

REFERENCES

- Albander,J., Olsen,I., and Gjermo,P.1990. Associations between six DNA probe-detected periodontal bacteria and alveolar bone loss and other clinical signs of periodontitis. Acta Odontol. Scand. 48: 415-423.
- American Academy of Periodontology. 1996. Ann. Periodontol. 1: 926-932.
- Aoyagi,T., Sugawara-Aoyagi,M., Yamazaki,K., and Hara,K. 1995. Interleukin4(IL-4) and IL-6-producing memory T-cells in peripheral blood and gingival tissues in periodontitis patients with high serum antibody titers to *Porphyromonas gingivalis*. Oral Microbiol. Immunol. 10: 304-310.
- Aramaki,M., Nagasawa,T., Koseki,T., and Ishikawa,I. 1998. Presence of activated B-cells in chronic inflamed gingival tissue. J. Clin. Immunol. 18: 427-429.
- Bertolini,D.R., Nedwin,G.E., Bringman,T.S., Smith,D.D., and Mundy,G.R. 1986. Stimulation of bone resorption and inhibition of bone formation *in vitro* by human tumor necrosis factor. Nature 319: 516-518.
- Bevilacqua,M.P., Pober,J.S., Wheeler,M.E., Cotran,R.S., and Gimbrone,M.A.Jr. 1985. Interleukin 1 acts on cultured human

vascular endothelium to increase the adhesion of polymorphonuclear leukocytes, monocytes, and related leukocyte cell lines. J. Clin. Invest. 76: 2003-2011.

Bickle,M. 1993. The role of interleukin-8 in inflammation and mechanisms of regulation. J. Periodontol. 64: 456-460.

Boyum,A. 1968. Isolation of leukocytes from human blood. Further observations. Scand. J. Clin. Lab. Invest. 97(suppl.): 31-50.

Bragd,L., Dahlen,G., Wikström,M., and Slots,J. 1987. The capability of *Actinobacillus actinomycetemcomitans*, *Bacteroides gingivalis* and *Bacteroides intermedius* to indicate progressive periodontitis; a retrospective study. J. Clin. Periodontol. 14: 95-99.

Caton,J. 1989. Periodontal diagnosis and diagnosis aids. In: Novins, M., Backer, W., Kornman, K., ed. Proceedings of the World Workshop in Clinical Periodontics. Princeton, Chicago: The American Academy of Periodontology: I1-I22.

Champaiboon,C., Yongvanichit,K., Pichyangkul,S., and Mahanonda,R. 2000. The immune modulation of B cell responses by *Porphyromonas gingivalis* and interleukin-10. J. Periodontol. 71: 468-475.

- Charon,J.A., Luger,T.A., Mergenhagen,S.E., and Oppenheim,J.J. 1982. Increases thymocyte-activating factor in human gingival fluid during gingival inflammation. Infect. Immun. 38: 1190-1195.
- Cole,K.L., Seymour,G.J., and Powell,R.N. 1987. Phenotypic and functional analysis of T cells extracted from chronically inflamed human periodontal tissues. J. Periodontol. 58: 569-573.
- Cowdery,J.S., Chace,J.H., Yi,A.K., and Kreig,A.M. 1996. Bacterial DNA induces NK cells to produce IFN- γ *in vitro* and increase the toxicity of lipopolysaccharides. J. Immunol. 156: 4570-4575.
- Cox,F.E.G., and Liew,F.Y. 1992. T-cell subsets and cytokine in parasitic infections. Immunol. Today 13: 445-448.
- Deshpande,R.G., Khan,M.B., and Genco,C.A. 1998. Invasion of aortic and heart endothelial cells by *Porphyromonas gingivalis*. Infect. Immun. 66: 5337-5343.
- Dinarello,C.A. 1987. The multiple biological properties of interleukin-1 influencing immunocompetent cells. Adv. Exp. Med. Biol. 213: 103-114.
- Ebersole,J.L., Taubman,M.A., and Smith,D.J. 1985. Local antibody response in periodontal disease. J. Periodontol. 56(suppl.): 51-55.

