UNIVERSITI TEKNOLOGI MARA

ELUCIDATING MICRO-MORPHOLOGICAL AND KINETIC RELEASE OF GROWTH FACTORS FROM CONCENTRATED GROWTH FACTORS IN PERIODONTITIS PATIENTS WITH DIABETES MELLITUS TYPE 2

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PhD

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Objective This study aimed to (1) compare the morphology of Concentrated Factors (CGF) of diabetic patient and healthy individuals under scanning electron microscope (SEM), (2) analyze the kinetic release of growth factors from CGF of healthy patient (3) compare the kinetic release of growth factors from CGF of diabetic patient and healthy individuals with generalized periodontitis. **Materials and Methods** Venous blood was collected from eight diabetic patient (test) and eight medically healthy (control), both with generalized periodontitis stage 2 and 3. CGF were extracted from the centrifuged blood and placed in DMEM culture medium. The culture medium was recollected at 5 hours, 24 hours, 5 days, 7 days, and 10 days. PDGF, TGF, FGF, and VEGF were quantified using MILLIPLEX® MAP Human 4-plex Proteomics Assay kit. **Results** The SEM of test group shows 3D collagen network architecture which is thick and condensed with multiple branches while the control group is thinner strand and less branches. All four growth factors measured were continuously released until day 10 in both healthy and diabetic groups. There were statistically significant different in the pattern of PDGF ($F=3.805$, $p=0.018$) and TGF ($F=2.836$, $p=0.05$) release with relation to time when comparing healthy and diabetic groups. The release of PDGF were significantly different at T3 where 15,976 pg/ml (±1529) released from healthy group where only 6,074 pg/ml (±1755) were released from diabetic group. There were no significant different of TGF release at any time points. Moreover, there were no statistically significant different comparing the kinetic release pattern of VEGF and FGF or at specific time point between healthy and diabetic group. **Conclusion** The CGF of diabetic mellitus released similar concentration of growth factors, at similar pattern when compared to CGF of healthy individuals. **Clinical Relevance** CGF of diabetic patient may have similar physical and biological properties as healthy patient, thus can be utilize as an autologous source of growth factors for accelerating wound healing.

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