories

- Glucose metabolism declines dramatically in Alzheimer's patients.

- Calcium Theories/ Excitotoxicity

- Too much calcium can kill cells. Suspect that it may reason why neurons die in Alzheimer's patients.

Theories Regarding Causes of Alzheimer's

- **Environmental**

- **Aluminum--Traces of metal found in brain.**
- **Zinc--found in brains on autopsies.**
- **Food borne poisons--amino acids found in legumes in Africa and India may cause neurological damage.**

- **Viral**

- **May be hidden in body and attack brain cells years later. (NIH-1995)**

Theories Regarding Causes of Alzheimer's

- **Head Trauma**
 - Head trauma increase the concentration of B-amyloid protein
- **Low Level of Education**
 - Individuals with low level of education less able to compensate for cognitive deficits

Causes of AD

Hallmarks of AD
Type title here

Loss of
Cholinergic neurons

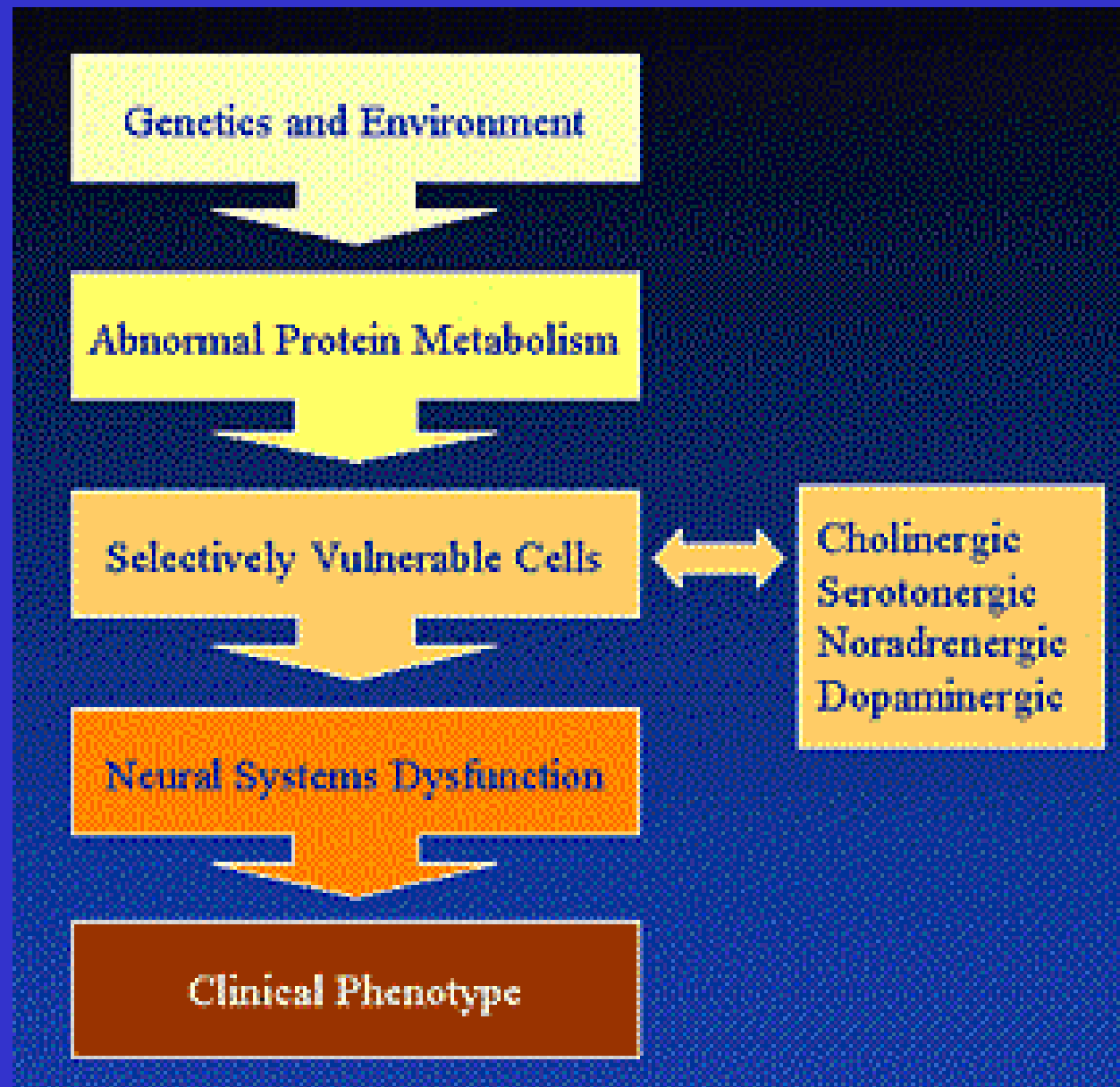
**30% of
symptoms**

Senile Plaques &
Neurofibrillary tangles

70% of symptoms

Dysfunction of glutamate
Neurotransmission

AD - Pathogenesis



THE TREATMENT AND MANAGEMENT

- There is no cure.
- Goal : Optimize function, enhance QOL
- PHARMACOLOGICAL
AND NON- PHARMACOLOGICAL
- Treatment of AD
- Treatment of Co-Morbidity(Psychiatric etc)
- Burden of Carers

Non Pharmacological Management

- Educate the Care-givers
- Psycho-education for Families on Prognosis
- ‘USE IT OR LOSE IT’ - need for intense cognitive stimulation
Reality orientation, Cognitive enhancement.
- “Patient is not acting this way intentionally.”
- Care givers should not take behaviours personally.
- Emotional support to care givers.

A B C OF BEHAVIOR MANAGEMENT

- **Antecedent:** What happened before or right after the behavior occurred? What triggered ?
- **Behaviour:** does the behaviour need correction?
Is there something that the patient needs?
- **Consequences:** Did some consequences predictably follow the behaviour? Is the care - giver responding with calm and support?



THANK YOU FOR YOUR ATTENTION