Rethinking Challenges in Aging: A Multidisciplinary Approach

Presented by Cecilia Fierro, Alvaro Gurovich, Patricia Lara, Anita Parada, and Carolina Valencia

UTEP

Objectives

- To identify the major cardiovascular changes that happen with age.
- To identify the effects of aging on the pain experience.
- To Identify the impact of the aging process on quality-of-life issues.
- To identify the typical and atypical neurocognitive changes that happen with age.
- To identify the cognitive and language changes that occur as a normal process of aging.
- To educate the next generation through Undergraduate Research in Geriatrics (URGE).

Major Cardiovascular Changes that Happen with Age

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Associate Professor of Physical Therapy
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The University of Texas at El Paso

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

NVSS National Vital Statistics System

https://www.cdc.gov/nchs/nvss/leading-causes-of-death.htm#publications

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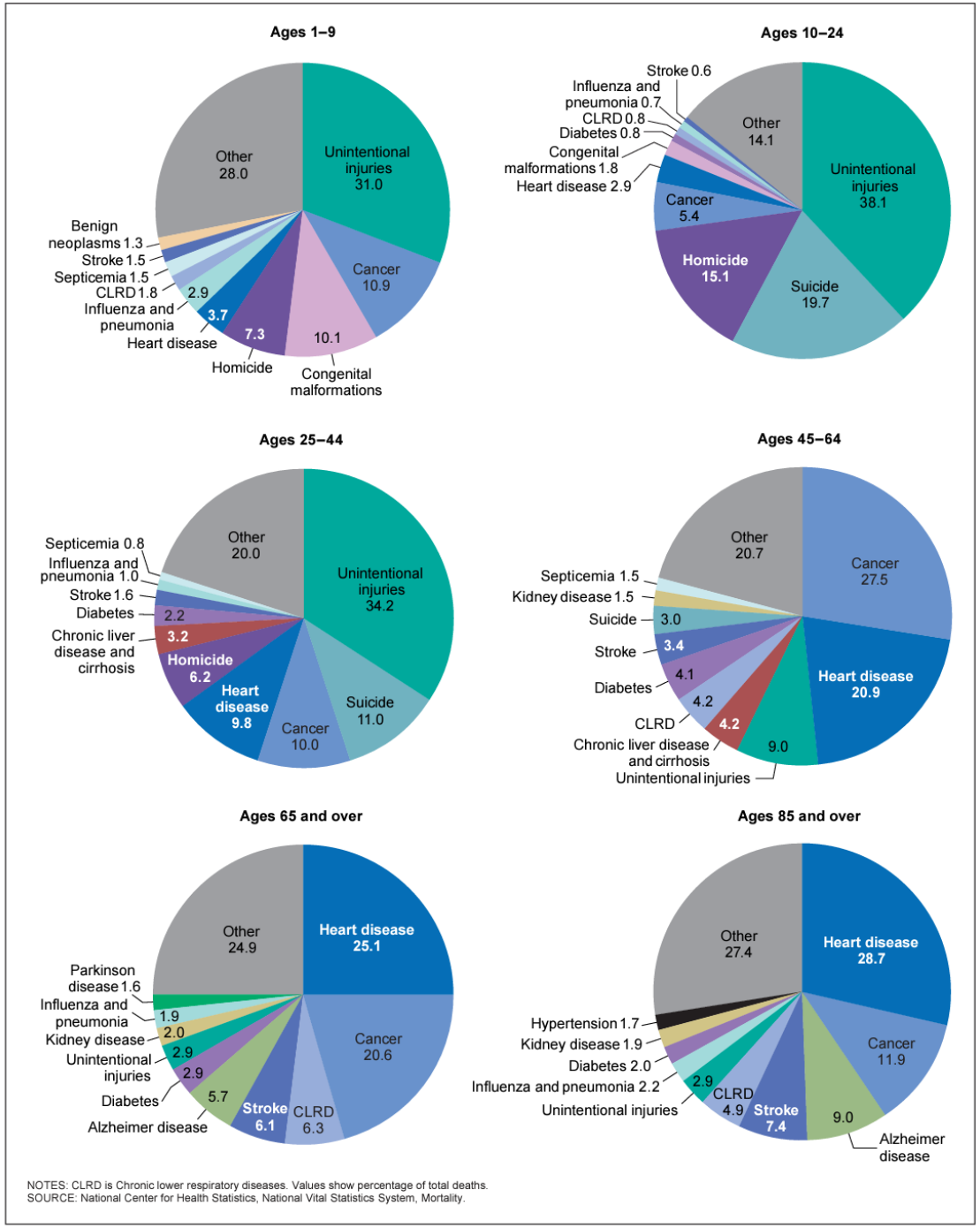
Figure 2. Percent distribution of the 10 leading causes of death, by age group: United States, 2019



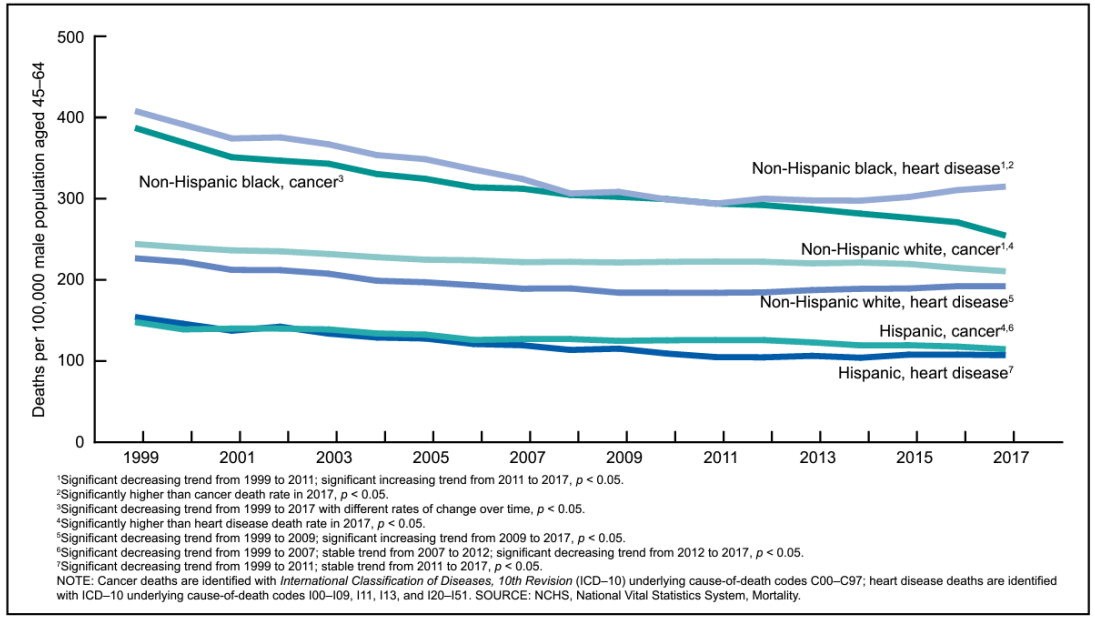
NOTES: CLRD is Chronic lower respiratory diseases. Values show percentage of total deaths.
SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Non-Modifiable Risk Factor's

1. Older age
   - male > 45; female > 55
2. Gender: male
3. Family History of CAD:
   - father or brother with CAD < 55 years
   - mother or sister with CAD <65 years
4. Race
   - African Americans > Whites > Hispanics
   - Asian Americans or Pacific Islanders and American Indians or Alaska Natives, heart disease is second only to cancer.

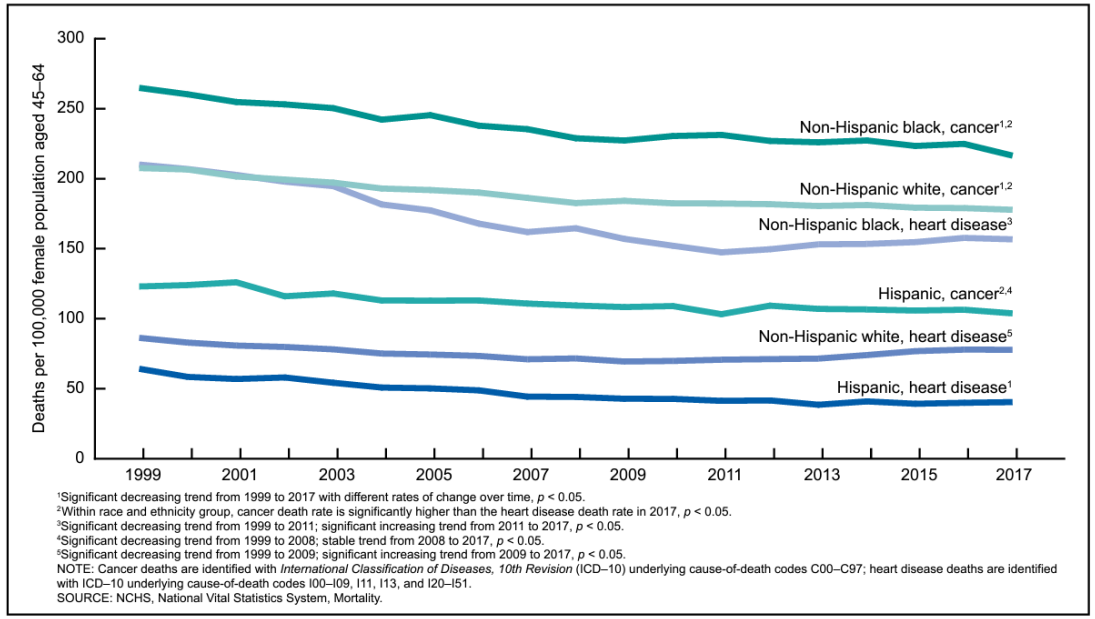
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

NVSS National Vital Statistics System



[1]Significant decreasing trend from 1999 to 2011; significant increasing trend from 2011 to 2017, $p < 0.05$.
[2]Significantly higher than cancer death rate in 2017, $p < 0.05$.
[3]Significant decreasing trend from 1999 to 2017 with different rates of change over time, $p < 0.05$.
[4]Significantly higher than heart disease death rate in 2017, $p < 0.05$.
[5]Significant decreasing trend from 1999 to 2009; significant increasing trend from 2009 to 2017, $p < 0.05$.
[6]Significant decreasing trend from 1999 to 2007; stable trend from 2007 to 2012; significant decreasing trend from 2012 to 2017, $p < 0.05$.
[7]Significant decreasing trend from 1999 to 2011; stable trend from 2011 to 2017, $p < 0.05$.
NOTE: Cancer deaths are identified with *International Classification of Diseases, 10th Revision* (ICD–10) underlying cause-of-death codes C00–C97; heart disease deaths are identified with ICD–10 underlying cause-of-death codes I00–I09, I11, I13, and I20–I51. SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 3. Death rates for cancer and heart disease among men aged 45–64, by race and ethnicity: United States, 1999–2017



[1]Significant decreasing trend from 1999 to 2017 with different rates of change over time, $p < 0.05$.
[2]Within race and ethnicity group, cancer death rate is significantly higher than the heart disease death rate in 2017, $p < 0.05$.
[3]Significant decreasing trend from 1999 to 2011; significant increasing trend from 2011 to 2017, $p < 0.05$.
[4]Significant decreasing trend from 1999 to 2008; stable trend from 2008 to 2017, $p < 0.05$.
[5]Significant decreasing trend from 1999 to 2009; significant increasing trend from 2009 to 2017, $p < 0.05$.
NOTE: Cancer deaths are identified with *International Classification of Diseases, 10th Revision* (ICD–10) underlying cause-of-death codes C00–C97; heart disease deaths are identified with ICD–10 underlying cause-of-death codes I00–I09, I11, I13, and I20–I51.
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 4. Death rates for cancer and heart disease among women aged 45–64, by race and ethnicity: United States, 1999–2017

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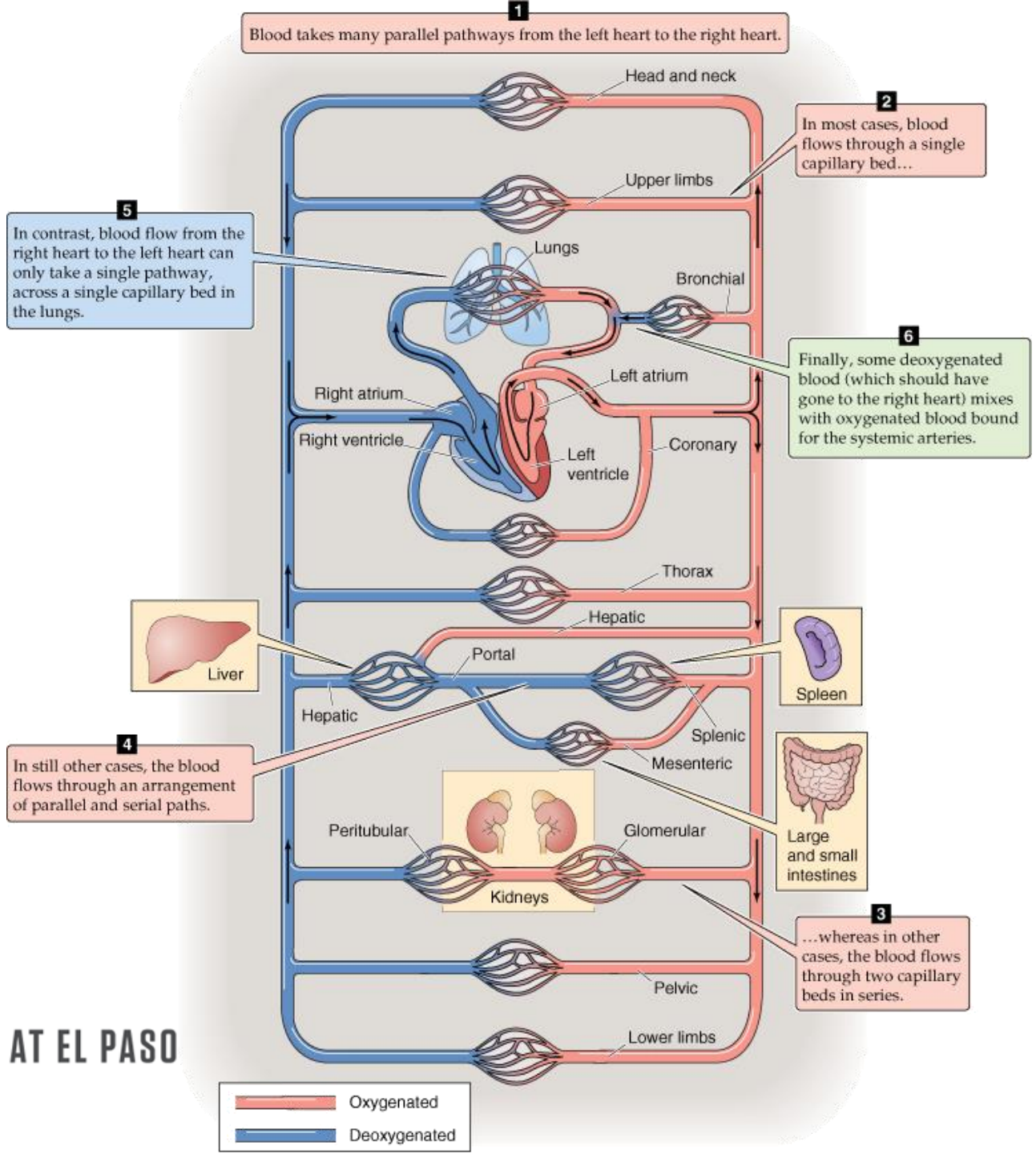
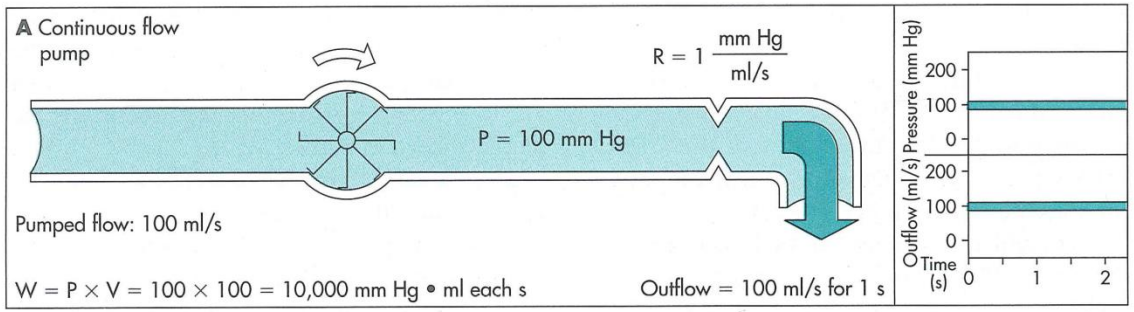
Primary Modifiable Risk Factors for CAD

1. Dyslipidemia
2. Hypertension
3. Diabetes
4. Smoking
5. Physical Inactivity
6. Obesity
7. “Metabolic syndrome”

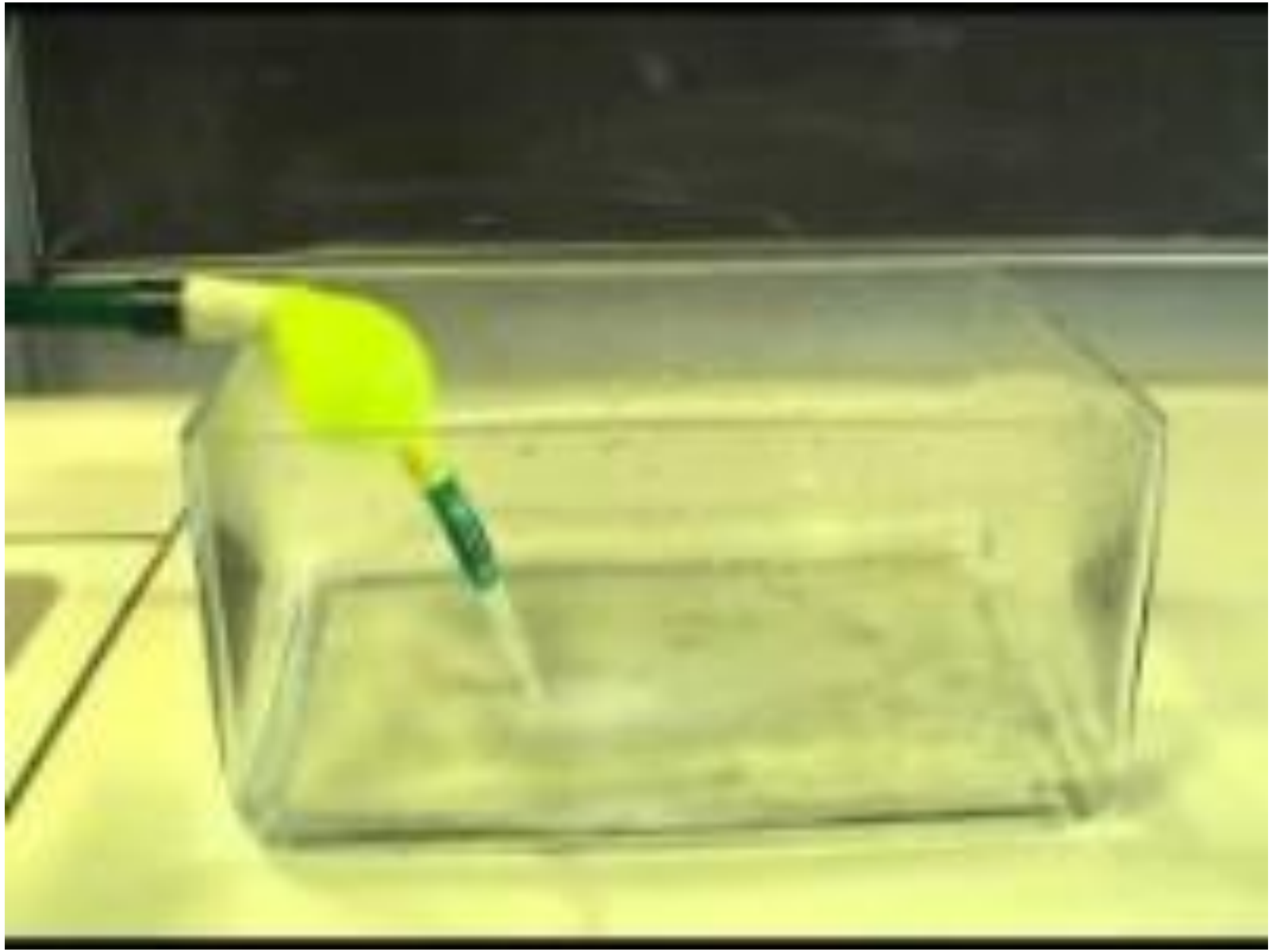
“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”


