How to treat Alzheimer’s with new LED light technology

Nguyen, Ngoc Mai ; Petersen, Paul Michael; Broeng, Jes

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How to treat Alzheimer's with new LED light technology

Ngoc Mai Nguyen[1,*], Paul Michael Petersen[2] and Jes Broeng[2]
[1]University of California, Berkeley and Berkeley, CA, USA
[2]Technical University of Denmark and Lyngby, Denmark
*E-mail: mnguyen61288@berkeley.edu

***Abstract*— We have developed a new therapeutic LED lamp that modulates with 40 Hz the neuron responses in different parts of the brain without affecting the human vision. The lamp may in the future be used to treat patients with Alzheimer's disease**

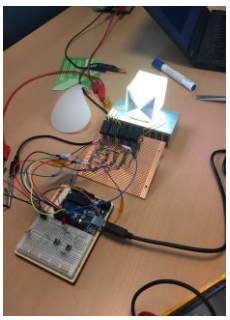
Keywords— LED; Alzheimer's; optogenetic; light therapy (3-5 words)

I. INTRODUCTION

Light-emitting diodes (LEDs) have been long utilized as a light source for industrial and commercial environments. In the past 10 years, it has become the dominant technology used for backlight displays such as ipads, laptops, and television sets. Its potential to be utilized for medical application have recently been examined for circadian disruption and neuropathological diseases such as Alzheimer's. In this lettter, we will discuss how new LED technologoy can be utilized to treat or prevent the progression of neurodegenerative diseases.

II. FIGURES AND TABLES

Fig. 1. First mock up of how the light protoype.



III. SUMMARY

One of the biggest demographic challenges in Europe and the US is the rapidly growing number of people with Alzheimer's and dementia (~30% of the world population has or will develop the neurodegenerative disease). Dementia is one of the leading causes of death among those 60 years and over. The increase in the number of Europeans and Americans living with dementia is already creating immense challenges for the health and social systems costing upwards of 259 billion dollars in healthcare. For most people, the cognitive decline starts with a failing memory and a lack of perception and attention. One of the things that have been attributed to the progression of Alzheimer's is the altered oscillatory rhythmic activity that could lead to cognitive abnormalities and beta amyloid developmet in the brain [1]. This desychronization of neuronal oscillations can be detected prior to the development of symptoms of Alzheimer's. Recently the use of ligth therapy as a non-invasive tool has been explored in the treatment of Alzheimer's. Studies have shown that flickering light at 40 hertz can reduce the beta amyloid plaque production (early clinical signs of Alzheimer's) in mice by stimulating the brain wave activity in the visual cortex [2]. However, trials on mice cannot be duplicated in humans due to the negative side effects of flickering that can induce very same positive effects. The current study addresses the side effects induced by flickering lights by utilizing the brains ability to detect and respond to specific wavelength that differ from the wavelength sensitivity of the eye vision [3], that are no longer perceived as a flicker by the visual cortex but the increase in gamma oscillations still be detected.

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