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Shear force activates secretion of immunosuppressive cytokines by PDL cells

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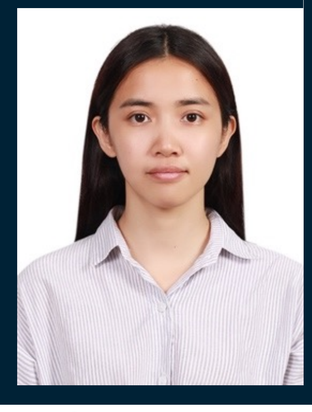
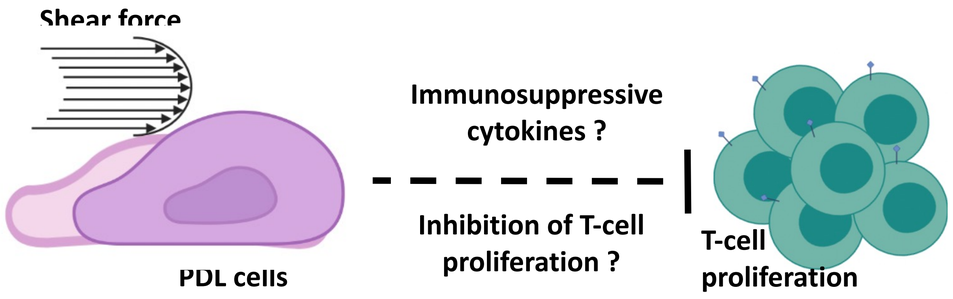


INTRODUCTION

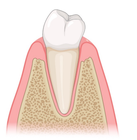


Immunosuppressive property is the ability of cells to regulate function and differentiation of immune via via the secretion of indoleamine 2,3-dioxygenase (IDO) and TGF-β1, which is a immunosuppressive cytokines to inhibit T-cell proliferation and induce differentiation of regulatory T-cell (1). However, this property needs the inductive signalling process such as inflammation. Mechanical stress has been proposed to be another inductive factor of this property (2-3). Periodontal ligament cells, resided in periodontal space, is a type of cells that always receive shear force from the function of teeth and oral cavity. PDL cells can secret several immunosuppressive molecules including IDO and TGF-β1, however, the interaction between shear force and secreted immunosuppressive molecules is still unclear.

OBJECTIVES

- To investigate the influence of shear force on secretion of immunosuppressive cytokines by PDL cells.
- To determine effect of condition medium from shear force-induced PDL on T-cell proliferation

METHODOLOGIES

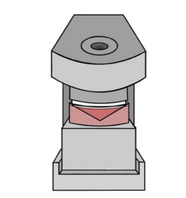


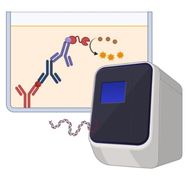
1. PDL cell cultures

- PDL cell from extracted teeth
- $CD4^+$ T-cell isolated from PBMC using sepmate-50

2. Shear stress experiment

- Magnitudes at 0, 0.5, 5, 10 dyne/cm² for 3 hours and continueously culture up to 24 hours
- Addition of cycloheximide (CHX)

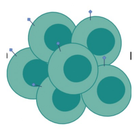




3. Gene and protein expression

- RT-PCR
- IDO activity assay
- ELISA assay

4. Lyophilzation



5. Cell proliferation

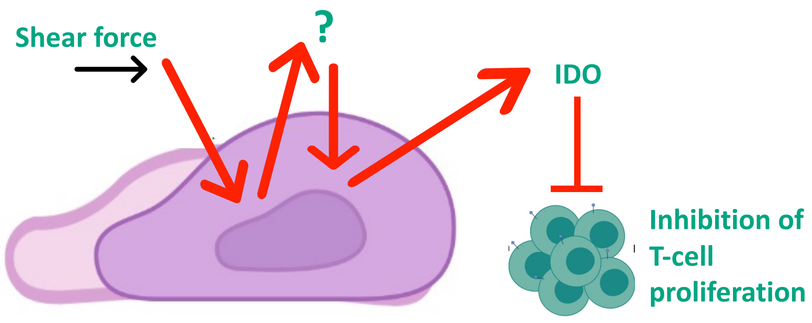
- Resazurin assay

6. Statistic analysis

- One-way ANOVA

CONCLUSION

Shear force could promote immunosuppressive property of PDL cells by inducing the expression and secretion of IDO. Furthermore, CM from shear force-induced PDL cells could inhibit proliferation of $CD4^+$ T-cell.