- Elias,J.A., Gustilo,K., Baeder,W., and Freundlich,B. 1987. Synergistic stimulation of fibroblast prostaglandin production by recombinant interleukin 1 and tumor necrosis factor. J. Immunol. 138: 3812-3816.
- Fujihashi, K., Yamamoto, M., Hiroi,T., Bamberg,T.V., McGhee,J.R., and Kiyono, H. 1996. Selected Th1 and Th2 cytokine mRNA expression by CD4+ T cells isolated from inflamed human gingival tissues. Clin. Exp. Immunol. 103: 422-428.
- Geivelis,M., Turner,D.W., Pederson,E.D., and Lamberts,B.L. 1993. Measurements of interleukin-6 in gingival crevicular fluid from adults with destructive periodontal disease. J. Periodontol. 64: 980-983.
- Gemmell,E., Feldner,B., and Seymour,G.J. 1992. CD45RA and CD45RO positive CD4 cells in human peripheral blood and periodontal disease tissue before and after stimulation with periodontopathic bacteria. Oral Microbiol. Immunol. 7: 84-88.
- Gemmell,E., Marshall,R.I., and Seymour,G.J. 1997. Cytokines and prostaglandins in immune homeostasis and tissue destruction in periodontal disease. Periodontol. 2000 14: 112-143.
- Gemmell,E., and Seymour,G.J. 1998. Cytokine profiles of cells extracted from humans with periodontal diseases. J. Dent. Res. 77: 16-26.

- Goodson,J.M., Tanner,A.R., Haffajee,A.D., Sornberger,G.C., and Socransky,S.S. 1982. Patterns of progression and regression of advanced destructive periodontal disease. J. Clin. Periodontol. 9: 472-481.
- Hinz,J., Hautzinger,H., and Stahl,K.W. 1986. Rationale for and results from a randomised, double-blind trial of tetrachlorodecaoxxygen anion complex wound healing. Lancet 12: 825-828.
- Hirschfeld,L.I., and Wasserman,B. 1978. A long-term survey of tooth loss in 600 treated periodontal patients. J. Periodontol. 49: 225-237.
- Holt,S.C. 1982. Bacterial surface structures and their role in periodontal disease: Host-parasite interactions in periodontal diseases. In: Genco,R.J., and Mergenhagen,S.E. ed. Proceedings of a symposium. Buffalo, New York: American Society for Microbiology: 139-151.
- Holt,S.C., Kesavalu,L., Walker,S., and Genco,C.A. 1999. Vilulence factors of *Porphyromonas gingivalis*. Periodontol. 2000 20: 168-238.
- Ishikawa,I., Nakashima,K., Koseki,T., Nagasawa,T., Watanabe,H., Arakawa,S., Nitta,H., and Nishihara,T. 1997. Induction of the

immune response to periodontopathic bacteria and its role in the pathogenesis of periodontitis. Periodontol. 2000 14: 79-111.

Ishimi,Y., Miyaura,C., Jin,C.H., Akatsu,T., Abe,E., Nakamura,Y., Yamaguchi,A., Yoshiki,S., Matsuda,T., Hirano,T., Kishimoto,T., and Suda,T. 1990. IL-6 is produced by osteoblasts and induces bone resorption. J. Immunol. 145: 3297-3303.

Ismail, M.O., Greenman,J., and Scully,C. 1988. Serum antibodies against the trypsin-like protease of *Bacteroides gingivalis* in periodontitis. J. Periodont. Res. 23: 193-198.

Killian,M., Thomsen,B., Petersen,T.E., and Bleeg,H. 1983. Occurrence and nature of bacterial IgA proteases. Ann. N.Y. Acad. Sci. 409: 612-624.

Kühne,H.H., Ullmann,U., and Kühne,F.W. 1985. New aspects on the pathophysiology of wound infection and wound healing-The problem of lowered oxygen pressure in the tissue. Infect. 13: 52-56.

Kurihara,N., Bertolini,D., Suda,T., Akiyama,Y., and Roodman,G.D. 1990. IL-6 stimulates osteoblast-like multinucleated cell formation in long term human marrow cultures by inducing IL-1 release. J. Immunol. 144: 4226-4230.