1
Blood takes many parallel pathways from the left heart to the right heart.
Head and neck
2
In most cases, blood flows through a single capillary bed…
Upper limbs
5
In contrast, blood flow from the right heart to the left heart can only take a single pathway, across a single capillary bed in the lungs.
Lungs
Bronchial
6
Finally, some deoxygenated blood (which should have gone to the right heart) mixes with oxygenated blood bound for the systemic arteries.
Left atrium
Right atrium
Right ventricle
Left ventricle
Coronary
Thorax
Hepatic
Liver
Portal
Spleen
Hepatic
Splenic
4
In still other cases, the blood flows through an arrangement of parallel and serial paths.
Mesenteric
Large and small intestines
Peritubular
Glomerular
Kidneys
3
…whereas in other cases, the blood flows through two capillary beds in series.
Pelvic
Lower limbs
Oxygenated
Deoxygenated

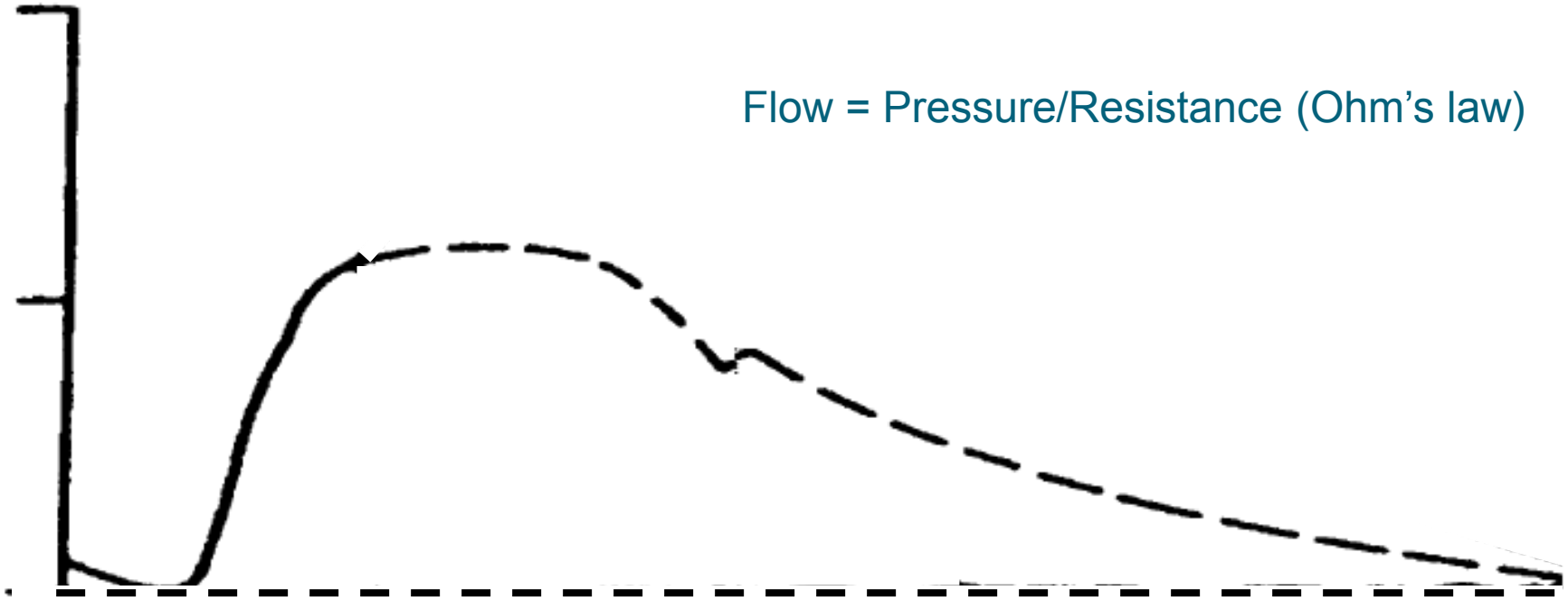
Hydraulic model



A, The pump flow is steady, and pressure will remain constant regardless of the distensibility of the conduit.

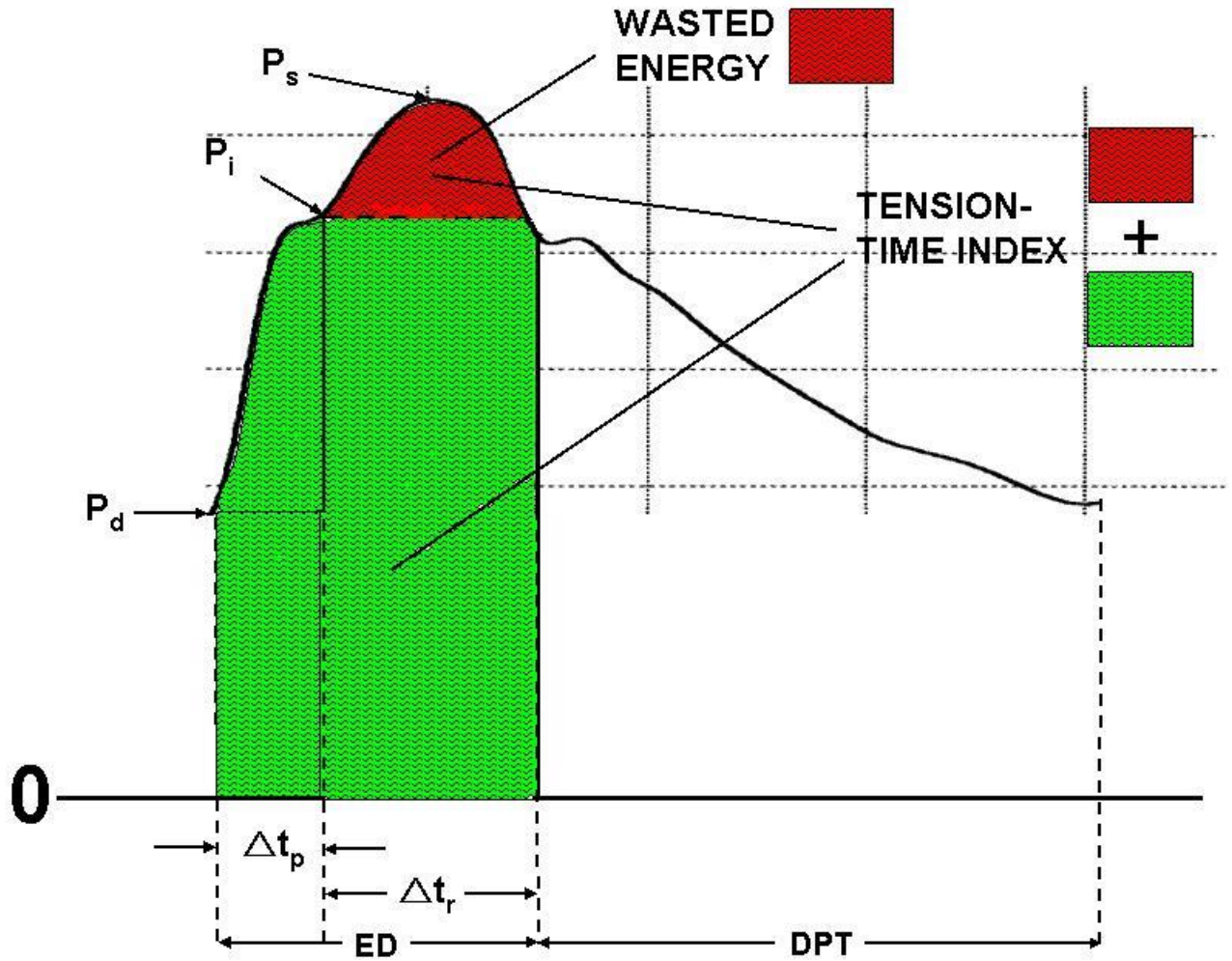


Pressure Waveform Analysis



Flow = Pressure/Resistance (Ohm's law)

Wasted LV Energy: Nichols W.W. et al. 2006



$TTI = MVO_2$

$LVE_W \approx 5\%\ TTI$

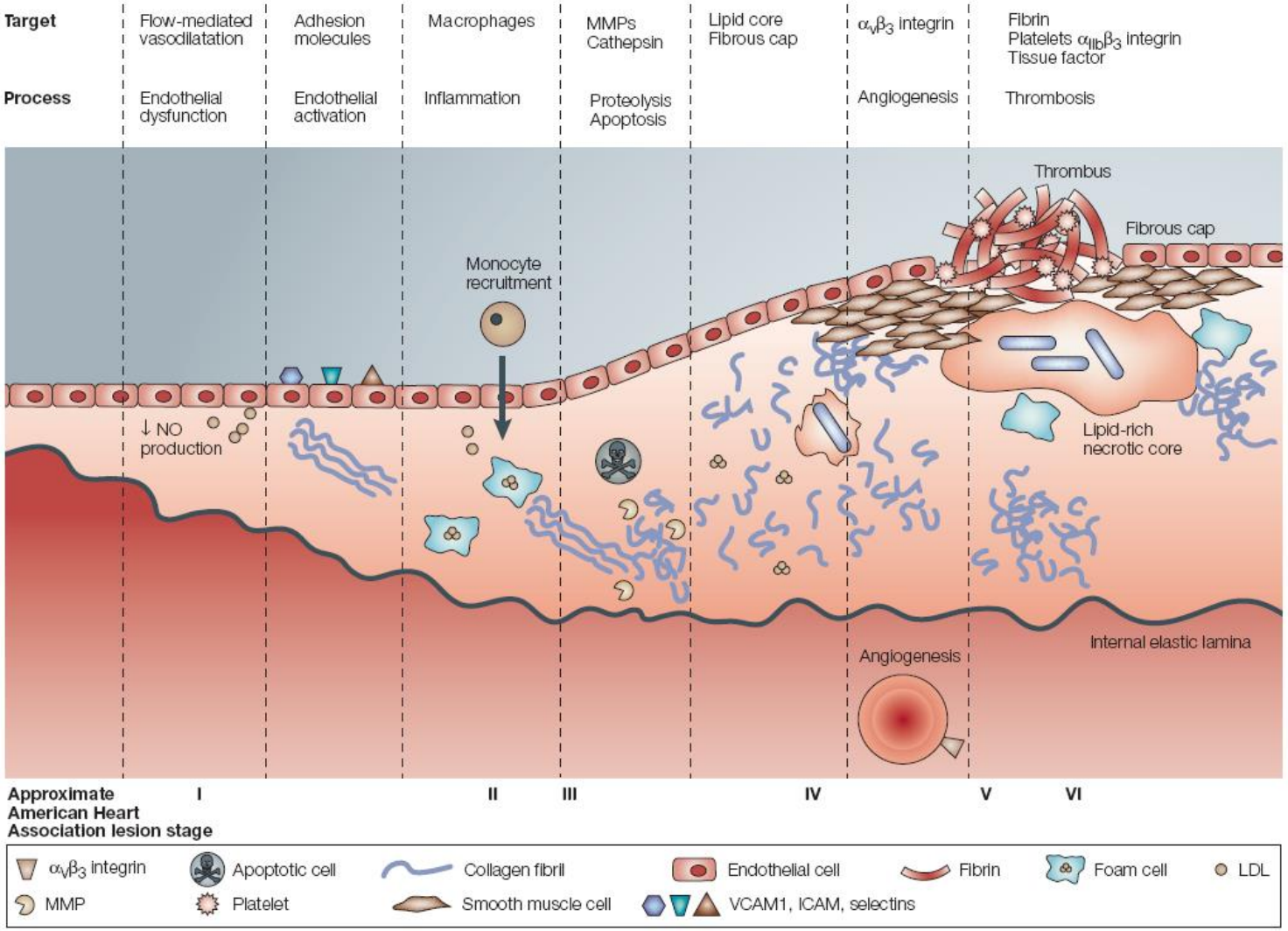
5% TTI → ~20% mechanical efficiency in CAD patients

Up to ~60% oxygen supply/demand imbalance in CAD patients

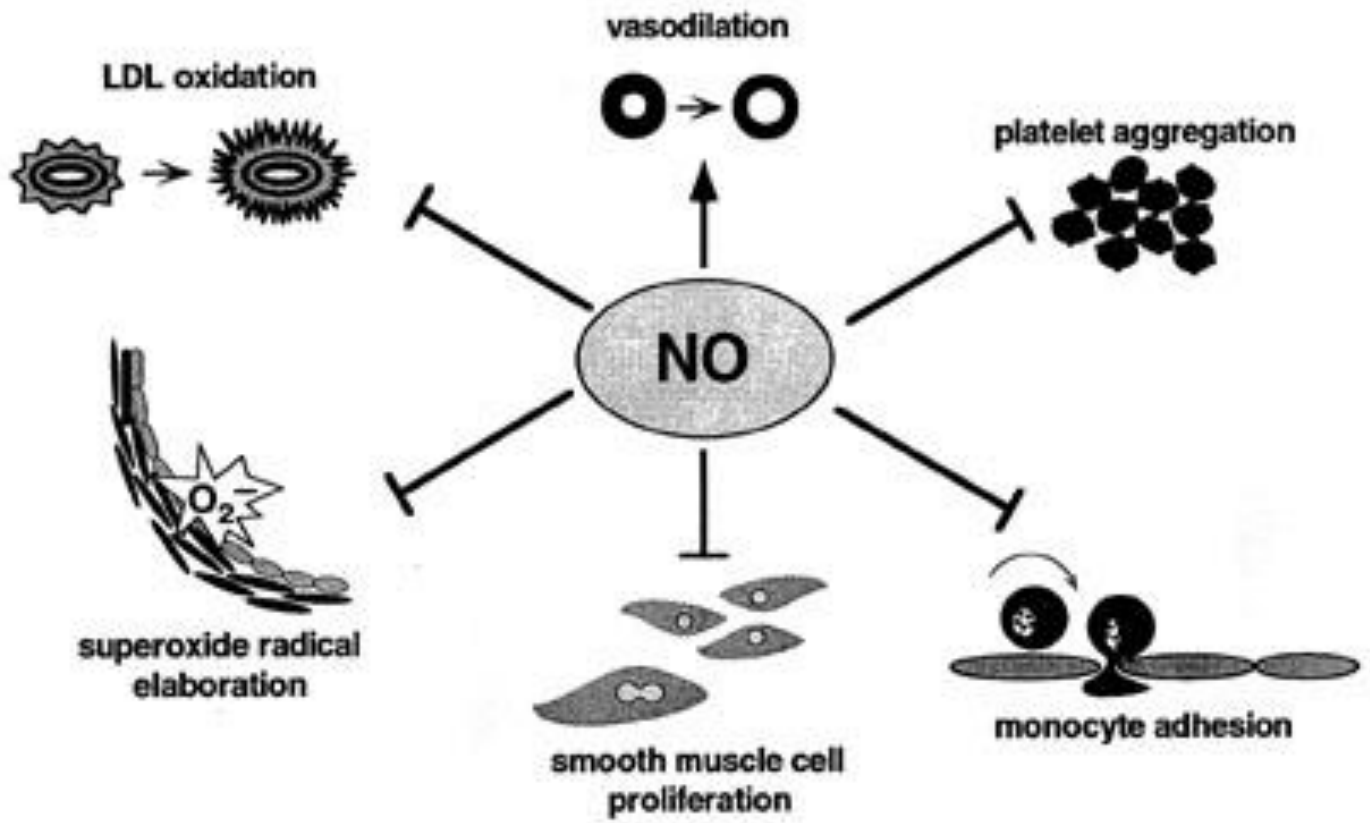
Gurovich et al (2014), Artery Research

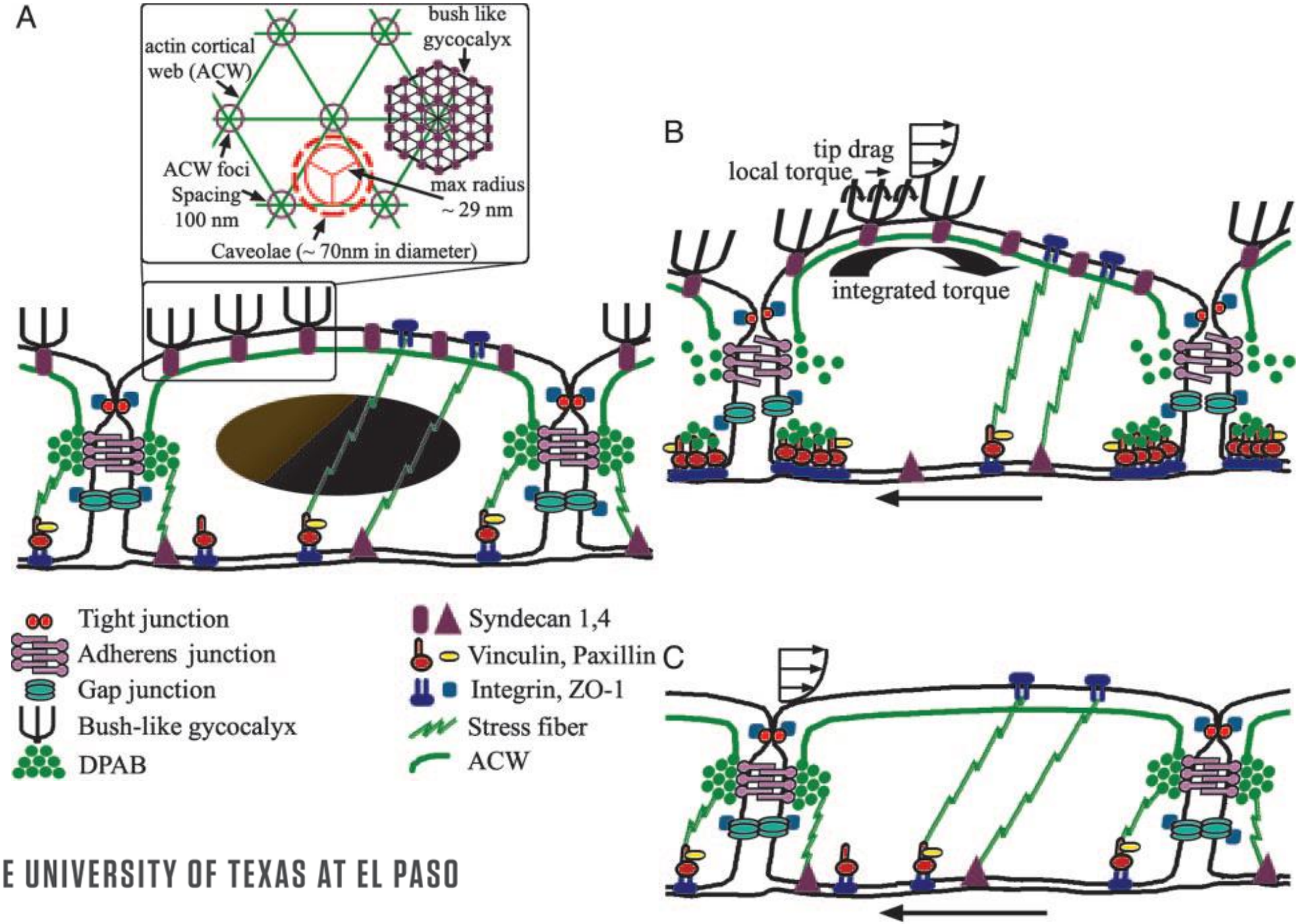
The InVision Guide to A Healthy Heart, © Copyright 2005, Anatomical Travelogue, Inc.

