



universität
wien

DIPLOMARBEIT/DIPLOMA THESIS

Titel der Diplomarbeit / Title of the Diploma Thesis

„Impact of vitamin D and strength training on
chromosomal damage in elderly“

verfasst von / submitted by

Sanja Kelecevic

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree
of

Magistra der Pharmazie (Mag.pharm.)

Wien, 2020 / Vienna, 2020

Studienkennzahl lt. Studienblatt /
degree programme code as it appears on
the student record sheet:

UA 449

Studienrichtung lt. Studienblatt /
degree programme as it appears on
the student record sheet:

Diplomstudium Pharmazie

Betreut von / Supervisor:

Univ.-Prof. Mag. Dr. Karl-Heinz Wagner

1. Introduction

Worldwide, life expectancy has increased in recent decades, and, as a result, a growth in population over 60 years is observed. Between 2020 and 2050, the number of people over the age of 60 in Europe is expected to increase from 25% to 35% (United Nations, 2019). With aging, various changes occur in humans, which can present a great risk for the development of many diseases such as cardiovascular diseases, diabetes, or cancer (National institute of ageing & Health National institute, 2019). Due to age-related changes, there is an increased susceptibility to the DNA damages as well as a decrease in muscle mass and muscle strength. Maintaining an active lifestyle can improve muscle function and consequently mobility in older individuals. Additionally, physical activity contributes to resistance against DNA damage (Franzke et al., 2015; Franzke et al., 2015).

One of the factors that affect age-related changes and most notably skeletal health is vitamin D. Numerous studies indicate a correlation between vitamin D and the function of the cardiovascular, immune, and musculoskeletal systems (Meehan & Penckofer, 2014; Moran et al., 2013). Furthermore, the physiological concentration of vitamin D has been found to protect cell membranes against oxidative stress as it prevents from DNA double-strand breaks, and stabilizes chromosomal structures (Chatterjee, 2001). The risk of lower vitamin D levels in the elderly is greater due to decreased dietary intake and reduced cutaneous synthesis (Wyskida et al., 2017).

In this diploma thesis, partial results of the "Nutri Aging" study at the University of Vienna will be presented, with the main objective to present data based on the cytokinesis-block micronucleus cytome assay. This study aimed to investigate the impact of daily and higher monthly doses of vitamin D on DNA- and chromosomal damages in combination with 10 weeks of strength training in healthy community-dwelling adults aged 65 to 85 years.