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**ALZHEIMER'S DISEASE**  
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Alzheimer's disease is a disorder that is characterized by an increase of amyloid-beta ( $A\beta$ ) plaques in the brain, which causes brain cells to die and the overall size of the brain to shrink. This disease gets worse overtime and is distinguished by a slow decline in memory, behavior, thinking patterns, and social skills. The mean diagnostic age of this disease is people 65 years of age and older. There're around 55 million people worldwide with dementia. It's estimated that sixty to seventy percent of them have Alzheimer's disease. Almost two-thirds of people with this disease are women. Although a clear answer to this question is still unclear, scientists speculate that women have a higher chance of developing Alzheimer's disease due to a higher average lifespan and a stronger immune response in case of pregnancy. Therefore, women may end up having more amyloid plaques than men. The early indications of Alzheimer's disease incorporate failing to remember ongoing events or discussions, and it gradually advances to powerlessness to perform regular errands, such as dealing with one's own hygiene needs.

The aim of this presentation is to highlight the defining characteristics of Alzheimer's disease and discuss new options in diagnosing and treating beginning phases of this condition. Although brain imaging tests have been available for diagnosing Alzheimer's disease for some time, PET scans have recently been established to detect groups of amyloid proteins. Additionally, MRI and CT brain imaging tests can also be utilized to detect degeneration of the brain and its cells.

A promising new clinical trial, published in May 2023, showed a decrease in cognitive and physical brain decay by 27% over one and a half years when taking a medication called lecanemab at beginning phases of Alzheimer's disease. Another drug that has been extensively studied in clinical trials is donanemab. The main difference between these two drugs is that they target the plaques at different stages as they build up in the brain. New information, published from a different journal, proposes that donanemab slows cognitive deterioration by 35%. Lecanemab trial results showed a higher mental decline with only 27% of improvement in cognitive function. Both drugs are given intravenously, but the dosage varies based on the medication.

Despite these advancements, there have been delays in releasing these new treatments to the public. The Food and Drug Administration (FDA) announced in the Spring of 2024 that it has postponed the choice to distribute donanemab to the general public. It was found that three-in-ten clinical trial participants taking lecanemab or donanemab showed a new development of amyloid-related imaging irregularities, defined as ARIA, causing cerebral edema or hemorrhaging.

Despite these delays, there is hope that effective treatments for Alzheimer's disease will soon come available to the public. Medications, like lecanemab and donanemab, are being studied to show a significant reduction in the amount of amyloid plaques in the brain and delay cognitive decline. If these treatments prove to be safe and cause minimal side effects, this can be a life-changing breakthrough in modern medicine.