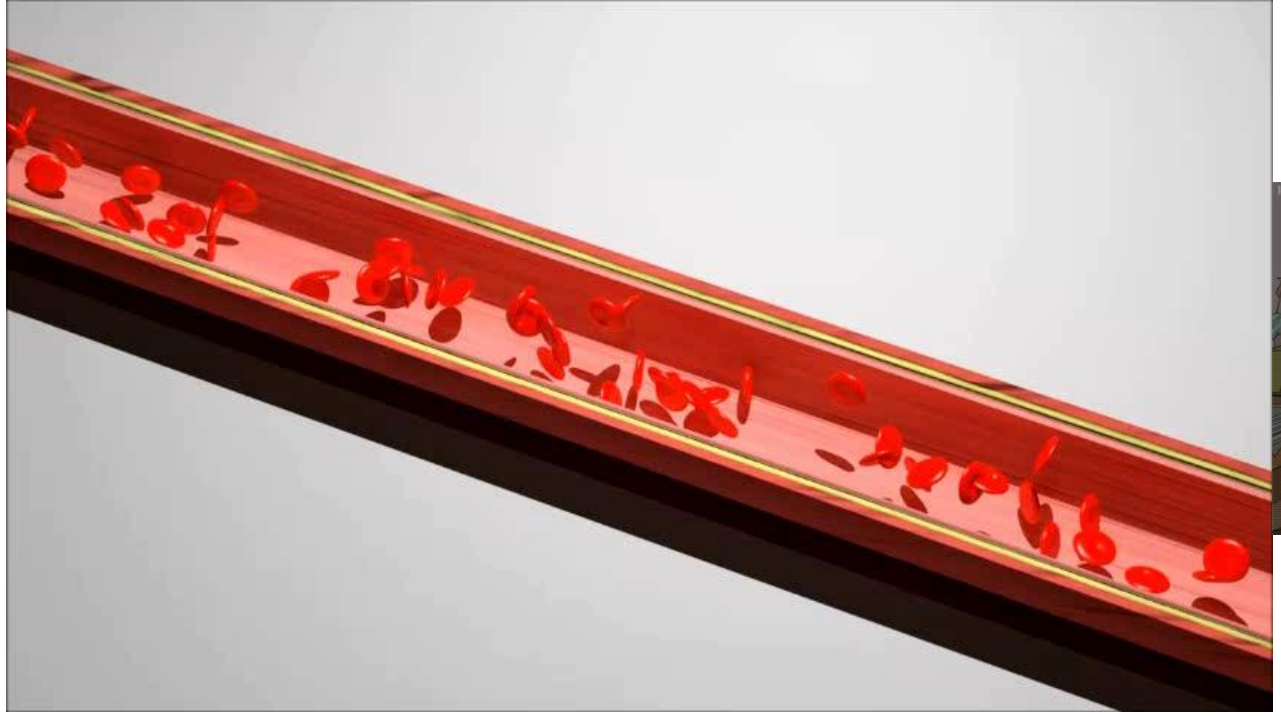
Atherosclerosis Pathophysiology

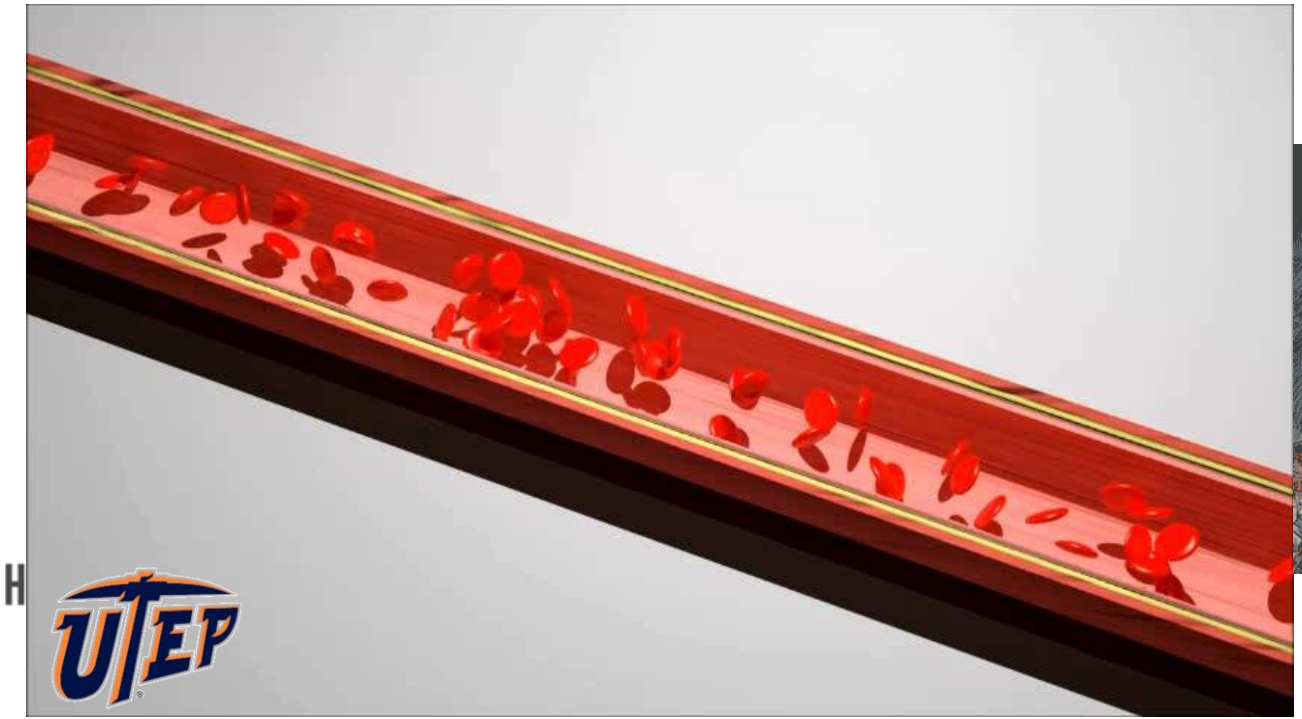


Nitric Oxide and Vascular Homeostasis




A
actin cortical web (ACW)
bush like gycocalyx
ACW foci Spacing 100 nm
max radius ~ 29 nm
Caveolae (~ 70nm in diameter)
B
tip drag
local torque
integrated torque
C
Tight junction
Adherens junction
Gap junction
Bush-like gycocalyx
DPAB
Syndecan 1,4
Vinculin, Paxillin
Integrin, ZO-1
Stress fiber
ACW





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RESEARCH REPORT

Imaging Ultrasound Assessment of Exercise-Induced Endothelial Shear Stress of the Brachial and Carotid Arteries

Alvaro N. Gurovich, PT, PhD, FACSM;[1,2] Lisa Rodriguez,[1] Manuel Gomez, BS;[1] Paulina Caraveo, BS;[1] Luis Ochoa, MS;[3] Francisco Morales-Acuna, MD, PhD[1]

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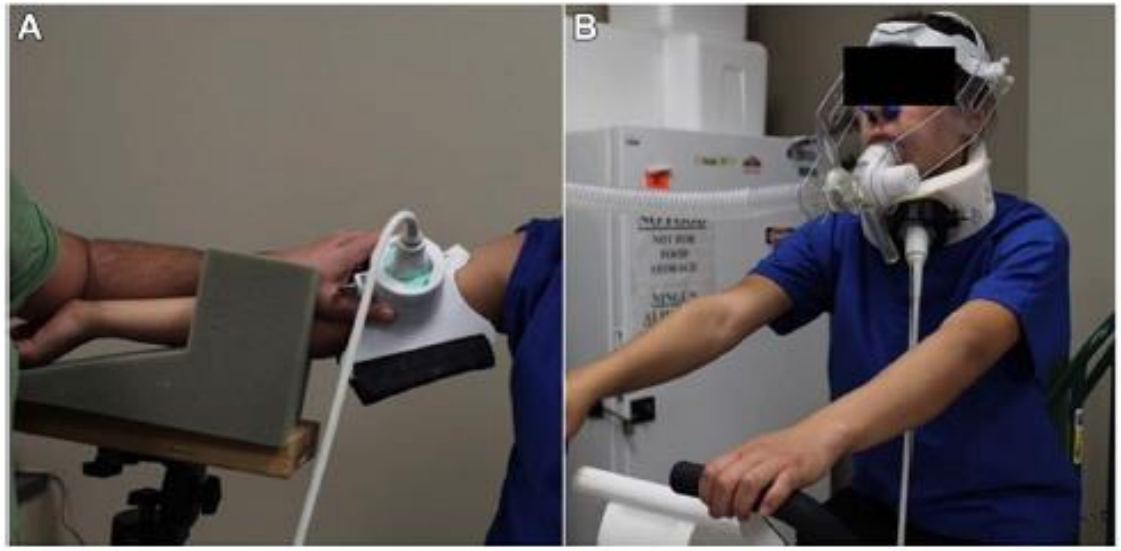

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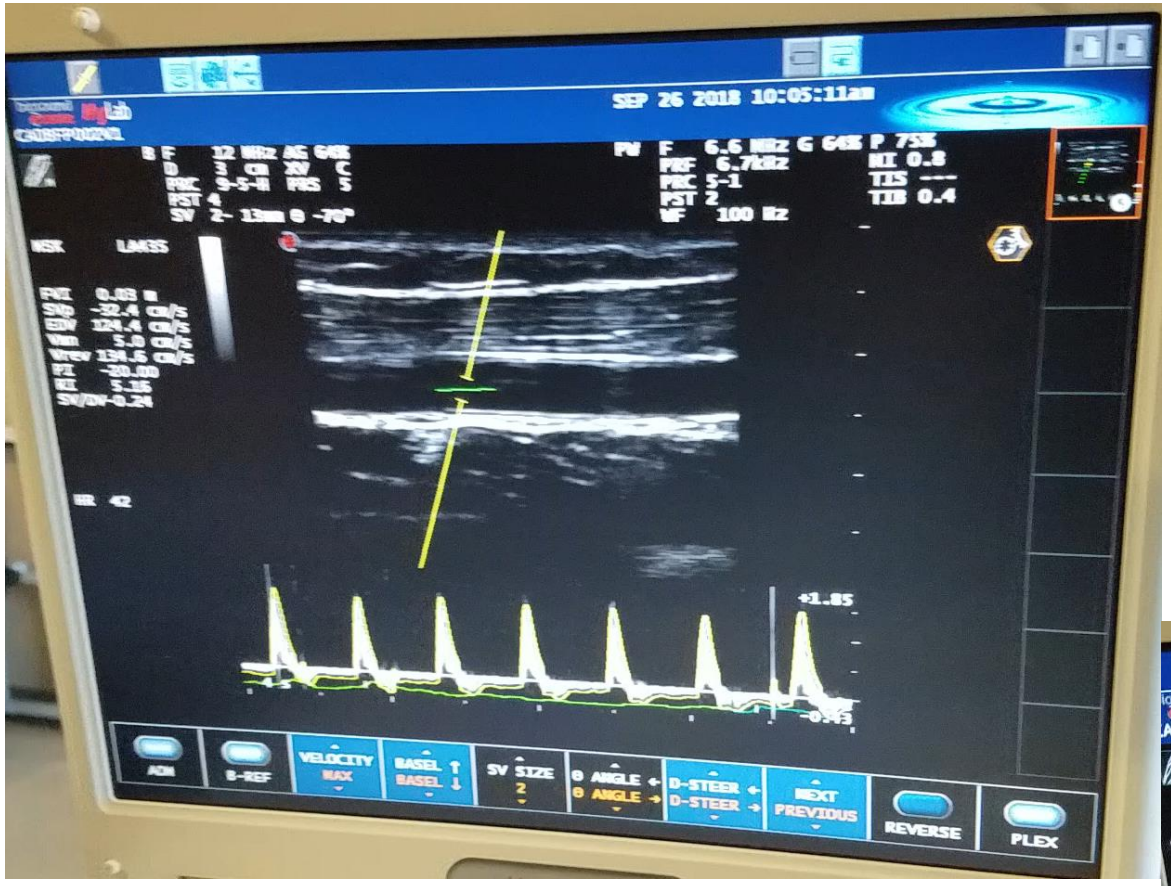

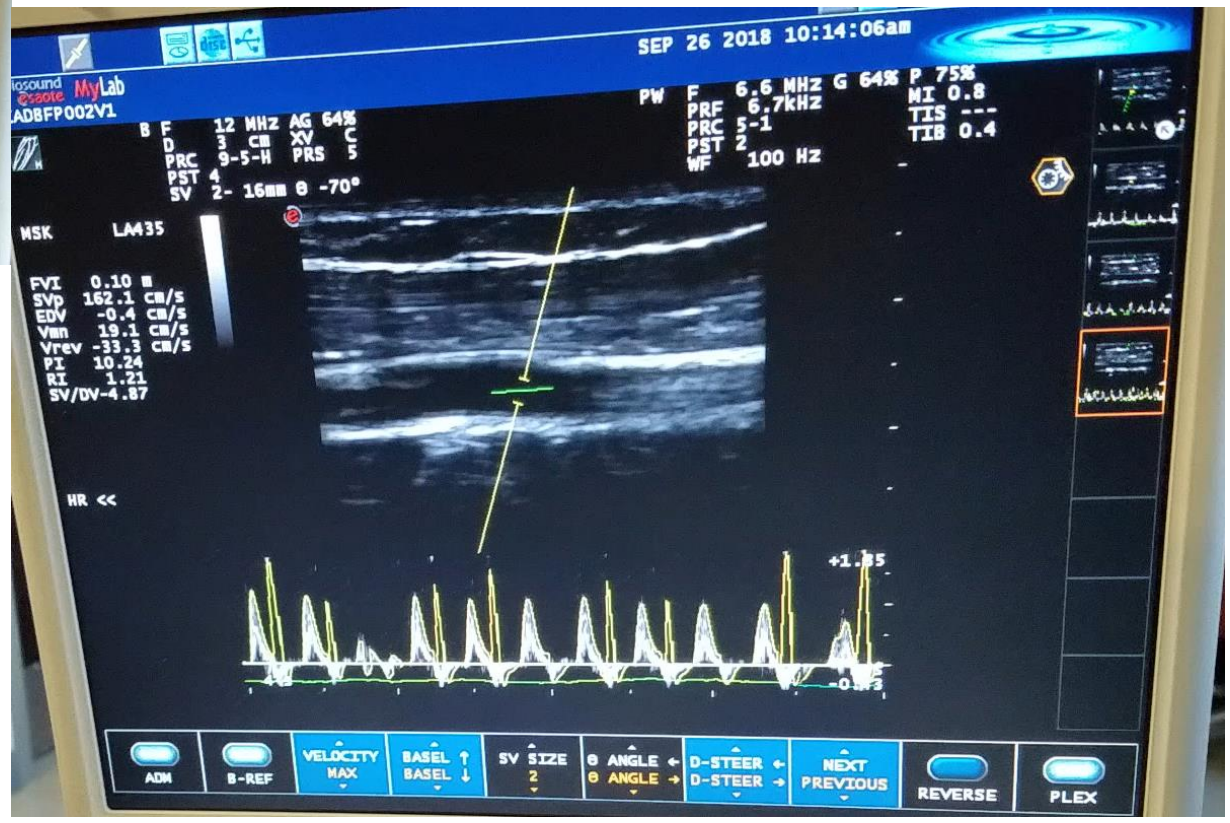

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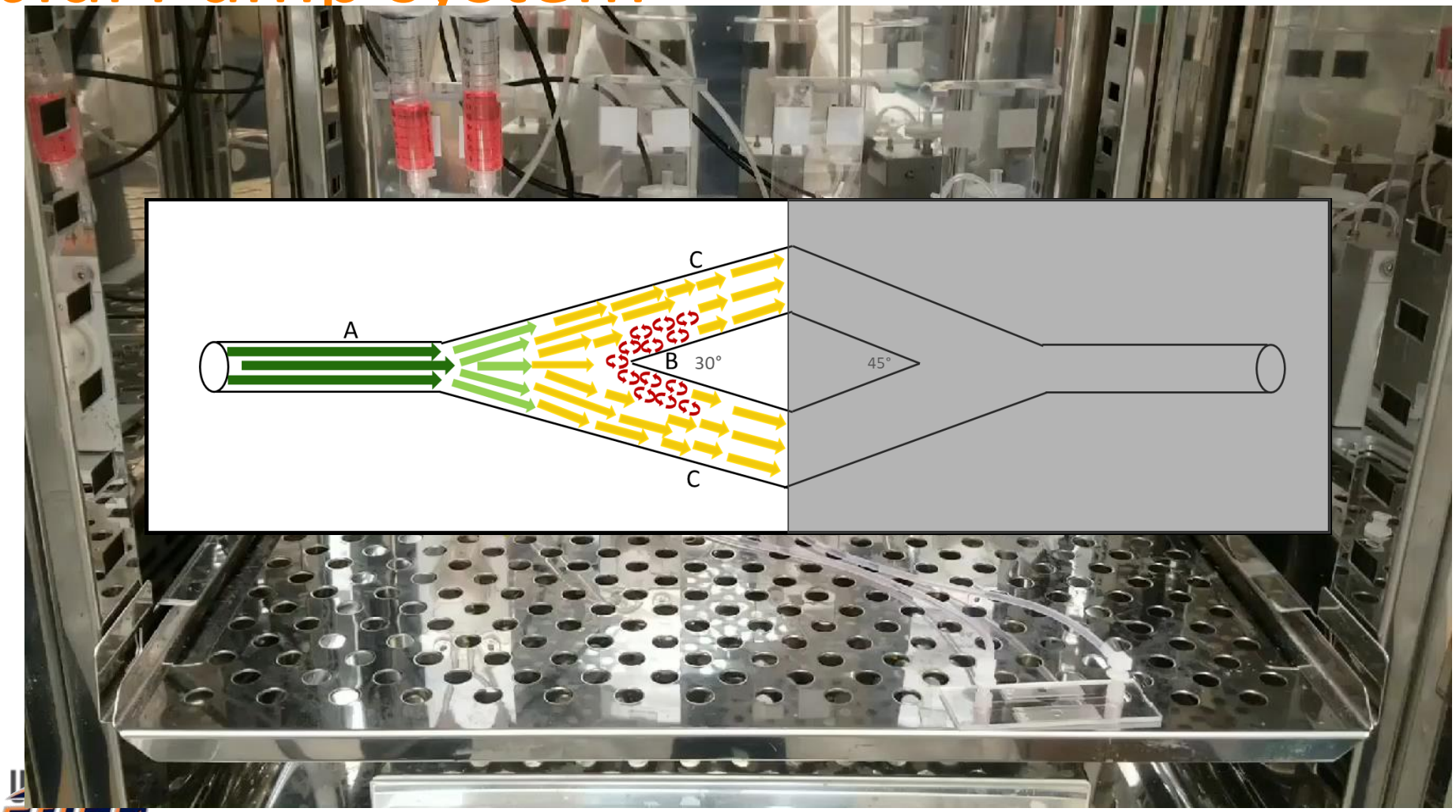
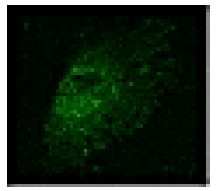
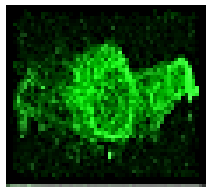
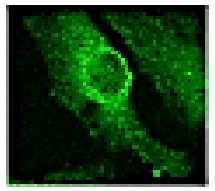
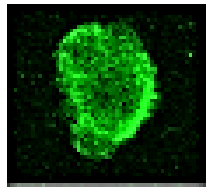
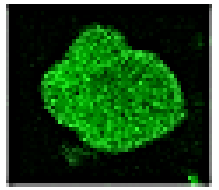
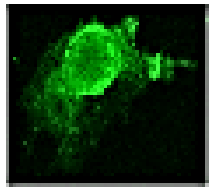
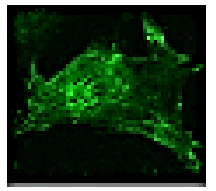
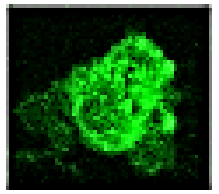
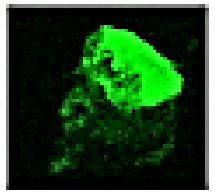
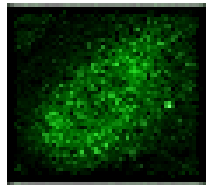
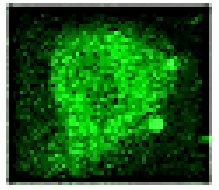
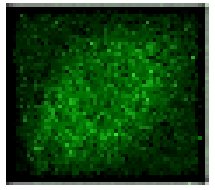
In Vitro Model
Ibidi Pump system