- Lamont,R.J., Chan,A., Belton,C.M., Izutsu,K.T., Vasel,D., and Wienberg,A. 1995. *Porphyromonas gingivalis* invasion of gingival epithelial cells. Infect. Immun. 63: 3878-3885.
- Lee,H.J., Kang,I.K., Chung,C.P., and Choi,S.M. 1995. The subgingival microflora and gingival crevicular fluid cytokines in refractory periodontitis. J. Clin. Periodontol. 22: 885-890.
- Linderman,R.A., and Economou,J.S. 1988. *Actibacillus actinomycetemcomitans* and *Bacteroides gingivalis* activate human peripheral monocytes to produce interleukin-1 and tumor necrosis factor. J. Periodontol. 59: 728-730.
- Lindermann,R.A., Economou,J.S., and Rothermel,H. 1988. Production of interleukin-1 and tumor necrosis factor by human peripheral monocytes activated by periodontal bacteria and extracted lipopolysaccharides. J. Dent. Res. 67:1131-1135.
- Macdonald,J.B., Socransky,S.S., and Gibbon,R.J. 1963. Aspects of the pathogenesis of mixed anaerobic infection of mucous membranes. J. Dent. Res. 42: 529-544.
- Macdonald,J.B., Sutton,R.M., Knoll,M.L., Madlener,E.M., and Grainger, R.M. 1956. The pathogenic components of an experimental fusospirochetal infection. J. Infect. Dis. 98: 15-20.

Malik,I.A., Moid,I., Haq,S., and Sabih,M. 1997. A double-blind, placebo-controlled, randomized trial to evaluate the role of tetrachlorodecaoxide in the management of chemotherapy-induced oral mucositis. J. Pain Symptom Manage. 14: 82-87.

Masada, M. P., Persson, R., Kenney, J.S., Page, R.C. and Allison.A.C. 1990. Measurement of interleukin-1 α and-1 β in gingival crevicular fluid: Implication for the pathogenesis of periodontal disease. J. Periodont. Res. 25: 156-163.

Matsuki,Y., Yamamoto,T., and Hara,K. 1992. Detection inflammatory cytokine messenger RNA(mRNA)-expressing cells in human inflamed gingiva by combined *in situ* hybridization and immunohistochemistry. Immunol. 76: 42-47.

Matsuki,Y., Yamamoto,T., and Hara,K. 1993. Localized of interleukin-1 (IL-1) mRNA-expressing macrophages in human inflamed gingival and IL-1 activity in gingival crevicular fluid. J. Periodont. Res. 26: 230-242.

Mayrand,D., and Holt,S.C. 1988. Biology of asaccharolytic black-pigmented *Bacteroides* species. Microbiol. Rev. 52: 134-152.

McGrath,M.S., Benike,C., Kuehne,F.W., and Engleman,E. 1998. Effect of WF10(TCDO) on antigen presentation. Transplant. Proceed. 30: 4200-4204.

Meikle,M.C., Atkinson,S.J., Ward,R.V., Murphy,G., and Reynolds,J.J. 1989. Gingival fibroblasts degrade type I collagen films when stimulated with tumor necrosis factor and interleukin 1: Evidence that breakdown is mediated by metalloproteinases. J. Periodont. Res. 24: 207-213.

Modlin,R.L., and Nutman,T.B. 1993. Type 2 cytokines and negative immune regulation in human infections. Curr. Opin. Immunol. 5: 511-7.

Mosmann,T.R. 1991. Cytokine secretion phenotypes of TH cells: how many subsets, how much regulation ?. Res. Immune. 142: 9-13.

Mouton,C., Hammond,P.G., Slots,J., and Genco,R.J. 1981. Serum antibodies to oral *Bacteroides asaccharolyticus* (*Bacteroides gingivitis*): relationship to age and periodontal disease. Infect. Immun. 31: 182-192.

Murayama,Y., Nagai,A., Okamura,K., Kurihara,H., Homura,H., Homura,Y., Kokeguchi,S., and Kato,K. 1988. Serum immunoglobulin G antibody to periodontal bacteria. Adv. Dent. Res. 2: 339-345.

Naito,Y., Okuda,K., Takazoe,I., Watanabe,H., and Ishikawa,I. 1985. The realtionship between serum IgG levels to subgingival Gram-

negative bacteria and degree of periodontal destruction. J. Dent. Res. 64: 1306-1310.

Napawongdee H.1995. Periodontal Health Survey Using CPITN Index and loss of Attachment Index and Detection of *Porphyromonas gingivalis* in the Patients at Faculty of Dentistry, Chulalongkorn University. M.Sc. Thesis. Graduate School, Chulalongkorn University, Thailand.

