Biomarkers Defined

- Biomarkers are measures of what is happening inside the living body, shown by laboratory and imaging tests.
- Biomarkers can help doctors and scientists:
  - diagnose diseases and health conditions,
  - find health risks in a person
  - monitor responses to treatment
  - see how a person's disease or health condition changes over time
Alzheimer’s Biomarkers

- Biomarkers measure changes in the size and function of the brain.
- Measure levels of specific proteins seen on brain scans and in cerebrospinal fluid, blood.
  - A Beta Proteins (precursors of amyloid) which accumulates in brains.
  - Tau Proteins.
  - Phospho Tau.
Cerebrospinal Fluid Biomarkers

- Beta-amyloid 42 (the major component of amyloid plaques in the brain)
- Tau
- Phospho-tau (major components of tau tangles in the brain)
- In Alzheimer’s disease, beta-amyloid 42 levels in CSF are low, and tau and phospho-tau levels are high, compared with levels in people without Alzheimer’s or other causes of dementia.
Imaging Biomarkers

MRI
MRI scans provide pictures of brain structures and whether abnormal changes, such as shrinkage of areas of the brain. MRI can show:
- brain structure and size
- chemistry
- Brain blood flow,
- Brain function MRI

PET Scan
Positron Emission Tomography (PET) Scan uses small amounts of a radioactive substance, called a tracer, to measure specific activity—in different brain regions.
- Different PET scans use different tracers.
- PET is commonly used in dementia research but less frequently in clinical settings.
PET Scans

- FDG PET Scan - Measures glucose in the Brain. Low glucose is correlated with dementia.
- Tau PET scans detect abnormal accumulation of a protein, tau, which forms tangles in nerve cells in Alzheimer’s disease and many other dementias.
- Amyloid PET Scan - Measures Abeta accumulation associated with Alzheimer’s.

Pet Scans are used primarily in research and generally not in clinical practice.
Alzheimer’s Disease Genetics: The Short Version

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Departments of Neurology and Human Genetics, Emory University
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<th>External Industry Relationships *</th>
<th>Company Name</th>
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<td>Equity, stock, or options in biomedical industry companies or publishers</td>
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<td>Royalties from Emory or from external entity</td>
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<td>Industry funds to Emory for my research</td>
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The Human Genome

- A history book of our species
- A detailed manual for every cell in the body
The Human Genome

• About 3 billion letters in a precise order

• Each cell stores 2 copies in 23 different chromosomes
  – 46 total chromosomes

• Each parent contributes half of their chromosomes to their children
46 Human Chromosomes
Resemblance among relatives
Resemblance among relatives
Small building blocks can be used to make large things
Studying exceptionally rare families with young-onset AD
AD-causing genes (exceptionally rare)

- Occur in 0.01% of AD
- Three genes:
  - APP
  - PSEN1
  - PSEN2
Common Alzheimer’s Disease

- 100s or 1000s of small changes contribute

- About 20 “high risk” genes are known:
  - APOE
    - E2, E3, E4
  - BIN1
Common Alzheimer’s Disease

- Risk among relatives allows us to estimate that the disease is:
  - 60-70% genetic
  - 30-40% environment
What can you do?

- Do not get genetic testing for AD unless directed by your doctor and after consultation with a genetic counselor.
- Focus on what you can modify by:
  - Exercising
  - Eating a balanced diet
  - Continuing to learn
  - Purpose in Life
Covid-19: Hydroxychloroquine?

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Infection Prevention Manager
Emory Ambulatory Clinics and ASC
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Should I take hydroxychloroquine?

- A choice to take a medication should be decided between you and your doctor. It is important to always discuss the risk vs. the benefit as well as any medication interactions and side effects.

- There are currently no medications licensed that are proven to prevent or treat COVID infections; there are several on-going drug trials.
While several drug trials are ongoing, there is currently no proof that hydroxychloroquine or any other drug can cure or prevent COVID-19. The misuse of hydroxychloroquine can cause serious side effects and illness and even lead to death.

WHO is coordinating efforts to develop and evaluate medicines to treat COVID-19.

FACT:
There are currently no drugs licensed for the treatment or prevention of COVID-19

#Coronavirus    #COVID19
Prevention:

• Stay home
• Avoid touching your eyes, nose and mouth
• Wash your hands
• Social distance
• Routine cleaning of high touch surfaces
• Good respiratory etiquette:
  Coughing into elbow/ tissue
  Sneeze into elbow/ tissue
  Immediately washing or sanitizing hands afterwards