A

Condition	Before Bifurcation	At Bifurcation	After Bifurcation
Resting			
Low			
Moderate			
High			

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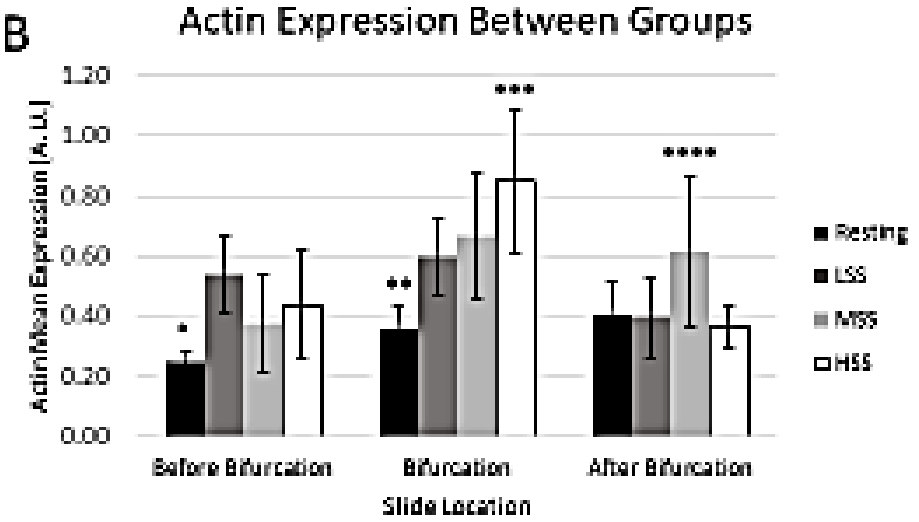

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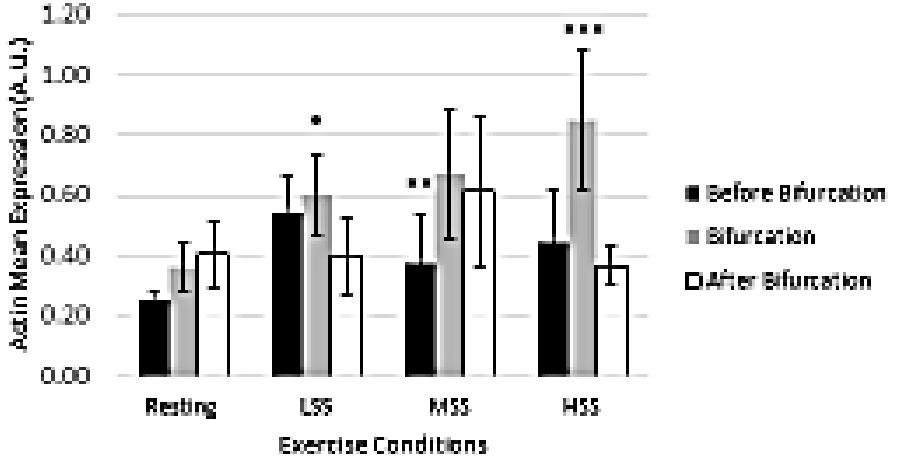

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PRECISION MEDICINE

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vidad Física y Deporte Infanto-Juvenil co
ar Fundamental en la Salud y Rendimient

Alvaro N. Gurovich, PT, PhD, FACSM

The University of Texas at El Paso (UTEP)

rtivo y del envejecimiento saludable es la actividad física durante el desarrollo infantil y
den alcanzar sus metas competitivas solo si han tenido una base motora previa. Esta b
ea, pero siempre es necesaria para rendir. Por otro lado, el envejecimiento saludable d
es crónicas no transmisible. El alrededor de 2 tercios de las muertes en el mundo está
seamos prevenir esta epidemia, debemos empezar la prevención a edad temprana, inc

MUCHAS GRACIAS!

Questions??

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NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES
SC2GM140952

The Effects of Aging on the Pain Experience

Presented by Carolina Valencia, PhD

Objective

- To identify the effects of aging on the pain experience.

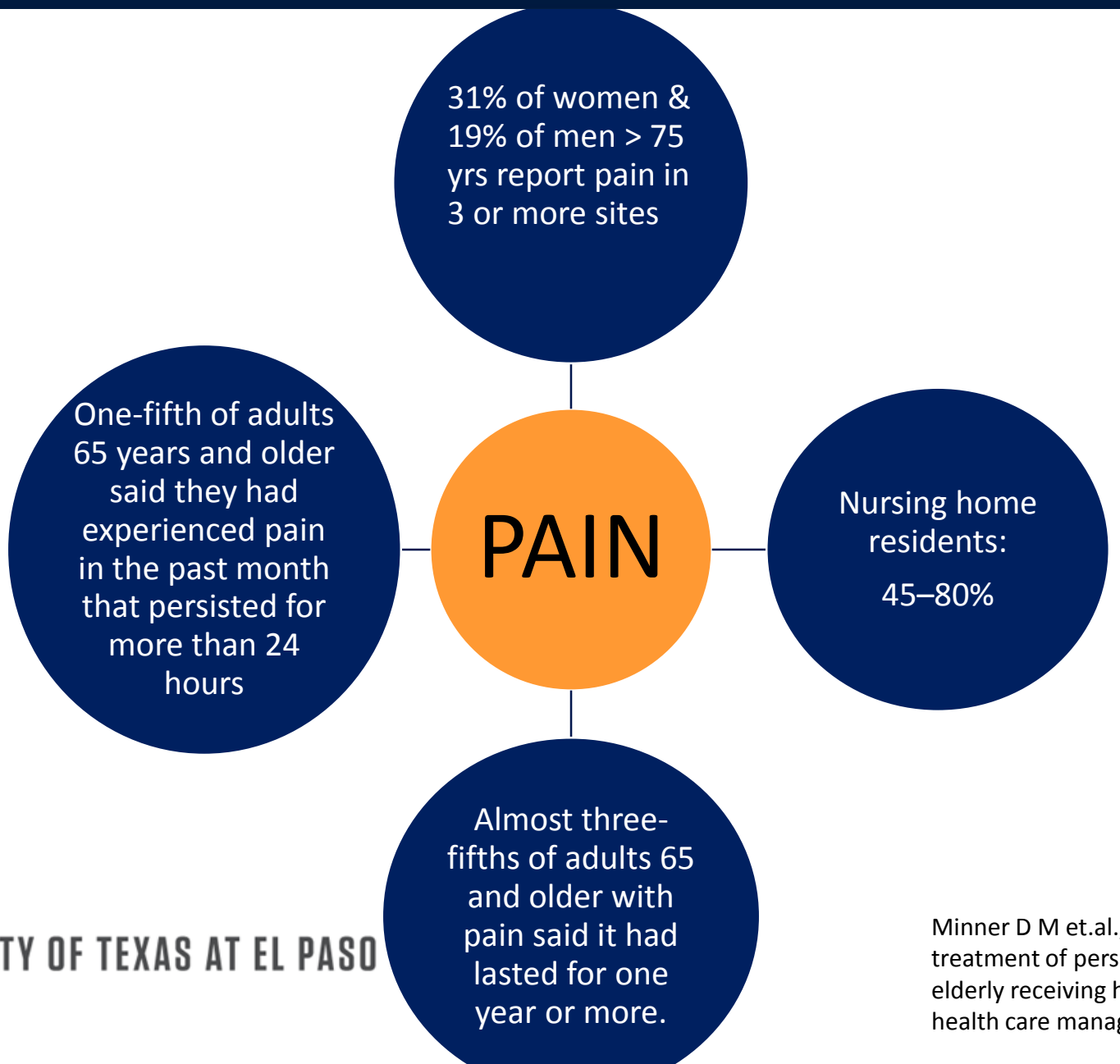
Outline

- Review of pain mechanism
- Age related changes in pain perception
- Understand the biopsychosocial contributions to pain
- Factors affecting perception of pain in Elderly
- Factors that Alleviate Pain in Olders- Role of care-provider

Why is this important?

- Pain is common in the elderly
- Pain is under-recognized and undertreated
- Pain affects quality of life

Same facts and prevalence of pain in Elderly



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Minner D M et.al., Evidence based assessment and treatment of persistent pain in the community dwelling elderly receiving home health services: A pathway, Home health care management and practice 17:294-301,2005.

International Association for the Study of Pain

IASP®

Working together for pain relief

“ An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”

Pain is not just a sensation but a multidimensional sensory experience, suffering, and alteration in behavior.

≠

Nociception is the activation of receptors of noxious stimuli.

General Concepts

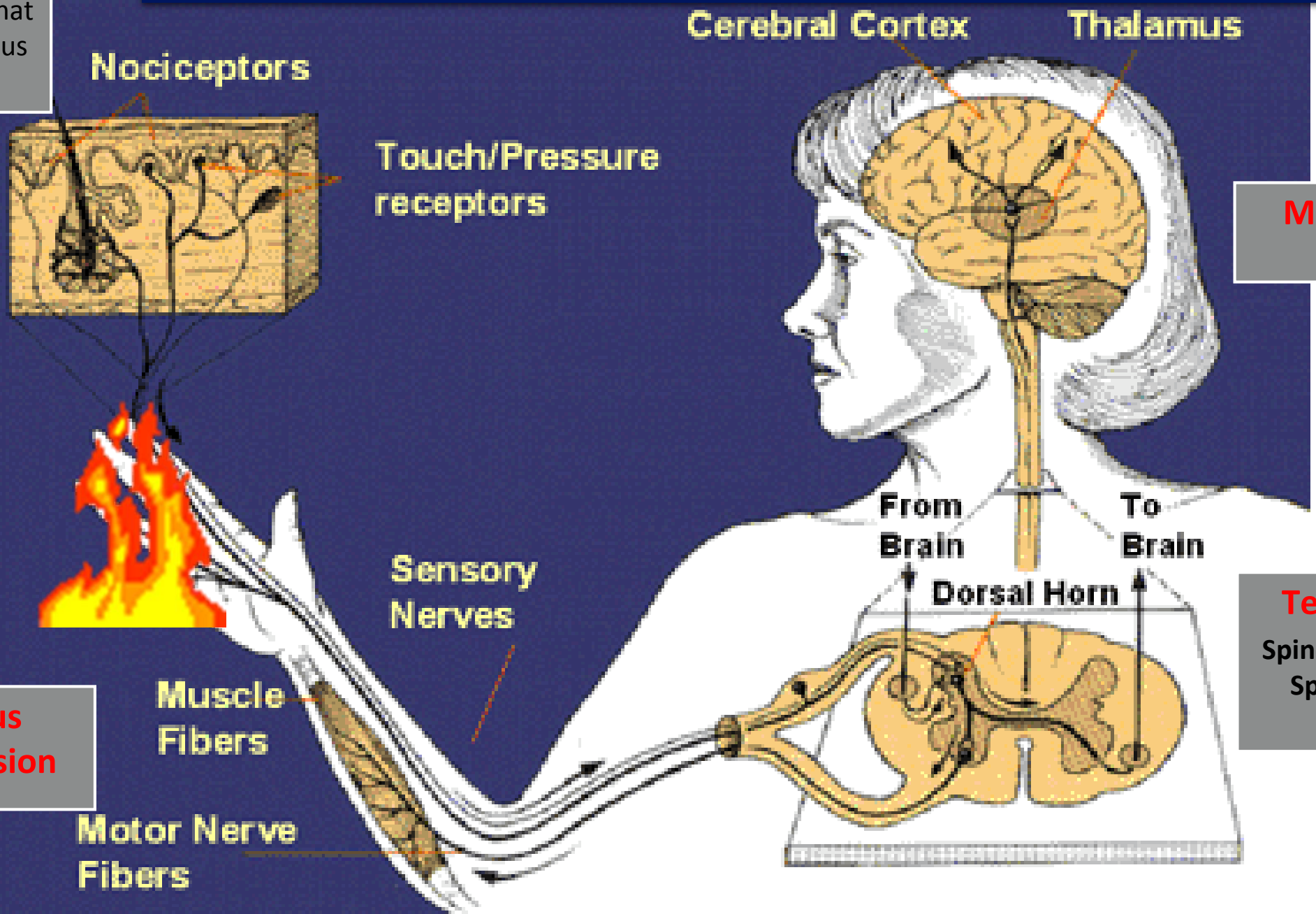
- Acute Pain is often limited, warns of tissue damage. Often with signs of autonomic nervous system activation

- Chronic persistent (> 3 months) - pain no longer signals tissue damage. Autonomic signs are often absent.

