**Trying to Prevent Alzheimer’s Disease**

**Abstract**

 Can Alzheimer’s disease be prevented or maybe even cured? Alzheimer’s disease is, currently, an uncurable disease. Alzheimer’s effects more than 5 million people in the U.S. alone and this includes those who have it and families of those who have it. It can also cost a lot of money for treatments that currently are more unsuccessful than they are successful. There are many trials using anti-amyloid therapies that are being done today. Although nothing is inevitable there may be ways to prevent or delay contracting the disease. There also may be a way to exercise our brains to make it better as we age.

**Introduction**

Alzheimer’s disease (AD) affects more than 5 million Americans. It can be costly and take a toll on the person who has AD, the families involved, as well as the society. Alzheimer’s is so bad that if we do not find anything to help cure it or at least slow it down by 2050 over 16 million Americans will have AD and 60 million people will have it worldwide, according to the predictions made by the Alzheimer’s Association. Not many clinical trials have met their endpoints which is phase III. Only 5 clinical trials in the past 25 years have successfully passed. Out of the 5 that have passed 4 of them are available today. The National Alzheimer’s plan act is trying to develop a disease-modifying agent by 2025 because since 2003 all the symptoms and disease-modifying agents have all failed to pass phase II or III. In order to meet the date that is projected the medication must already be into phase II testing to even make it on the market. If we were able to get a disease-modifying agent (DMT) available by 2025 the projected 16 million Americans would be reduced to 10.3 million and it would save the society about $367 billion dollars.

**Recent Progress (Body)**

Can Alzheimer’s be prevented and what steps can we take to help prevent it? There are many factors that play a role in prevention. These factors include modifiable variables like your social habits and life style and nonmodifiable factors like genetics or age. Precision medicines are being applied to neurodegenerative disorders like AD which can helps to start prevention processes. Precision medicine can be defined as a customization of healthcare, with medical decisions, treatments, and practices that can be modified for each individual person. Medicines like that can have great potential for pharmaceutical and nonpharmacological approaches. The recent revisions to the clinical criteria for AD and mild cognitive impairment (MCI) helped us better understand the role of biomarkers in defining the pathological cascade, and the addition of research criteria for presymptomatic disease. This by which sets the stage for better modeling of the preclinical and prodromal stages of diseases. Due to the efforts of developing and validating fluids (blood and cerebrospinal fluid) and imaging biomarkers it is possible to explore underlying pathological changes in amyloid, tau, dopamine transport, inflammation, signaling pathways better, and in the future, alpha‐synuclein and TDP‐43 in symptomatic, prodromal, and presymptomatic individuals. With the advances in genetic, epigenetic, and “omic” (e.g., proteomic, lipidomic, metabolomic) the approaches will permit the modeling of transcriptional, translational, and posttranslational changes. Precision medicines could help with earlier identification, better opportunities, and better stratification. They can also help by getting a higher enrollment for randomized clinical trials with reducing screen failure rates which could eventually lead to better effective treatments. This is true not for just AD but for all neurodegenerative disorders (e.g., Parkinson’s disease and dementia). Based on this information, precision medicine approaches with demonstrable benefits in oncology are being applied to neurodegenerative disorders. Thus, leading us is in place to begin prevention initiatives.

**Modifiable Factors (Body cont.)**

 There are many factors that can be modified to prevent from getting AD. Modifiable factors can include smoking, alcohol abuse, obesity, depression, diabetes, and many more. These are the kind of factors that we can change to help slow down the process of developing AD. There are also protective factors that can help prevent it. These include mindfulness and wellness activities, social engagement, physical activity and exercise, dieting, optimism and purpose in life, and many more. When you practice using more protective factors daily you are helping yourself from developing AD. Risk factors like smoking and alcohol, depression, low cognitive activity, and diet account for more than half of the risk for AD combined. Diet is one of the hardest risk factors to address because it is dependent on income as well as access to fresh foods. Brain Health (LIBRA) performed a 16-year observational study for individuals using Brain Health’s lifestyle to measure modifiable risk factors. There were 949 individuals participating in this study. On the LIBRA score a 1-point increase was associated with a 19% greater chance of developing dementia. In the article by Galvin a metanalyses of 19 studies was taken. It said that cognitive leisure activities, including crossword puzzles, card games, computer use, arts and crafts, life‐long learning, group discussions, and music, had a protective effect (odds ratio (OR) = 0.58).” When you do things that help your mind grow and strengthen your brain it gives you a protective effect then slows down the process of developing dementia or AD. In addition to cognitive leisure activities having a protective effect, Physical activities may lead to a 20% to 65% risk reduction. Physical activities may lead to a risk reduction depending on the type and intensity of activity through mechanisms involving lower vascular disease risk, better respiratory function, stimulation of trophic factors, and lower oxidative stress and inflammation. Based on the objective measurement, midlife vascular risk factors demonstrated greater risk of dementia in later lifetime. In another study of 2,000 individuals aged 71 to 78, work‐related stress increased the risk of Mild Cognitive Impairment (MCI) (OR = 1.38), dementia (OR = 1.53), and AD (OR = 1.55). Based on the study above exercising your brain may one of the best ways to prevent from developing AD. Stress also seems to play a big role in increasing the chances you get AD or Dementia. Risk factors understandably play an important role in prevention or even development of Alzheimer’s disease and related diseases.

**Discussion**

All the trials containing disease-modifying agents since 2003 have all failed to pass the clinical trial phases II or III due to safety issues. There are many risk factors that can either help or hurt your chances of preventing AD or other related diseases. Studies have shown that by exercising your brain and reduce the stress in your life you can reduce your chances of getting AD or Dementia. By exercising better selfcare and social interaction with less stress we can increase the chance of prevention. Now with the possibility of exploring the underlying pathological changes in tau, dopamine transport, inflammation, and signaling pathways we can try and better understand diseases like AD and dementia. Precision medicine approaches specifically target the heterogeneity of AD. This is accomplished by identifying person‐specific risk factors and applying a customized intervention directed against this risk profile. If precision treatments do not cure or even prevent AD, by removing other pathways to neurodegeneration they could help amyloid therapies finally reach their endpoint and make it on the market. Sometimes it’s good to try something other than the generalized methods and consider other alternatives to combat AD and other neurodegenerative disorders.

References

Galvin, James E. “Prevention of Alzheimer’s Disease: Lessons Learned and Applied.” *Journal of the American Geriatrics Society*, vol. 65, no. 10, Oct. 2017, pp. 2128–2133. *EBSCOhost*, doi:10.1111/jgs.14997.