Advanced Imaging Research at MUSC

New Visions on Aging and Alzheimer’s disease and Related Dementias

Andreana Benitez, PhD
Department of Neurology
Center for Biomedical Imaging
Main Points

• Alzheimer’s disease takes a long time to develop
  • Clarifying terms: What is MCI? What is AD?

• We may see it before we feel it
  • Early detection using MRI and PET

• We are doing visionary imaging research at MUSC
  • Studying brain wiring, firing, and spreading
Alzheimer’s disease is not normal aging.
Memory / Thinking

Time (in years)

Normal Aging

Preclinical

MCI (Mild Cognitive Impairment)

Dementia

↓ Independence
↓ Dependence

↑ Independence

Mild

Moderate

Severe

2 in 3 stay normal

1 in 3 develop dementia

2 in 3 develop dementia

70% Alzheimer’s disease

Vascular Disease

Other Causes

0%

Changing What’s Possible | MUSC.edu
Seeing Alzheimer’s disease before dementia starts.

**Brain Imaging:**
MRI and PET
Brain Imaging

MRI
Magnetic Resonance Imaging

PET
Positron Emission Tomography
Brain Imaging

**MRI**
Magnetic Resonance Imaging

*Images of brain scans showing different stages of brain conditions:*
- Normal Aging
- MCI
- AD Dementia

**PET**
Positron Emission Tomography

*Images of PET scans showing positive and negative results.*

---

Medical University of South Carolina
Changing What’s Possible | MUSC.edu
Brain Imaging Research at MUSC

Science is but an image of the truth. –Sir Francis Bacon
Brain Imaging Research at MUSC

Imaging Aging and Memory (IAM)
PIs: J. Helpern & J. Mintzer

MR Imaging of Neurodegeneration (MIND)
PI: A. Benitez

Connectomics for Understanding Risk for Dementia and AD (CURforDAD)
PIs: J. Joseph & J. Mintzer

The Heart: A Window to the Brain
PI: F. del Monte
Brain Imaging Research at MUSC
Procedures

Imaging

Memory Testing Questionnaires

Blood Draw Genetic Testing
What do we want to learn?

CONNECTIVITY

WIRING
FIRING
SPREADING

Beta-Amyloid Plaque
Imaging the Brain: **WIRING**
IAM and MIND studies

**Recruiting Participants:**
- Ages 45-85
- No problems with memory/thinking
  or
- Diagnosed with MCI
Imaging the Brain: FIRING
CURforDAD Study

Recruiting Participants:

- Ages 45-85
- Diagnosed with MCI
  or
- Diagnosed with Alzheimer’s dementia
Imaging the Brain: SPREADING
The Heart-Brain Institute

Amyloid in the BRAINS of Alzheimer’s patients.

Amyloid in the HEARTS of heart disease patients.

Amyloid in the HEARTS of Alzheimer’s patients!

Amyloid in the BRAINS of heart disease patients?
Main Points

• Alzheimer’s disease takes a long time to develop
  • Alzheimer’s disease is not normal aging!

• We may see it before we feel it
  • Early detection is key to prevention!

• Join us in our fight against Alzheimer’s disease at MUSC!