General Concepts of Pain Mechanisms

Nociceptors

Afferent nerves that respond to noxious stimulation



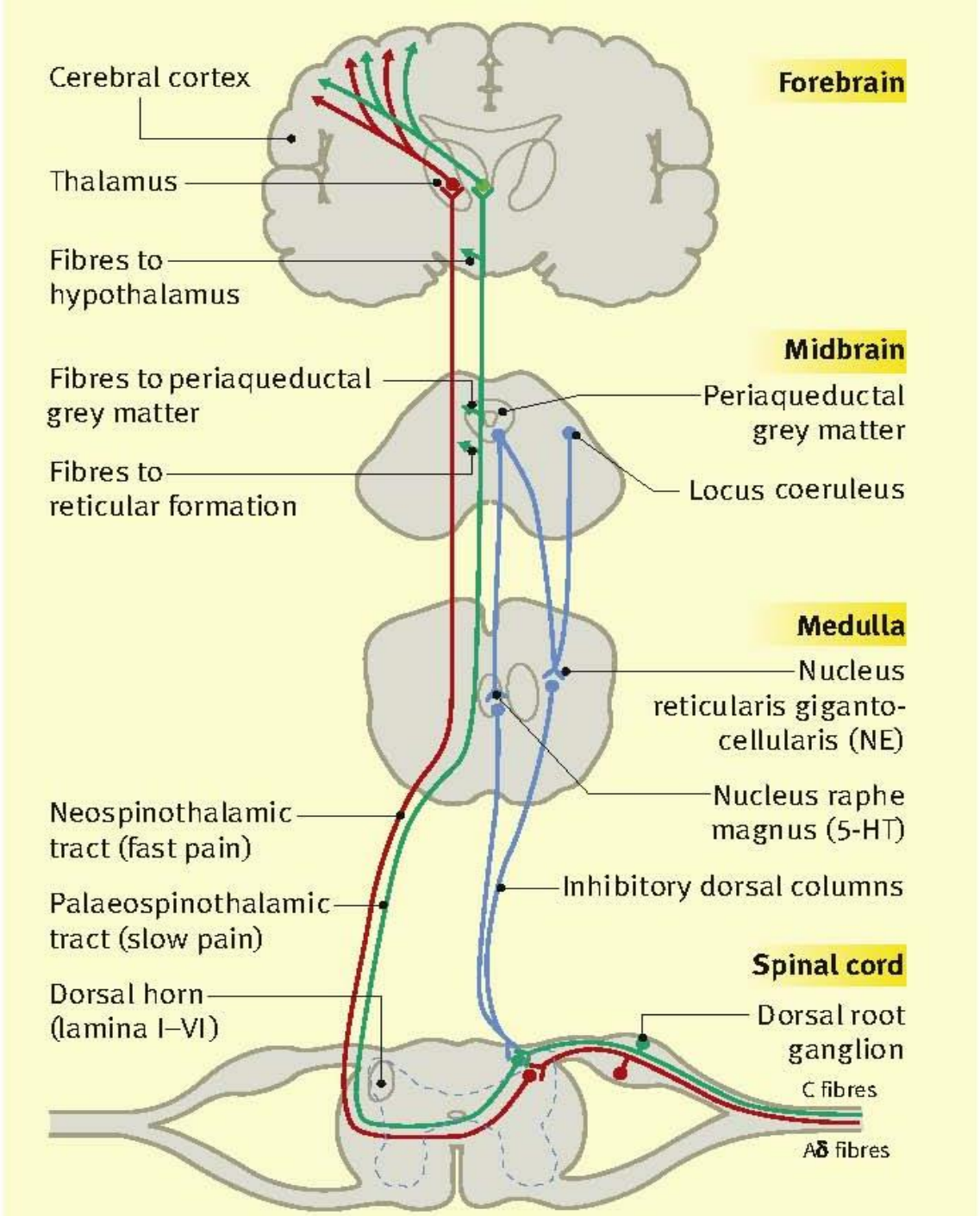
Modulation

Termination

Spinothalamic and Spinoreticular pathways

Stimulus Transmission

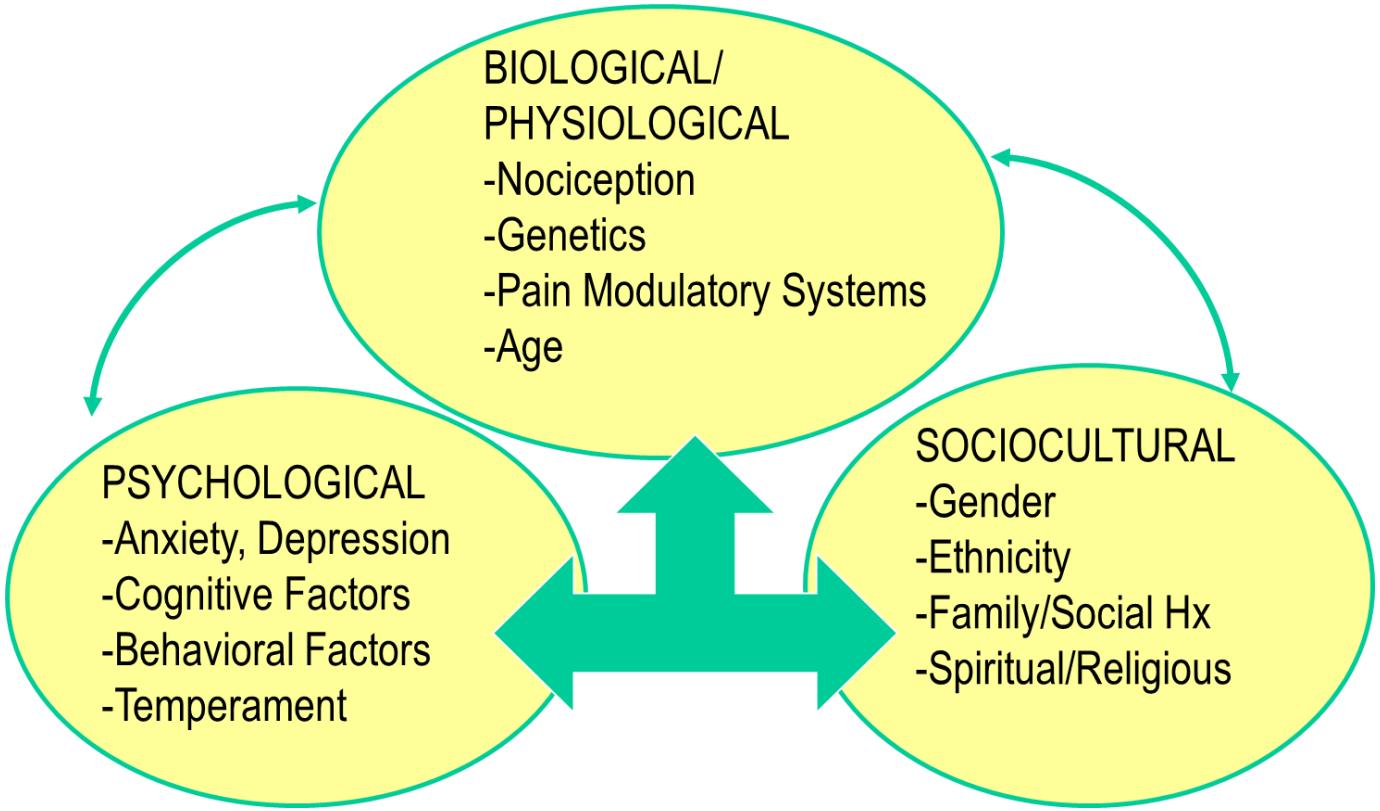
Midbrain descending control



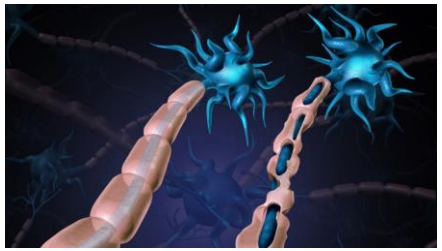
Ascending nociceptive ↑
Fast (red)
Slow (green)
Descending inhibitory tracts ↓ (blue)

Age Related Changes-biopsychosocial Model

The ***BIOPSYCHOSOCIAL MODEL*** is a key way to assess and treat patients in pain as it gives the most comprehensive view of a person



Age related changes



Changes in Peripheral nerves-decrease density and increase abnormal/degenerating fibers

Recovery from peripheral nerve injury appears to be delayed

Sensory threshold for thermal and vibratory stimuli increase with age

Conduction velocities are impaired in both myelinated and unmyelinated fibers at the CNS

Pain receptors: 50% decrease in Pacini's corpuscles,10%-30% decrease in Meissner's/Merkle's disks

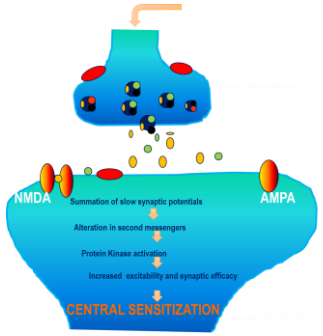
18% loss in thalamus

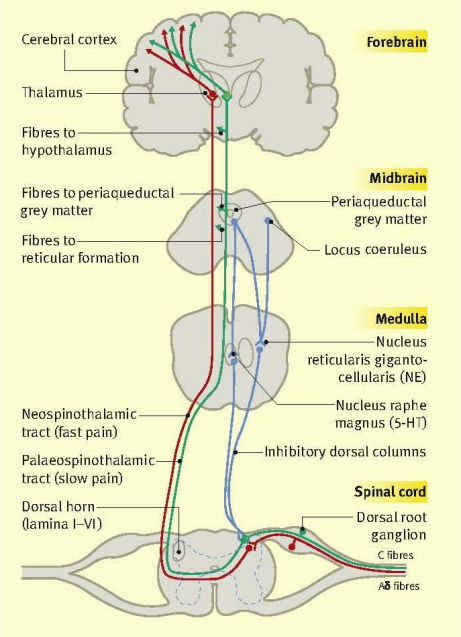
Diminished endogenous analgesic response (endorphins) in the older patients.

Loss of neurons in cortex, midbrain, brainstem , 18% loss in thalamus

Loss in dorsal horn neurons

Reduction in number and function of peripheral nociceptive neurons.





Tinnirello A, et al. Chronic Pain in the Elderly: Mechanisms and Distinctive Features. *Biomolecules 2021*

Age Differences in Pain: CHANGES IN BRAIN PERCEPTION

- Painful thermal stimuli activates midline and central cortical regions in young and old, but older adults show activation of frontal and lateral sites
  - ➢ This implies wider recruitment of neurons and slower cognitive processing
- **The elderly have been shown to be more reluctant than young people to report painful stimuli**

UF Institute on Aging study shows chronic pain might accelerate brain aging

Published: Apr 9, 2019 *By: Bill Levesque*

Category: AIatUF, University of Florida, UF Health, College of Public Health & Health Professions, College of Medicine, Institute on Aging, Department of Neuroscience, Department of Aging and Geriatric Research

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PAIN IN THE ELDERLY

NOXIOUS STIMULUS

Less sensitive to heat-evoked pain

More sensitive to mechanically-evoked pain

CHRONIC PAIN DIAGNOSIS

Superior pain acceptance and self-efficacy, with less catastrophizing levels

- Peripheral and central sensitization
- Higher anxiety levels
- Worsened depression and sleeping time

ACUTE PAIN

↓ Pain perception
↑ Pain threshold
↓ Sensitivity to mild pain

- Postoperative pain
- Cancer pain
- Peritonitis

PERSISTENT PAIN

- Poorly tolerated
- Progressing worsening symptoms

↓ Pain unpleasantness:
- Caregiver
- Family member
- Distraction
- Sedentarism
- Dementia

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Factors affecting perception of pain in Elderly

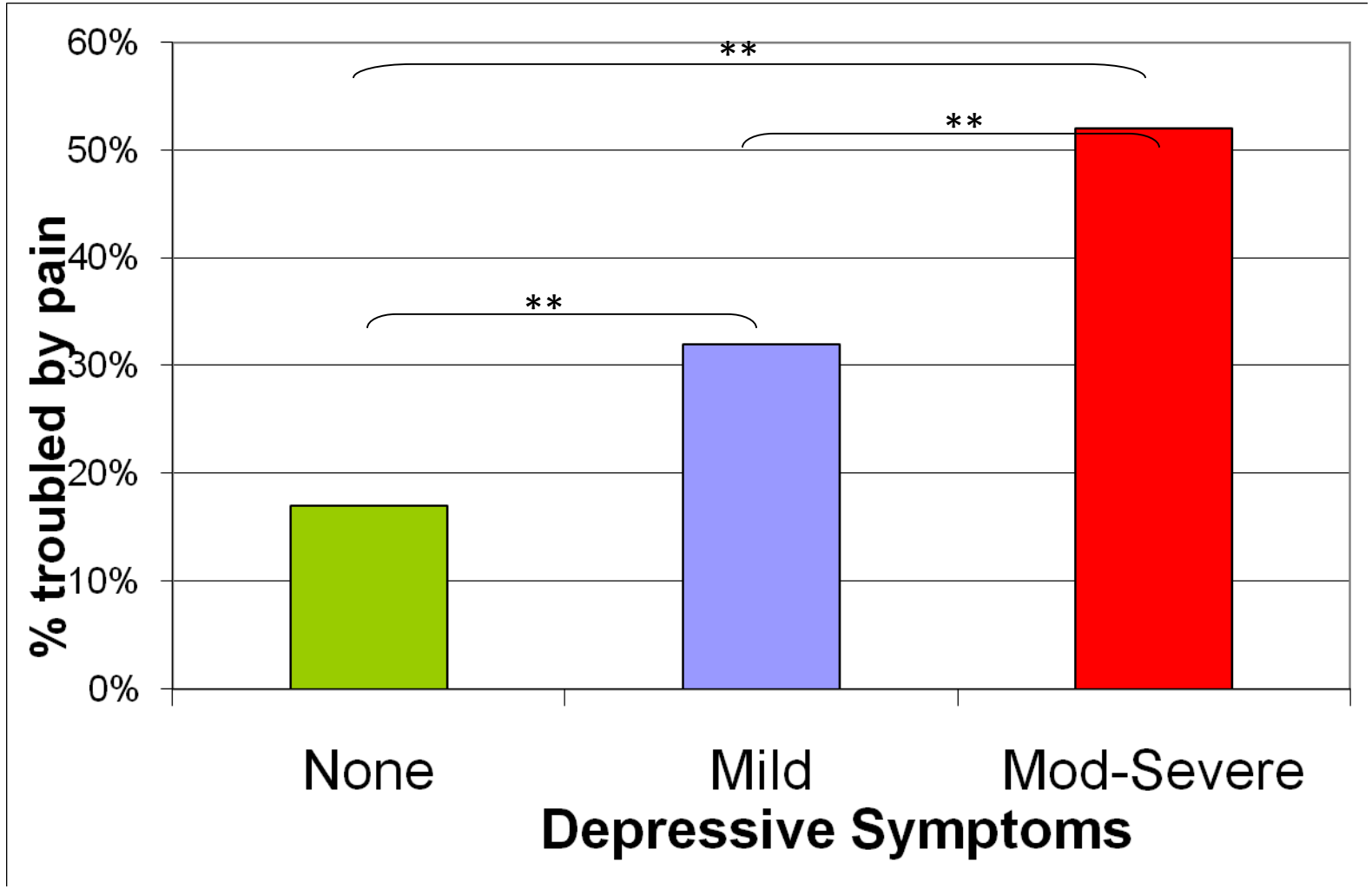
- **Pain affects quality of life** far beyond the local region of injury
- **Feeling of loneliness** is predictor of psychological distress
- **Lack of intimate relationships**, dependency, and loss increase loneliness
- **Loneliness** has been shown to lower pain threshold
- **Loneliness** is a risk factor for **depression**

Deane G et.al., Overview of pain management in older persons. Clin Geriatr Med 24,185-201,2008.

Factors affecting perception of pain in Elderly

- **Depression**: lack of energy, avoidance of diversional activities, decreased engagement in treatment
- **Anxiety**: may inhibit participation in rehab efforts
- **Sleep disturbance**: pain is best predictor of sleep disturbance.
- **Isolation and reduced independence**: Involvement with family and friends can provide pleasurable experience

Pain Is Strongly Associated with Depression



** p < 0.001

THE UNIVERSITY OF TEXAS AT EL PASO

Thielke, HRS, 2008

Challenges of pain assessment in older patients

- Myths that having pain is “natural” with aging
- Fears about addiction to pain medications
- Sensory and cognitive impairments
- Under-reporting
- Co-morbidities complicating the clinical picture and caregivers' beliefs and the reliability of patients' pain.
- Lack of congruence between patients' and caregivers' perceptions of pain
- Caregiver may misinterpret pain perception

- What may be painful to a young adult may present in the elderly as behavioral changes such as confusion, restlessness, aggression, anorexia, and fatigue
- When pain is reported, it may be referred from the site of origin in an atypical manner
- Elderly women are more likely than elderly men to present with atypical pain

Consequences of untreated pain

- **Impaired function**: Pain can lead to decreased activity and ambulation leading to de-conditioning, gait disturbances and injuries from falls.
- **Sleep deprivation**: decrease pain thresholds, limit the amount of daytime energy, increased risk of depression and mood disturbances.
- **Increases financial and care giving burdens** placed on families and friends by increased utilization of health care services.
- **Diminished quality of life** by isolating individuals from important social stimulation, amplifying the functional and emotional losses already experienced from undertreated pain.

Jakobsson, U. et.al., Old people in pain: A comparative study. *Journal of Pain and Symptom Management*, 26, 625-636,2003.

Weiner, D.K., et.al., Pain in nursing home residents; management strategies. *Drugs and Aging, 18(1)*, 13-19,2001.

Factors that Alleviate Pain in Olders- Role of care-provider

- **Biopsychosocial theory of pain** instead of medical theory (often no clear biomedical explanation for the persistence of chronic pain)
- **Goal is to reduce disability** through reducing pain-related fear or other attributions
- **Focus is on reducing disability** and NOT pain
- **It is not about ignoring pain**, but about not allowing pain to restrict your life and attaching different meaning to pain after exposure (shift away from pain)

Carolina Valencia, PhD
cvalencia4@utep.edu

Any Questions?

Rethinking Challenges in Aging: A Multidisciplinary Approach

Presented by Cecilia Fierro, OTD, OTR

Quality of Life and the Aging Process

Objective

- To Identify the impact of the aging process on quality-of-life issues

Quality of Life and the Aging Process

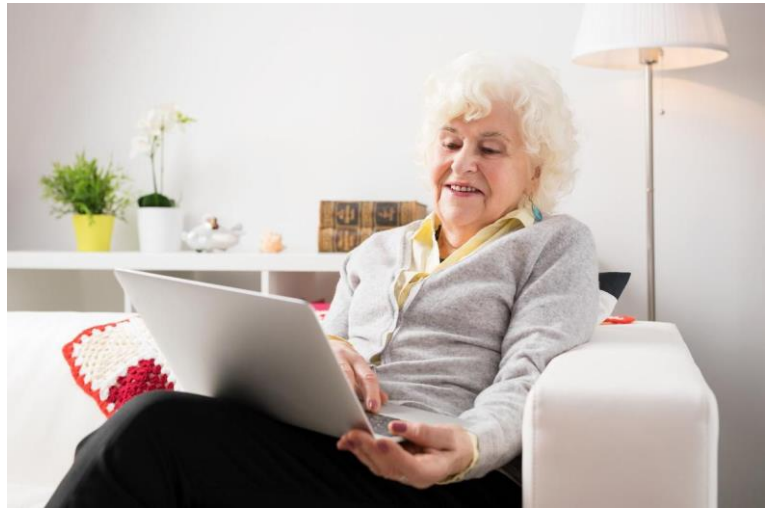
- What is Quality of Life?
- It is defined as a person's perception of their position in life in the context of the culture and value systems in which they live and in relation of their goals, expectations, standards, and concerns (Lucas-Carrasco, 2012).
- In other words, are we where we want to be based on what we expected to be?

Quality of Life and the Aging Process

- What impacts our perception of quality of life?
  - ❖Physical health
  - ❖Mental well-being
  - ❖Socio-economic status
  - ❖Social interactions
  - ❖Environment/community

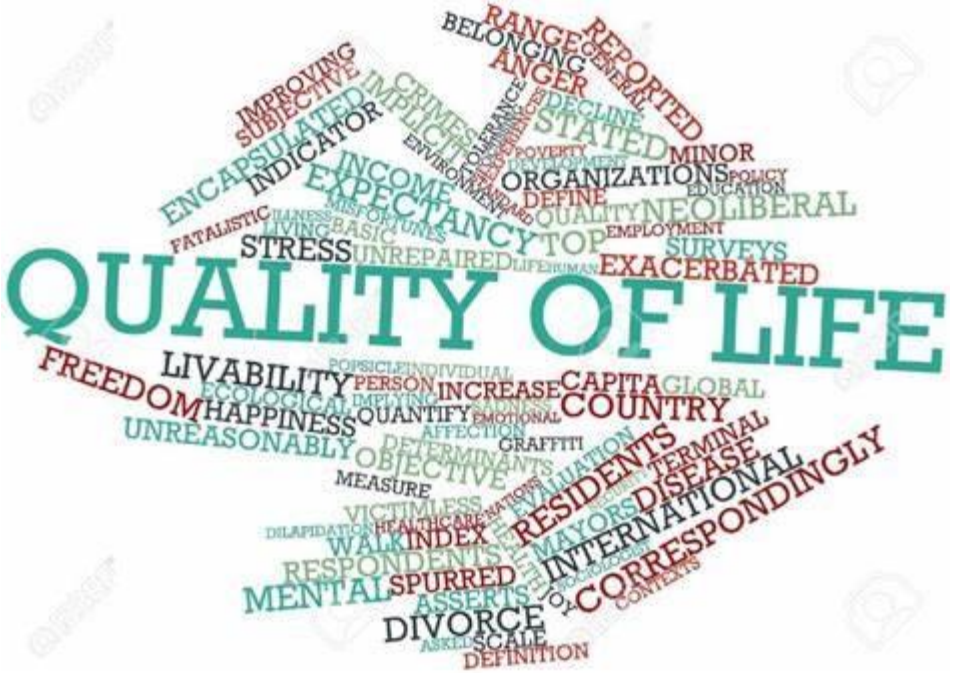
Quality of Life and the Aging Process

- Aging in place- the ability to enhance older adults' living environments in order to promote aging in their homes and communities.
- Comfort of home
- Sense of community
- Familiarity
- Social interaction
- Independence



Quality of Life and the Aging Process

- What if older adults can't stay in their homes?
- Does our environment and community impact our quality of life?



Quality of Life and the Aging Process: COVID Impact

According to the CDC (2022), the rate of hospitalizations and deaths related to COVID-19 is much higher than those under the age of 49.