RESULTS

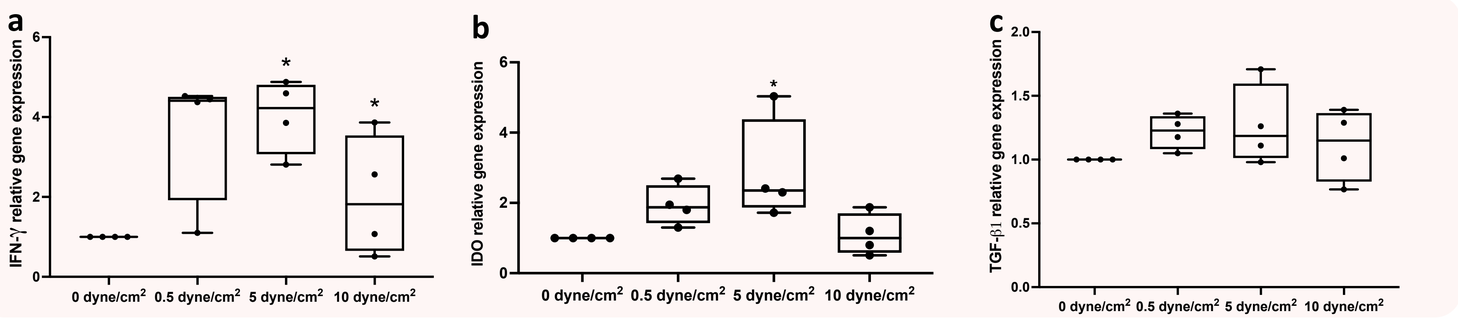


Fig1. The results shown that 5dyne/cm² significantly induced mRNA expression of IFN-γ (a) and IDO (b), but not TGF-β1 (c) by using RT-PCR. (*$p<0.05$)

