

**FINAL SCIENTIFIC ASSIGNMENT
INTERNATIONAL DENTAL COURSE**

**The Effect of Secondary Calciprotein Particles on
Calcification in MC3T3-E1 Cell Cultures**



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C180452**

**Department of Calcified Tissue Biology
School of Dentistry, Hiroshima University
Hiroshima, Japan
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This final scientific assignment was completed to fulfill
the requirement of bachelor program from
Faculty of Dental Medicine Airlangga University under
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Faculty of Dental Medicine Airlangga University Indonesia

LEMBAR PENGESAHAN

**THE EFFECT OF SECONDARY CALCIPROTEIN PARTICLES
ON CALCIFICATION IN MC3T3-E1 CELL CULTURES**

SKRIPSI

**Diajukan Sebagai Salah Satu Syarat Untuk Menyelesaikan Pendidikan
Dokter Gigi Di Fakultas Kedokteran Gigi Universitas Airlangga Surabaya**

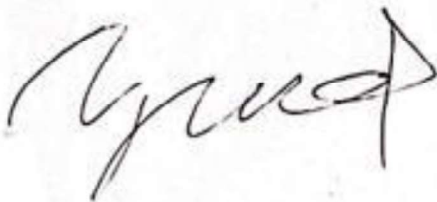
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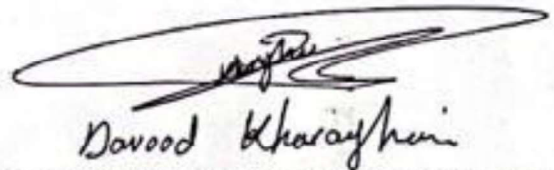
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Professor Yuji Yoshiko, Ph.D.

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FAKULTAS KEDOKTERAN GIGI, UNIVERSITAS AIRLANGGA
SURABAYA**

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SURABAYA**

2022

APPROVAL SHEET

We certify that we have read the final scientific assignment

Prepared by : Hayyu Norma Almira

Entitled : The Effect of Secondary Calciprotein Particles on Calcification in
MC3T3-E1 Cell Cultures



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JUDGES

This Final Scientific Assignment has been reported on August 23rd, 2022

- 1. Professor Yuji Yoshiko, PhD**
- 2. Special Asst. Prof. Davood Kharaghani, Ph.D.**

SURAT PERNYATAAN TENTANG ORISINILITAS

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Menyatakan bahwa saya tidak melakukan plagiat dalam penulisan skripsi saya yang berjudul:

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Apabila pada suatu saat nanti terbukti melakukan tindakan plagiat, maka saya akan menerima sanksi yang telah ditetapkan.

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Surabaya, 1 November 2022



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ABSTRACT

Background: Vascular calcification (VC) leads to disturbing windkessel physiology function and promotes heart failure. In Chronic Kidney Disease patients, VC is one of the common complications that can be a predictor of vascular mortality. Fetuin-A is a circulating glycoprotein that is involved in various stages of atherosclerosis. Fetuin-A plays a role in the formation of the primary CPPs (CPPIs) including calcium (Ca) and phosphate (Pi) to prevent VC. **Objective:** To investigate the calcification expression of MC3T3-E1 cell under CPPIs treatment with or without 50 µg supplemented medium of Ca, 3 mM of Pi, and 2.7 mM of Ca. **Methods:** The presence of fetuin-A in CPPIs was detected using Western blotting with primary antibodies against bovine asialofetuin and peroxidase-conjugated donkey anti-sheep IgG (H+L) was used as a secondary antibody to detect signals. Alkaline phosphatase (ALP)/von Kossa double staining was employed to visualize cell differentiation and matrix mineralization in cell culture. **Result:** The results shows that CPPIs induces calcification in the absence or presence of phosphate or calcium supplemented medium. **Conclusion:** CPPIs induced calcification in MC3T3-E1 cell cultures with or without either Pi or Ca. These results suggest that CPPIs may increase bone mineralization in vitro.

Keywords: CPPIs, MC3T3-E1 cells, Western blot, Pi, Ca,

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