Rate compared to 18-29 year olds	50-64	65-74	75-84	85+
Cases	1x	1x	1x	1x
Hospitalization	3x	5x	8x	10x
Deaths	25x	60x	140x	330x

Quality of Life and the Aging Process: COVID Impact

- In a scoping review by Kasar and Karaman (2021), they looked at how the Coronavirus disease-2019 (COVID-19) had an unprecedented effect all over the world, especially in older individuals. Their aim was to evaluate the social isolation, loneliness and quality of life of elderly individuals during the COVID-19 pandemic and to map suggestions to reveal and improve the current situation.
- Areas of concern for older adults was an increase in loneliness, anxiety, and depression not only in the short-term, but long lasting effects

Quality of Life and the Aging Process

- What strategies can help
  - Taking advantage of technological opportunities and accessibility
  - Providing peer communication by technology
  - Providing social support and environments for social interaction
  - Cognitive behavioral therapy online (mindfulness classes, etc.)
  - Providing support by means appropriate to the individual's cultural make-up (spirituality, prayer practices)
  - Encouraging independence and accessibility in the environment/community

Quality of Life and the Aging Process

References

- Brice Pablo de Diesbach, Richard P Bagozzi, Alexandre Mazel, Jean-Philippe Galan, Michele Grimaldi, & Maria Cornide Santos. (2021). EcSAAM: a model studying the acceptance and effect of virtual agents, holograms and robots on loneliness and quality of life, for elderly care in a context of Covid or social isolation. *IDEAS Working Paper Series from RePEc*.
- Gauthier, A., Lagarde, C., Mourey, F., & Manckoundia, P. (2022). Use of Digital Tools, Social Isolation, and Lockdown in People 80 Years and Older Living at Home. *International Journal of Environmental Research and Public Health*, *19*(5), 2908–. https://doi.org/10.3390/ijerph19052908
- Sayin Kasar, K., & Karaman, E. (2021). Life in lockdown: Social isolation, loneliness and quality of life in the elderly during the COVID-19 pandemic: A scoping review. *Geriatric Nursing (New York)*, *42*(5), 1222–1229. https://doi.org/10.1016/j.gerinurse.2021.03.010
- Siew, S. K. H., Mahendran, R., & Yu, J. (2021). Directional Effects of Social Isolation and Quality of Life on Anxiety Levels Among Community-Dwelling Older Adults During a COVID-19 Lockdown. *The American Journal of Geriatric Psychiatry*, *29*(12), 1274–1279. https://doi.org/10.1016/j.jagp.2021.03.012
- https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-age.html

Thank you!!

Questions??

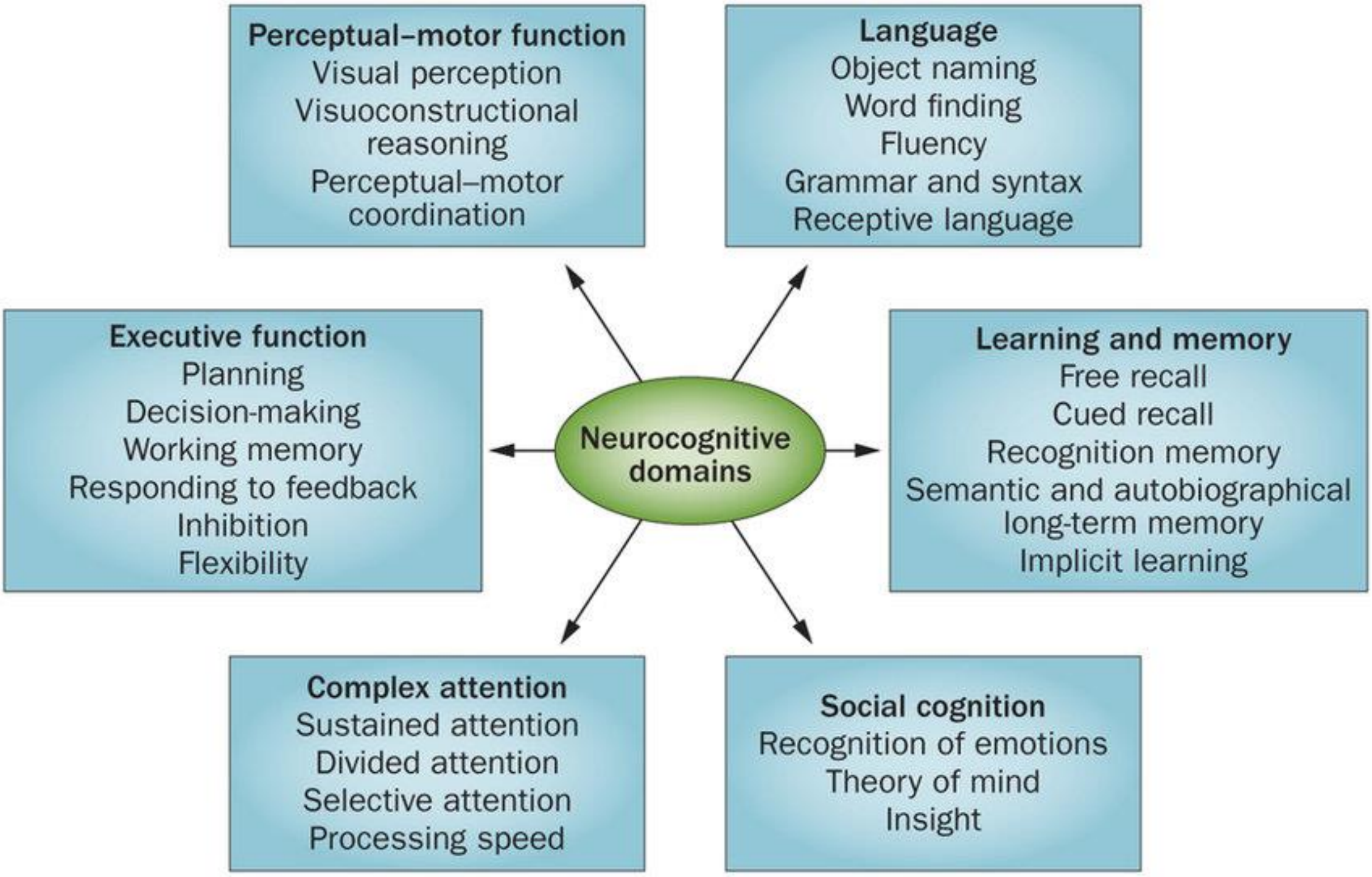
Rethinking Challenges in Aging: A Multidisciplinary Approach

Presented by Dr. Anita Parada, Ph.D., LP, CBIS

The typical and atypical neurocognitive changes happening with age: Agenda

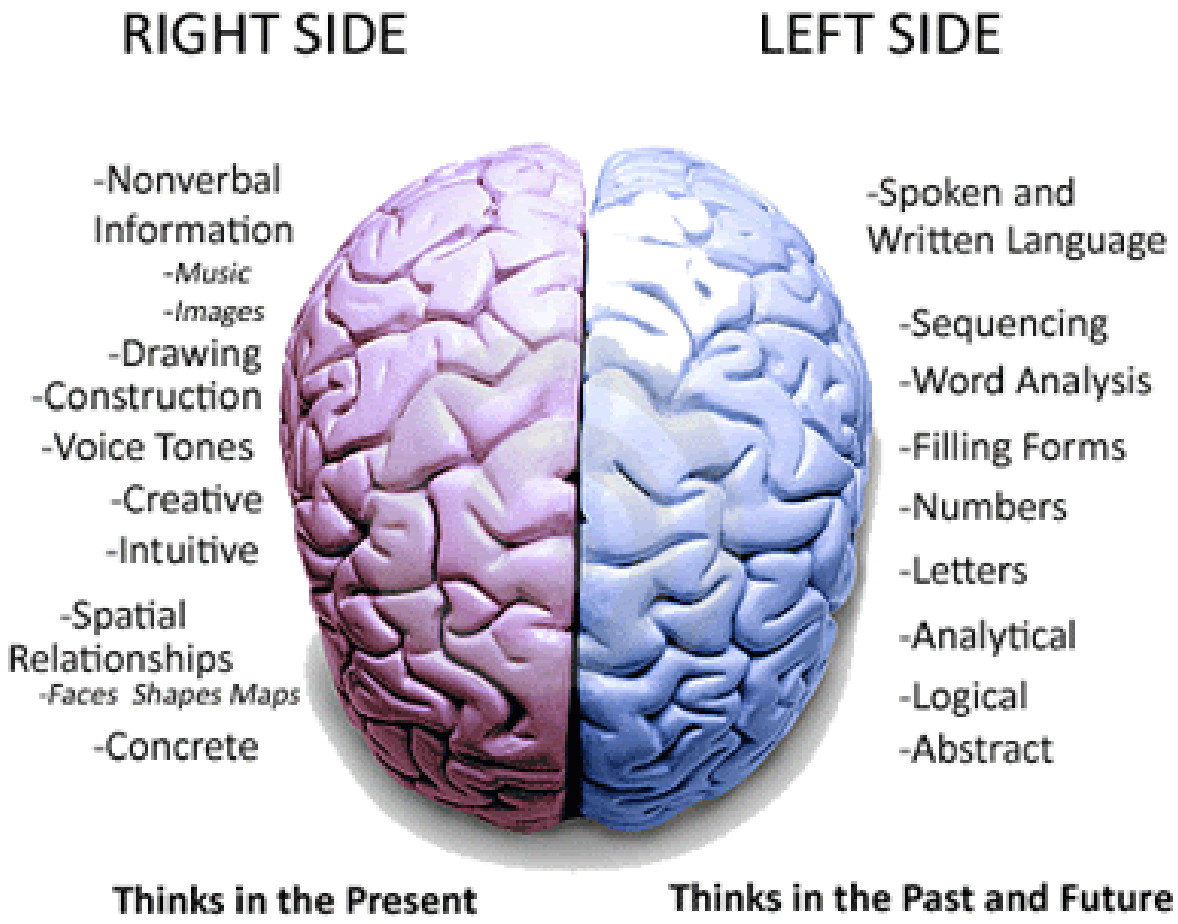
- Review of the key cognitive functions and underlying brain systems.
- The changes in the brain's functions with age (typical and degenerative).
- The consequences of neurodegenerative aging on cognition.
- COVID-19 and early neurocognitive aging

Key (cognitive) functions and the brain


Perceptual–motor function
Visual perception
Visuoconstructional reasoning
Perceptual–motor coordination
Language
Object naming
Word finding
Fluency
Grammar and syntax
Receptive language
Executive function
Planning
Decision-making
Working memory
Responding to feedback
Inhibition
Flexibility
Neurocognitive domains
Learning and memory
Free recall
Cued recall
Recognition memory
Semantic and autobiographical long-term memory
Implicit learning
Complex attention
Sustained attention
Divided attention
Selective attention
Processing speed
Social cognition
Recognition of emotions
Theory of mind
Insight

Key cognitive functions and the brain

Thinking, walking, talking

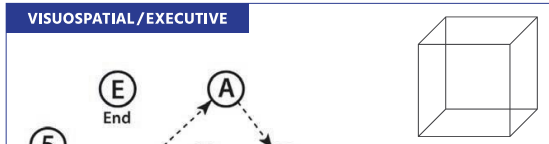


MoCA COGNITIVE ASSESSMENT

Version 8.1 English

Name:
Education: Date of birth:
Sex: DATE:

VISUOSPATIAL / EXECUTIVE



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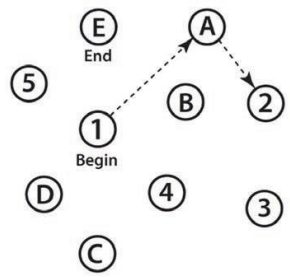


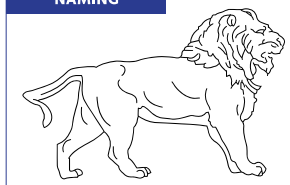
[ ] [ ]

Draw CLOCK (Ten past eleven)
(3 points)

[ ] Contour [ ] Numbers [ ] Hands

POINTS __/5

NAMING



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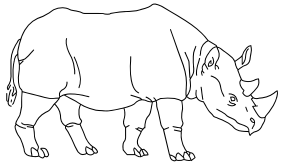

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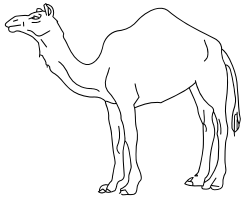

[ ]

__/3

MEMORY

Read list of words, subject must repeat them. Do 2 trials, even if 1st trial is successful. Do a recall after 5 minutes.

	FACE	VELVET	CHURCH	DAISY	RED
1ST TRIAL					
2ND TRIAL					

NO POINTS

ATTENTION

Read list of digits (1 digit/ sec.).

Subject has to repeat them in the forward order. [ ] 2 1 8 5 4

Subject has to repeat them in the backward order. [ ] 7 4 2

__/2

Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors

[ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B

__/1

Serial 7 subtraction starting at 100. [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65

4 or 5 correct subtractions: **3 pts**, 2 or 3 correct: **2 pts**, 1 correct: **1 pt**, 0 correct: **0**

__/3

LANGUAGE

Repeat: I only know that John is the one to help today. [ ]

The cat always hid under the couch when dogs were in the room. [ ]

__/2

Fluency: Name maximum number of words in one minute that begin with the letter F. [ ] _____ (N ≥ 11 words)

__/1

ABSTRACTION

Similarity between e.g. orange - banana = fruit [ ] train - bicycle [ ] watch - ruler

__/2

DELAYED RECALL

Memory Index Score (MIS)

(MIS)	Has to recall words WITH NO CUE	FACE	VELVET	CHURCH	DAISY	RED	Points for UNCUED recall only
X3		[ ]	[ ]	[ ]	[ ]	[ ]	
X2	Category cue						MIS = ____ /15
X1	Multiple choice cue						

__/5

ORIENTATION

[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City

__/6

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www.mocatest.org

Training and Certification are required to ensure accuracy.

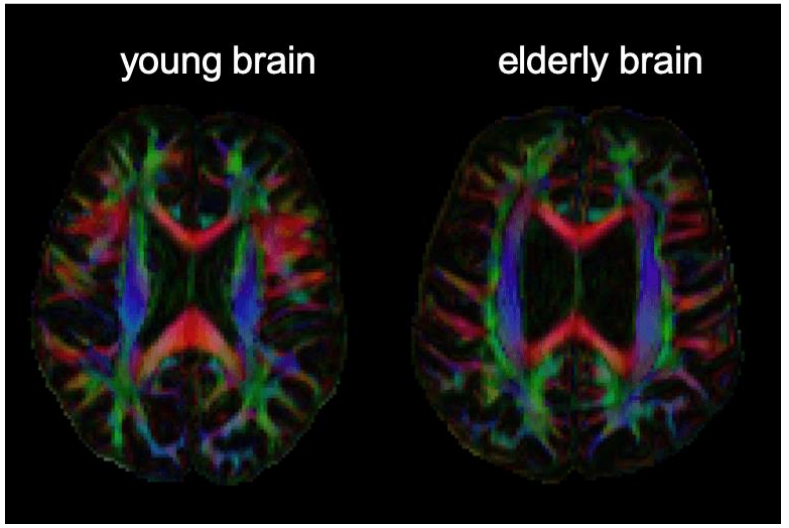
MIS: /15
(Normal ≥ 26/30)
Add 1 point if ≤ 12 yr edu

TOTAL __/30

ADMINISTERED BY BERNADETA PARADA, ANITA MOCA CERTIFIED RATER ID USBIAAN271479-01

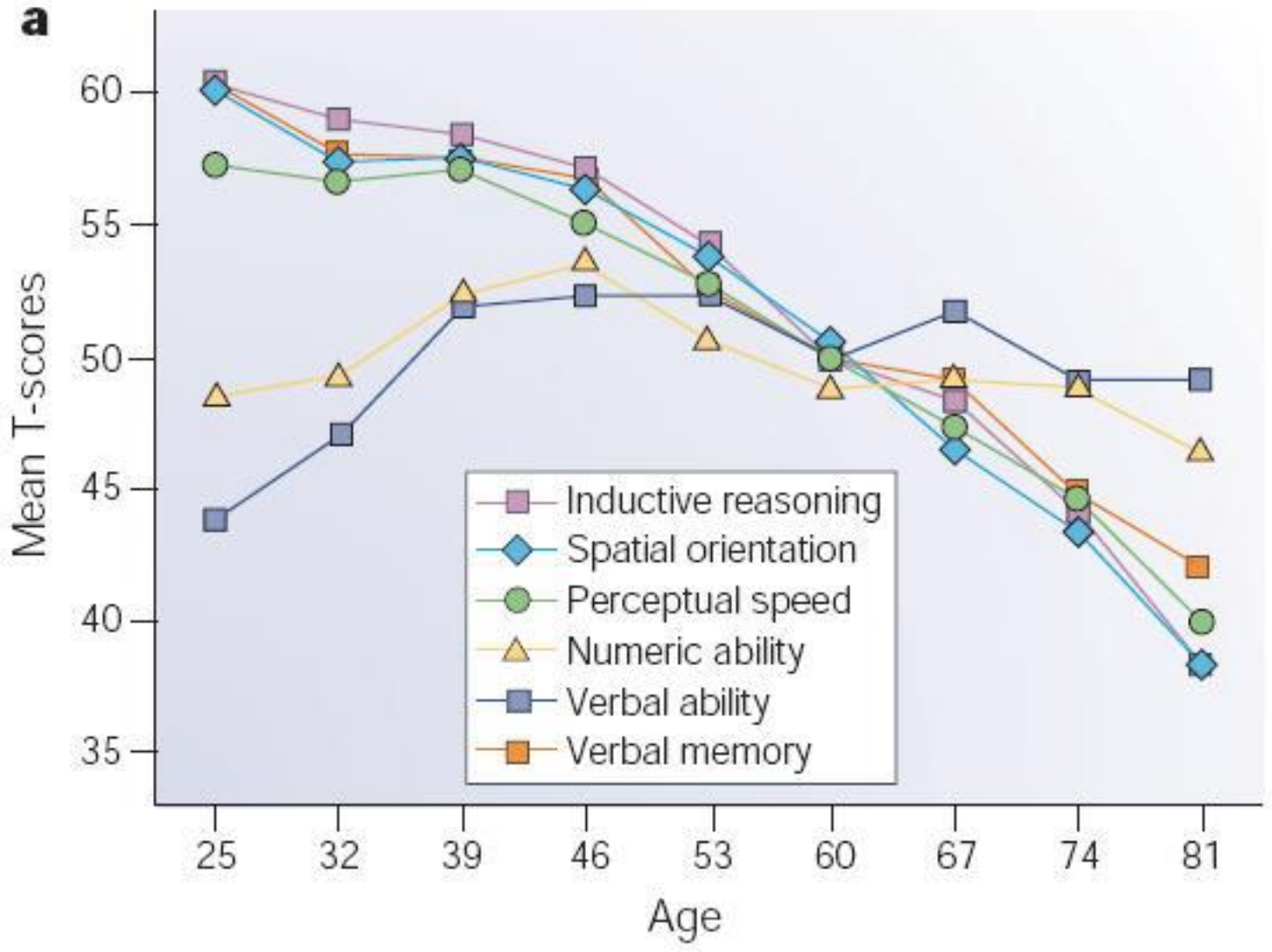
THE UNIVERSITY OF TEXAS AT EL PASO

Neurocognitive aging



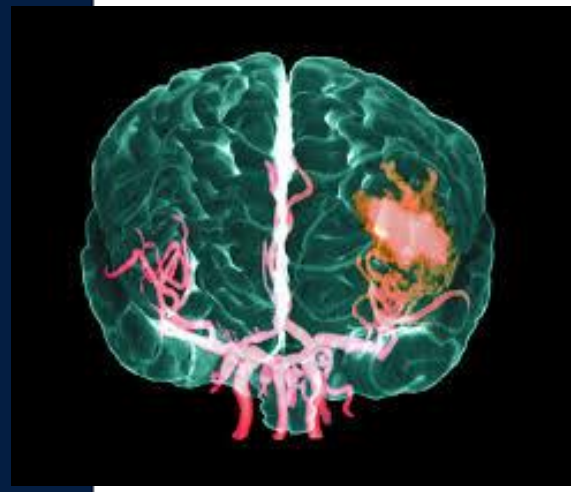
- Impaired bottom-up processing
- Hearing and vision loss
- Auditory and visual acuity
- Higher level and multimodal processing
- Attention
- Working memory and learning
- Executive and motor control