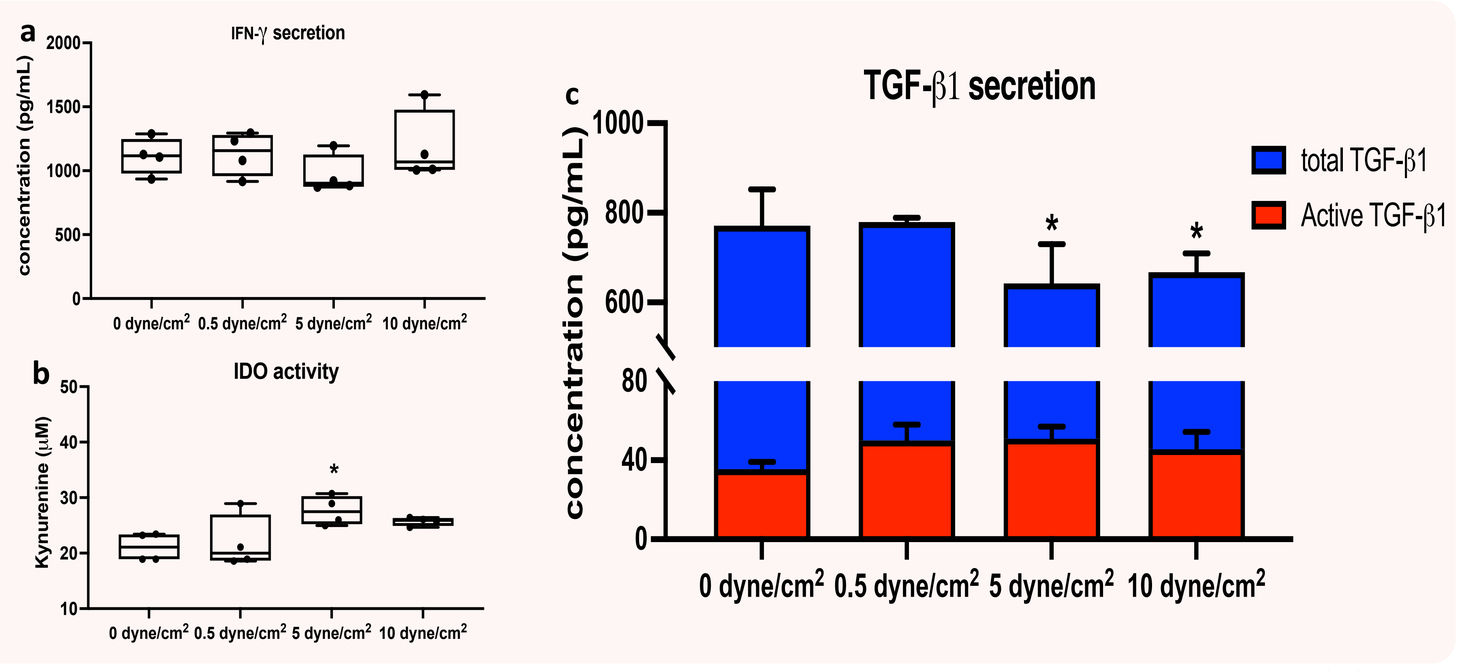


Fig2. The results shown that shear stress significantly induced secretion of IDO (b), but not IFN-γ (a) and TGF-β1 (c) by using IDO activity assay and ELISA assay, respectively (*$p<0.05$). Subsequently, the optimal magnitude at 5dyne/cm² would be used in next experiment.

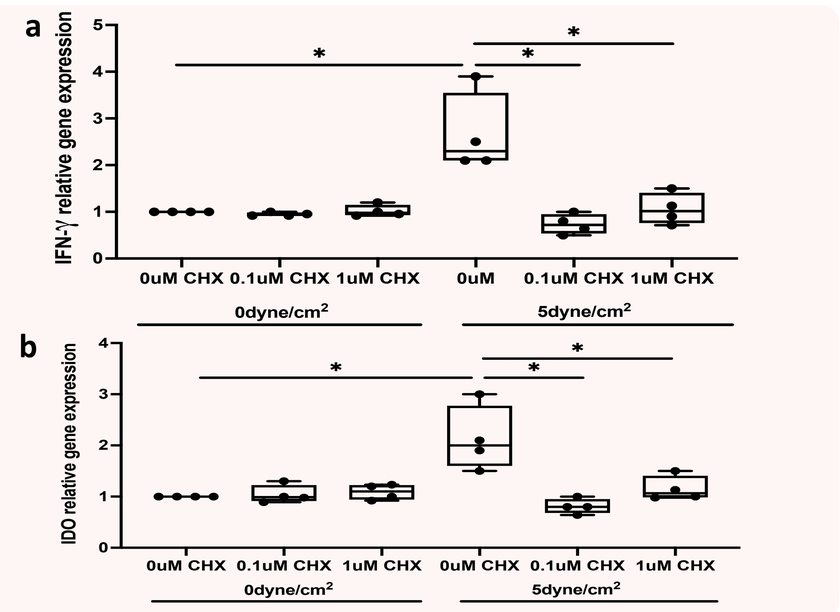


Fig3. The results shown that IFN-γ (a) and IDO (b) was inhibited mRNA expression by using CHX (*$p<0.05$).

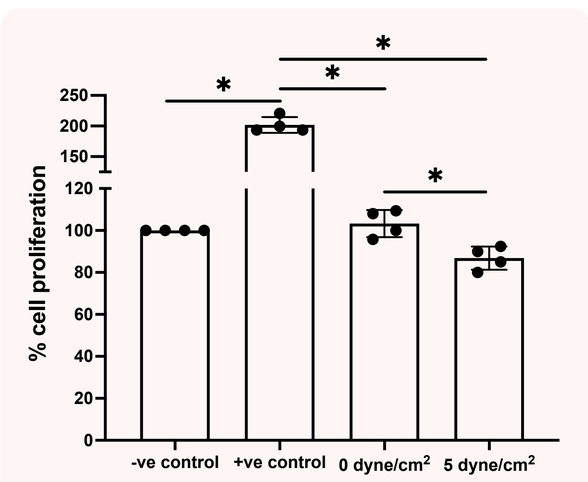


Fig4. The results shown that condition medium at 5dyne/cm² significantly inhibited proliferation of $CD4^+$ T-cell when compare with – ve control group and + ve control group (*$p<0.05$).

ACKNOWLEDGEMENT

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