Neurocognitive aging



‘Neurodegenerative’ aging

- Alzheimer Disease
- Parkinson’s Disease
- Frontotemporal dementia
- Lewy-Body Dementia
- Chronic Traumatic Encephalopathy
- Cardiovascular, poststroke-, multi-infarct-dementia



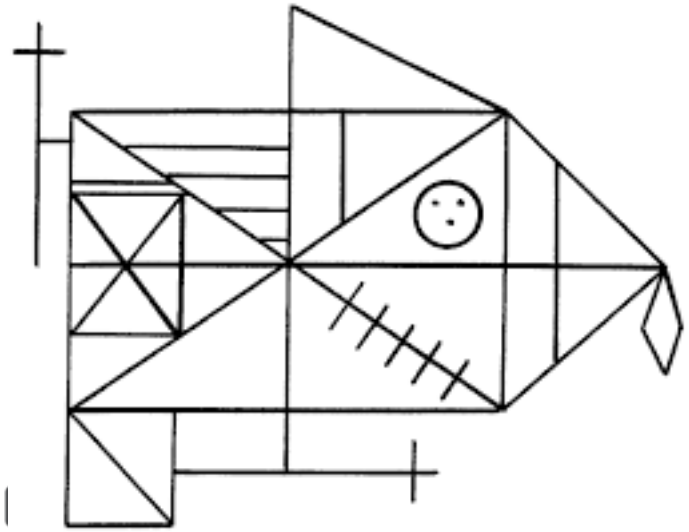
Cardiovascular system and cognition

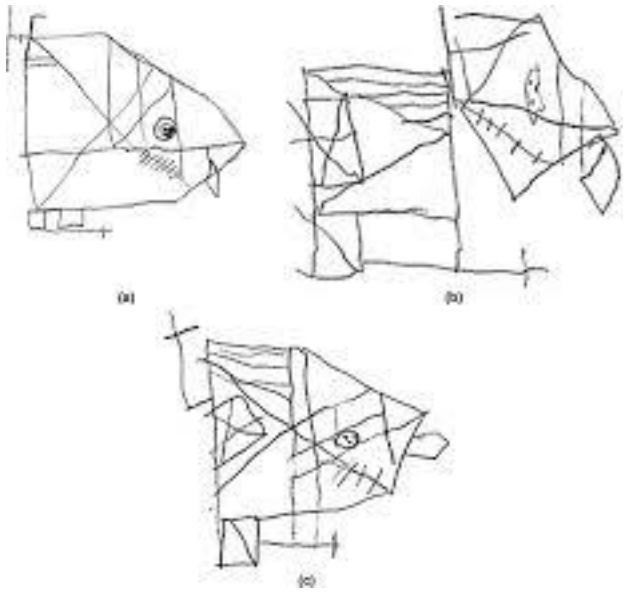
- The human brain is perfused by nearly 400 miles of blood vessels that stem from either the internal carotid artery or the vertebral artery
- Transient or permanent restriction of oxygen and metabolic exchange in this system can produce a wide range of symptoms based on the affected cerebral circuitry

Vascular Cognitive Impairment

Impairment in one or more cognitive domains which in turns disrupts daily living functioning

- Rey–Osterrieth Complex Figure Copy





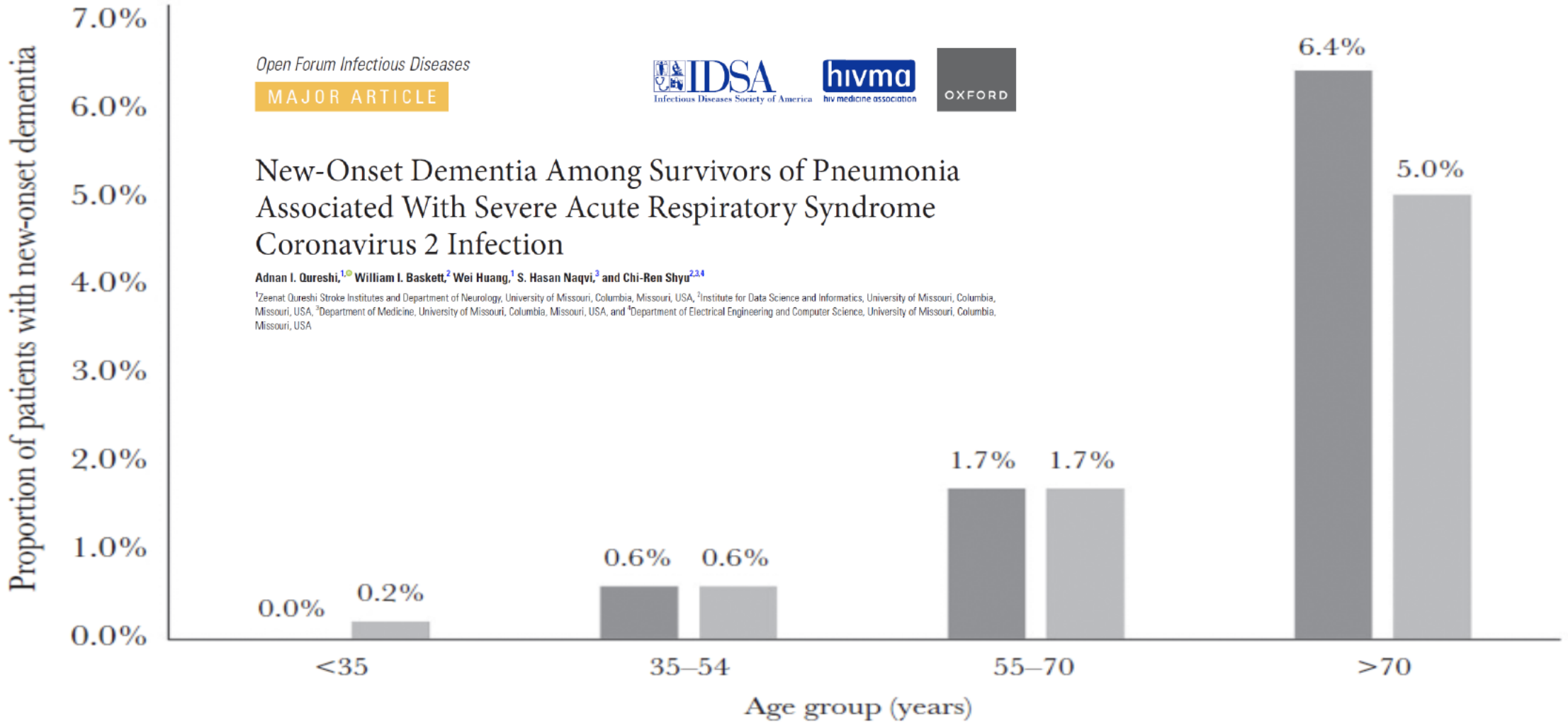
COVID-19 and early neurocognitive aging

COVID-19 and dementia prevalence (Qureshi et al. 2021)

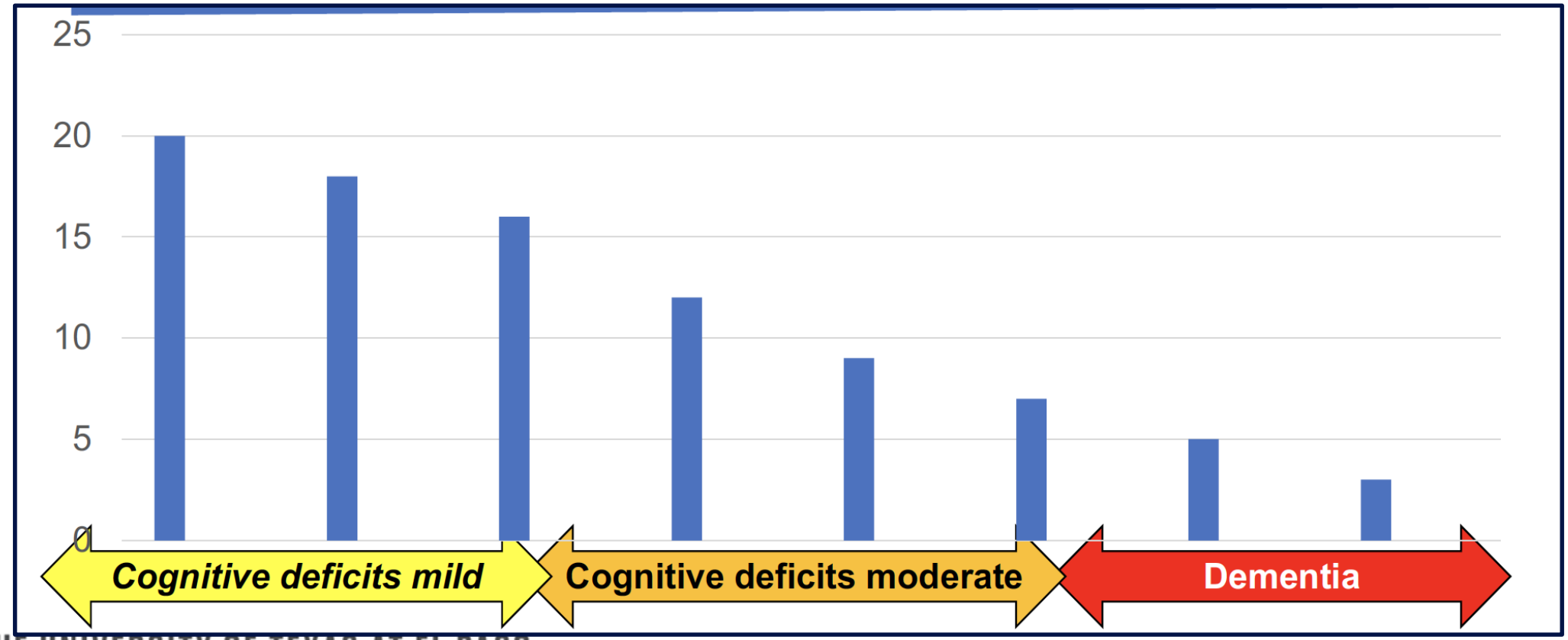
- 8,163 patients with confirmed COVID-19 among 27,676 patients in the Cerner de-identified COVID-19 dataset.
- 103 (1.3%) patients developed acute ischemic stroke
- 94 of these patients received their COVID-19 diagnosis during the same encounter that they had acute ischemic stroke.

Cognitive Impairment Among Survivors of Covid-19 infection

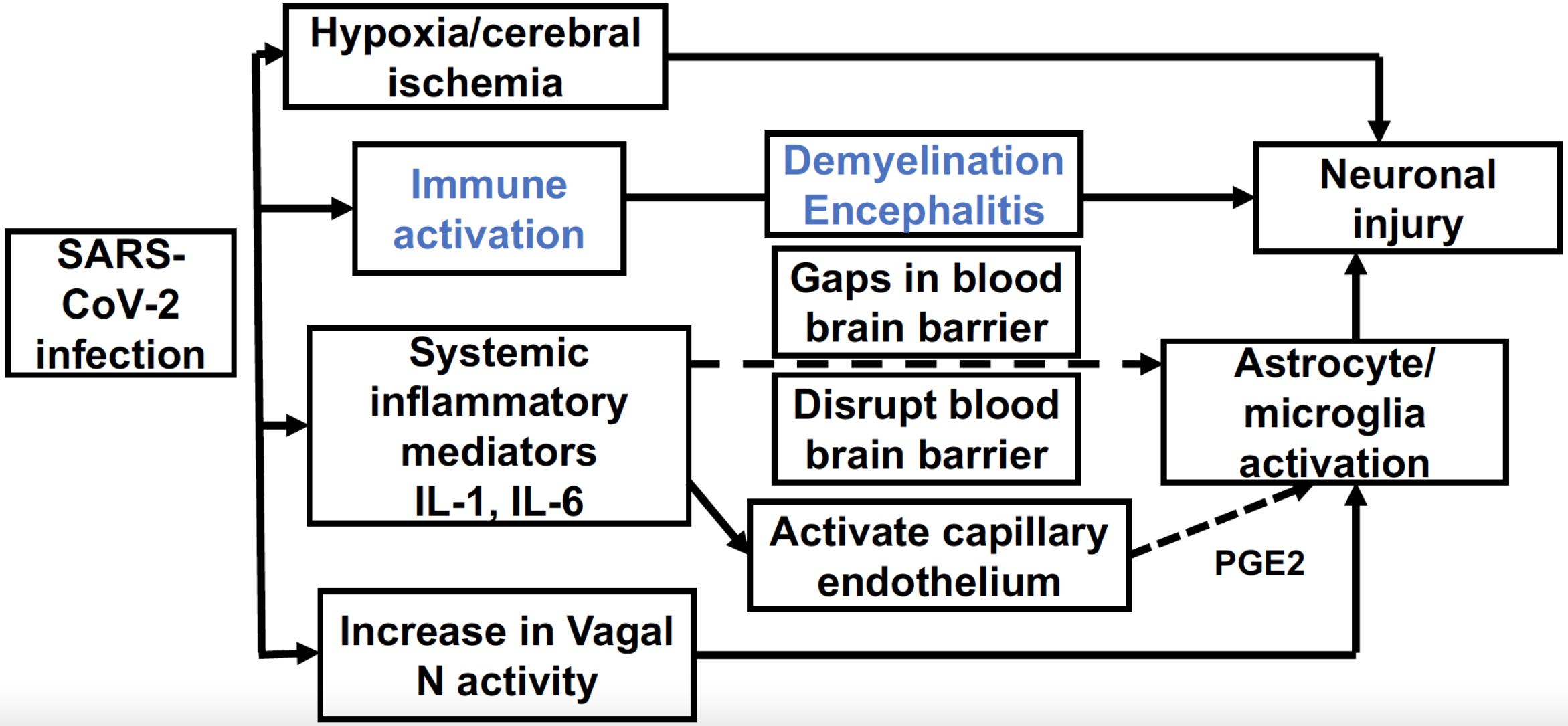
Study	Patients	Definition of cognitive impairment	Prevalence
Hellmuth et al. 2021	100 non-hospitalized	Detailed neuropsychological testing which revealed mild disorganization and inefficient, error-prone task execution.	20 (20%)
Taquet et al. 2021	236,379 hospitalized	Dementia by ICD-10 codes	6229 (2.6%)


Open Forum Infectious Diseases
MAJOR ARTICLE
IDSA Infectious Diseases Society of America
hivma hiv medicine association
OXFORD
New-Onset Dementia Among Survivors of Pneumonia Associated With Severe Acute Respiratory Syndrome Coronavirus 2 Infection
Adnan I. Qureshi,[1] William I. Baskett,[2] Wei Huang,[1] S. Hasan Naqvi,[3] and Chi-Ren Shyu[2,3,4]
[1]Zeenat Qureshi Stroke Institutes and Department of Neurology, University of Missouri, Columbia, Missouri, USA, [2]Institute for Data Science and Informatics, University of Missouri, Columbia, Missouri, USA, [3]Department of Medicine, University of Missouri, Columbia, Missouri, USA, and [4]Department of Electrical Engineering and Computer Science, University of Missouri, Columbia, Missouri, USA
Proportion of patients with new-onset dementia
7.0%
6.0%
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
0.0%
0.2%
0.6%
0.6%
1.7%
1.7%
6.4%
5.0%
<35
35–54
55–70
>70
Age group (years)
Patients with SARS-CoV-2 infection
Patients without SARS-CoV-2 infection

What kind of cognitive deficits do survivors of Covid-19 infection have?



Cognitive impairment among survivors of Covid-19 infection - pathophysiology



Impact of cognitive deficits presented in survivors of Covid-19 infection

How many survivors of Covid-19 infection are present in the USA?

- ❑ 20 million
- ❑ 40 million
- ❑ 80 million
- ❑ 160 million

Impact of cognitive deficits presented in survivors of Covid-19 infection

Screening, post-recovery care, and resources

- Montreal Cognitive Assessment (MoCA)
- The Mini-Mental State Examination (MMSE)
- Saint Louis University Mental Status (SLUMS) Examination

Impact of cognitive deficits presented in survivors of Covid-19 infection

- Caregiver burden, and financial and productivity loss
- The impact on public health may be much larger than the acute manifestations of Covid-19 infection due to the lifelong burden of dementia

Impact of cognitive deficits presented in survivors of Covid-19 infection

- NIH research emphasizes on ‘Long COVID’ can be debilitating and
- some people will require assistance with personal care months after the initial infection with:
  - ✓ 80% reporting difficulty in their ability to work and
  - ✓ 36% reported negative financial consequences

References

Glisky EL. Changes in Cognitive Function in Human Aging. In: Riddle DR, editor. Brain Aging: Models, Methods, and Mechanisms. Boca Raton (FL): CRC Press/Taylor & Francis; 2007.

Hellmuth J et al. Persistent COVID-19-associated neurocognitive symptoms in non-hospitalized patients. J Neurovirol. 2021 Feb;27(1):191-195.

Leentjens J et al. COVID-19-associated coagulopathy and antithrombotic agents-lessons after 1 year. Lancet Haematol. 2021 Jul;8(7):e524-e533.

Qureshi AI et al. Acute Ischemic Stroke and COVID-19: An Analysis of 27 676 Patients. Stroke. 2021 Mar;52(3):905-912.

Qureshi et al. New-Onset Dementia Among Survivors of Pneumonia Associated With Severe Acute Respiratory Syndrome Coronavirus 2 Infection. Open Forum Infect Dis. 2022 Mar 7;9(4):ofac115.

Taquet M et al. 6-month neurological and psychiatric outcomes in 236 379 survivors of COVID-19: a retrospective cohort study using electronic health records. Lancet Psychiatry. 2021 May;8(5):416-427.

Tuokko HA, Smart CM. Neuropsychology of Cognitive Decline. New York (NY): The Guilford Press; 2018

Thank you!!

Questions??

Rethinking Challenges in Aging: A Multidisciplinary Approach

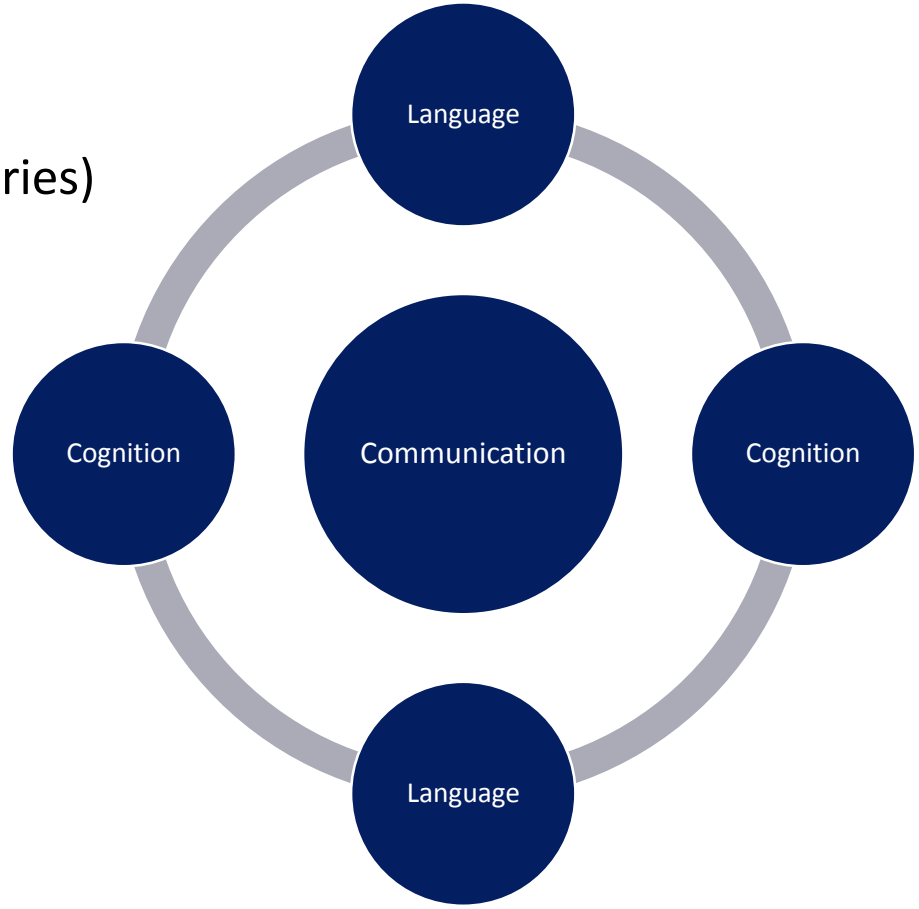
Presented by Patricia Lara

Objective

- To identify the cognitive and language changes that occur as a normal process of aging

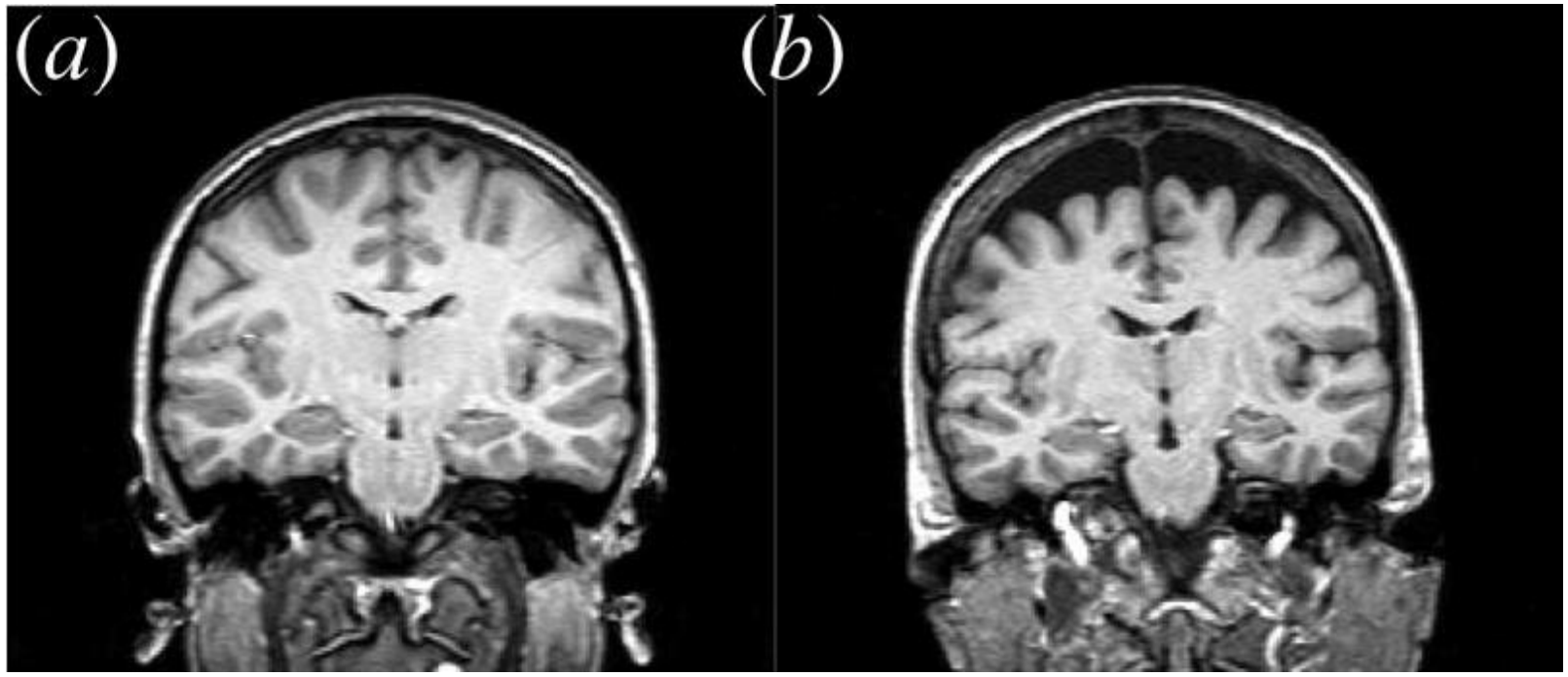
Relationship between Cognition, Language and Communication

- What is Cognition?
  - All higher mental processes
    - (everyday life, new learning, new memories)
- What is Language?
  - Ability to understand and express needs and wants



Neurological Changes in the Older Brain

- Brain volume decreases



www.researchgate.com

Neurological Changes in the Older Brain

Loss of Neurons and neurotransmitter

Affects the frontal lobes and parietal lobes more

Changes result in poor memory and poor attention/concentration

Additional Changes that Occur in Older Adults that Affect Communication and Language

Changes to the Outer Ear

Pinna is enlarged due to skin elasticity muscle tonicity, and gravity.

Increased hair growth in the ear canal, drier cerumen and collapsing ear canal.

Changes typically do not cause hearing loss.

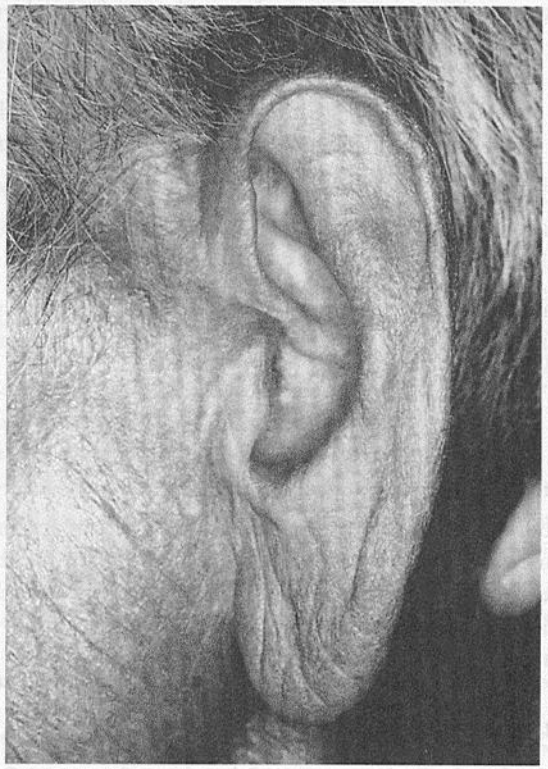
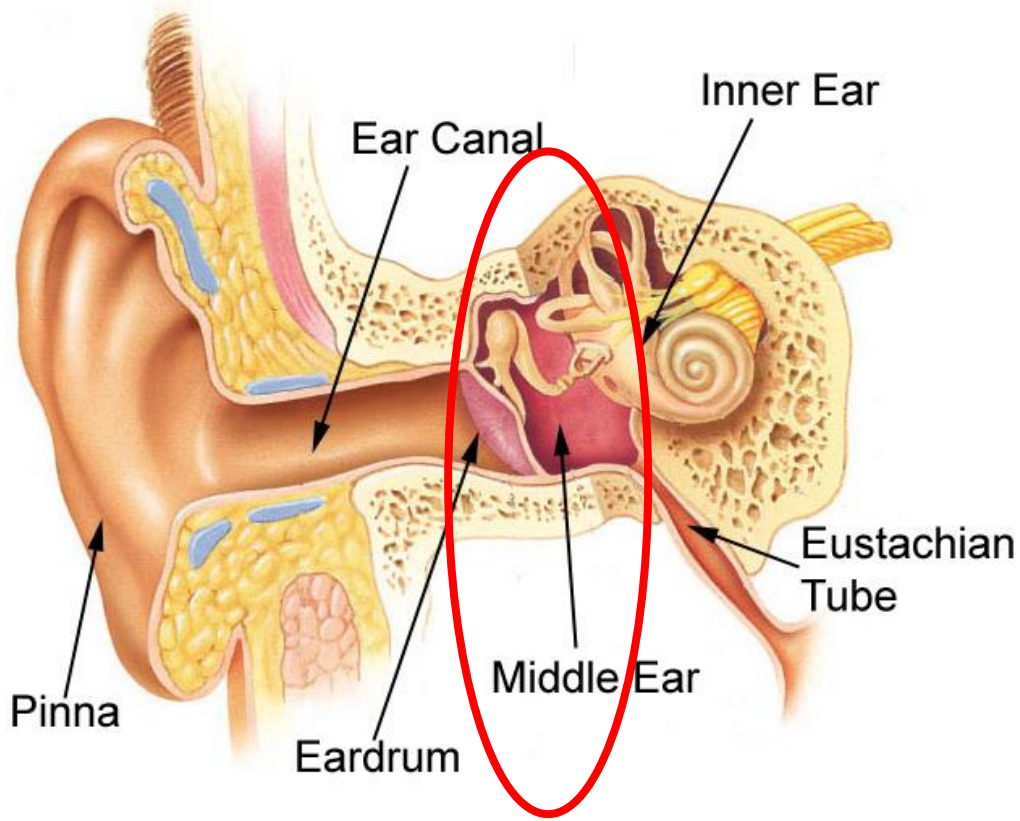


FIGURE 12-4 "Buddha ear" of an older patient. (Courtesy of Dr. Michael Hawke)

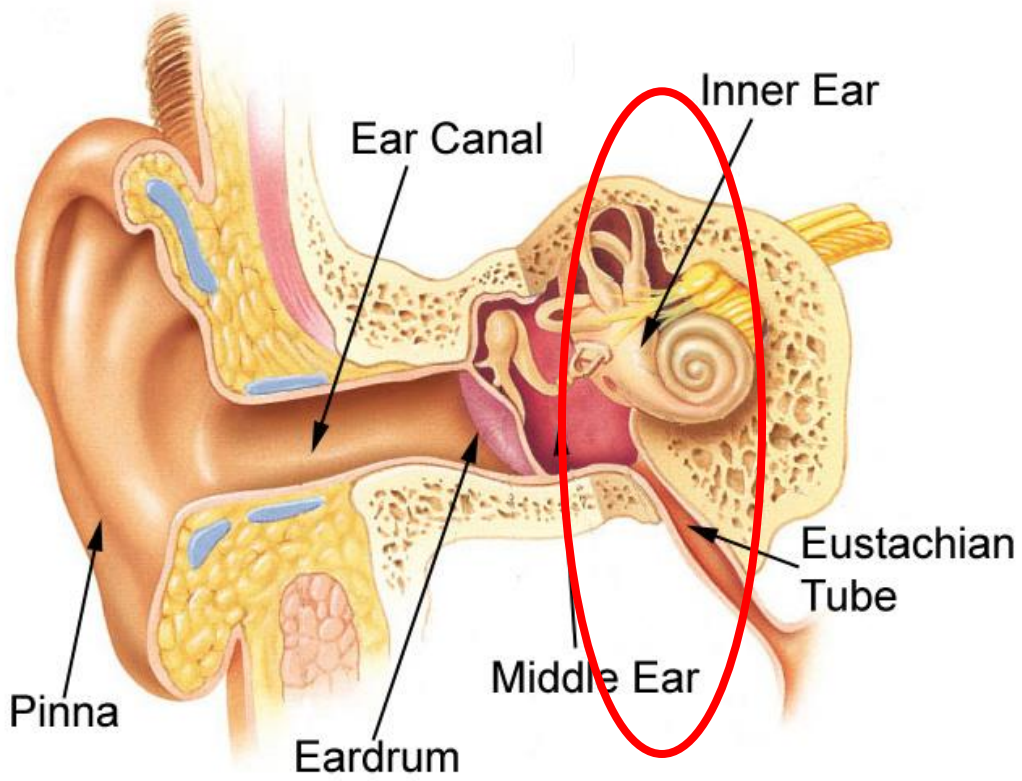
Changes in the Middle Ear

- Stiffening of tympanic membrane
- Middle ear bones become less spongy
- Changes may or may not cause hearing loss



Changes in the Inner Ear

- Cochlea becomes damaged.



Prevalence of Hearing Loss

- 1 in 3 adults over the age of 60 years have difficulty hearing, and approximately 1 in 2 adults over the age of 75 years have a significant hearing loss (NIH, 2022).
- ONLY 20% of older hearing impaired adults & 15% of hearing impaired adults in their 50s USE HEARING AIDS!!
- 22.9 million older adults in the U.S. DO NOT wear hearing aids (Chien & Lin, 2012).

UNTREATED HEARING LOSS

- Depression
- Withdrawal
- Reduced Job Performance
- Diminished Health

→ Psychosocial problems

- Decreased cognitive skills

→ **Increased risk for dementia**

Results of Neurological and Audiological Changes

- Increased effort due to reduced ability to process spoken information.
- Affects the body's ability to react quickly to internal or external environment.
- Word finding difficulties.
- Difficulty having conversations.
- Difficulty with new learning.
- Difficulty with making new memories.
- Lack of auditory input from an untreated hearing loss could negatively effect neural pathways involved in memory and concentration.
- Difficulty functioning in everyday life.

Wong, et. al., 2011; Lindenberger & Baltes, 1994; Sekuler & Blake, 1987; Desjardins & Doherty, 2013; 2014; Desjardins, 2016 ; Kahneman, 1973; Rabbitt, 1968; Wingfield, Tun, McCoy, 2005; DesJardins, 2016.

Thank you!!

Questions??

Rethinking Challenges in Aging: A Multidisciplinary Approach

Presented by Cecilia Fierro, Alvaro Gurovich, Patricia Lara, Anita Parada, and Carolina Valencia

UTEP

Objective

- To educate the next generation through Undergraduate Research in GEriatrics (URGE)

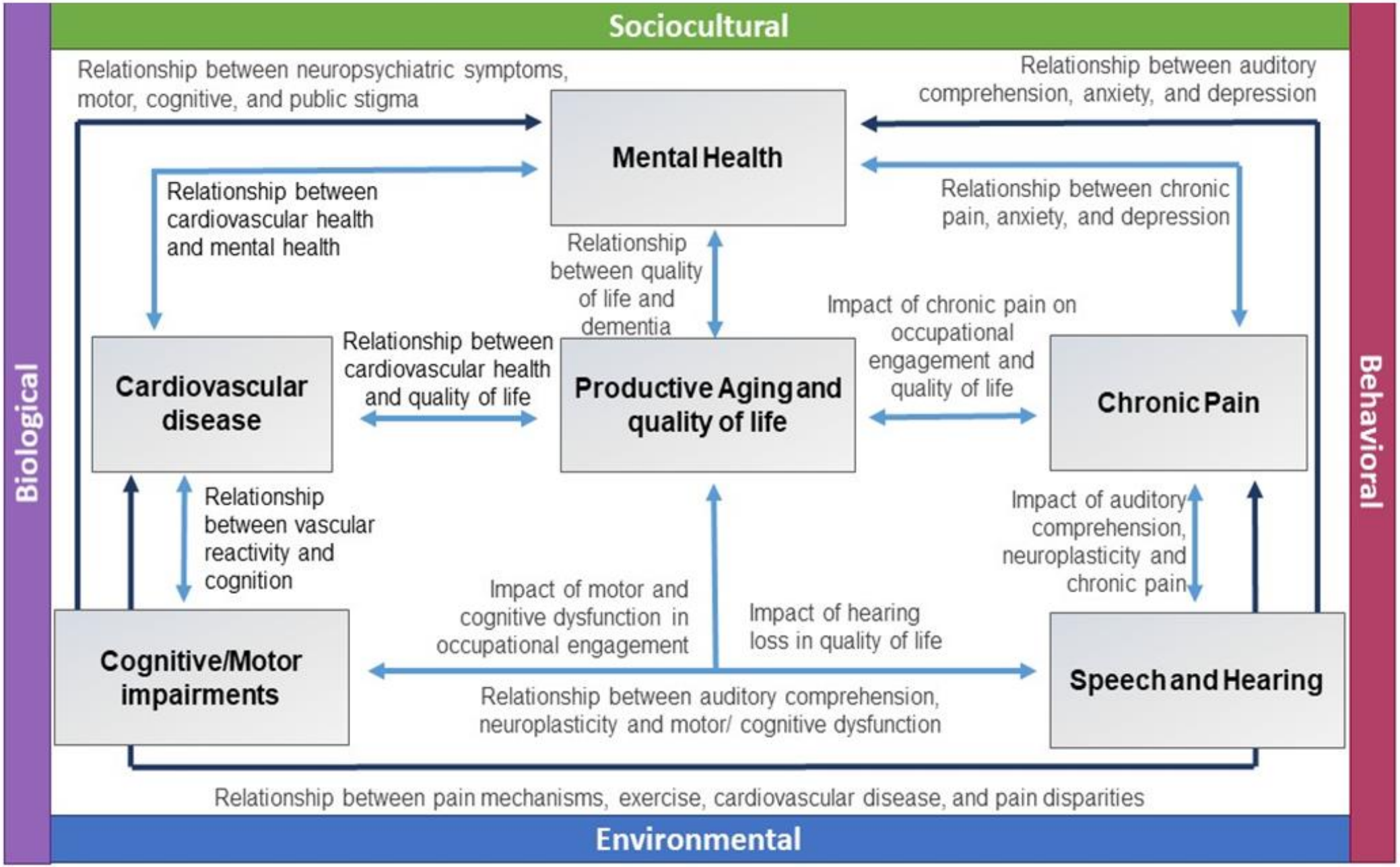
R25 grant from National Institute on Aging (NIA) Undergraduate Research in GEriatrics (URGE)

This proposal is requesting funding to establish the **U**ndergraduate **R**esearch in **GE**riatrics (URGE) program at The University of Texas at El Paso (UTEP).

URGE will engage four cohorts of 8-12 undergraduate students each (40 students total) in an innovative program that includes two years of research experiences, courses in aging, and opportunities to enhance research, transferable and interdisciplinary skills.

Through these activities URGE aims to immerse undergraduate students from groups underrepresented in Medicine, Science, Technology, Engineering and Mathematics (MSTEM) in research on aging, and empower them to pursue graduate programs and careers in this area

Comprehensive interdisciplinary approach to research on aging



Undergraduate Research in GEriatrics (URGE): Purpose

- To engage students in research on aging and the aging population
- To bring awareness regarding the issues that impact the aging process
- To promote and facilitate interdisciplinary and multidisciplinary collaborations that can promote productive aging

Undergraduate Research in GEriatrics (URGE)

Thank you!

THE UNIVERSITY OF TEXAS AT EL PASO