Nguyen,I., Dewhirst,F.E., Hauschka,P.V., and Stashenko,P. 1991. Interleukin-1 β stimulates bone resorption and inhibits bone formation *in vitro*. Lymphokine Cytokines Res. 10: 15-21.

O'Garra, A. 1989a. Peptide regulatory factors. Interleukins and the immune system. Part I. Lancet 1 : 943-946.

O'Garra, A. 1989b. Peptide regulatory factors. Interleukins and the immune system. Part II Lancet 1:1003-1005.

Ogawa,T., Uchida,H., and Amino,D. 1994 Immunobiological activities of chemically defined lipid A from lipopolysaccharides of *Porphyromonas gingivalis*. Microbiol. 140: 1209-1216.

Okada,H., Shimabukoro,Y., Kassai,Y., Ito,H., Matsuo,T., Ebisu,S., and Harada,Y. 1988. The function of gingival lymphocytes on the

establishment of human periodontitis. Adv. Dent. Res. 2: 264-267.

Oppenheim,J.J., Kovacs,E.J., Matsushima,K., and Durum,S.K. 1986. There is more than one interleukin 1. J. Immunol. Today 7: 45-46.

OXO Chemie(Thailand).1999. IMMUNOKINE[®] Investigator's Brochure.

Page, R.C. 1991. The role of inflammatory mediators in the pathogenesis of periodontal disease. J. Periodont. Res. 26: 230-242.

Page,R.C., Offenbacher,S., Schroeder,H.E., Seymour,G.J., and Kornman,K. 1997. Advanced in the pathogenesis of periodontitis: summary of development, clinical implications and future direction. Periodontol. 2000 14: 216-248.

Payne,J.B., Rienhardt,R.A., Masada,M.P., DuBois,L.M., and Allison,A.C. 1993. Gingival crevicular fluid IL-8: correlation with local IL-1 β levels and patients estrogen status. J. Periodont. Res. 28: 451-453.

Reddi,K., Wilson,M., Nair,S., Poole,S., and Henderson,B. 1996. Comparison of the pro-inflammatory cytokine-stimulating activity of the surface-associated proteins of periodontopathic bacteria. J. Periodont. Res. 31: 120-130.

- Reinhardt,R.A., McDonald,T.L., Bolton,R.W., DuBois,L.M., Feely,D.E., and Kaldahl,W.B. 1988. *In situ* activated T lymphocytes in active versus stable periodontal lesion. J. Periodont. Res. 23: 295-302.
- Romagnani,S. 1993. Regulatory role of IL-4 and other cytokines in the function and development of human T-cell clones. Res. Immunol. 144: 625-628.
- Rossmando,E.F., Kennedy,J.E., and Hadjimichael,J. 1990. Tumor necrosis factor alpha in gingival crevicular fluid as a possible indicator of periodontal disease in humans. Ach. Oral Biol. 35: 431-434
- Santis,A.G., Lopez-Cabrera,M., Sanchez-Madrid,F., and Poundfoot,N. 1995. Expression of the early lymphocyte activation antigen CD69, a C-type lectin, is regulated by mRNA degradation associated with AU-rich sequence motifs. Eur. J. Immunol. 25: 2142-2146.
- Schopf,R.E., Hermann,G.A., Hinz,J., and Morsches,B. 1995. Granulocyte activity is enhanced by culture supernatants of mononuclear leukocytes incubated with tetrachlorodecaoxide. Wound Healing and Skin physiology. Almeyer et al.,(Eds). Springer-Verlag Berlin Heidelberg: 229-334

- Schopf,R.E., Keller,R., Rehder,M., Benes,P., Kallinowski,F., and Vaupel,P. 1990. TNF- α primes polymorphonuclear leukocytes for an enhanced respiratory burst to a similar extent as bacterial lipopolysaccharide. J. Invest. Dermatol. 95: 216s-218s.
- Schröder,J.M., Persoon,N.L.M., and Christophers,E. 1990. Lipopolysaccharide-stimulated human monocytes secrete, apart from neutrophil-activating peptide 1/interleukin 8, a second neutrophil-activating protein. J. Exp. Med. 171: 1091-1100.
- Scott,D.W. 1993. Analysis of B cell tolerance *in vitro*. Adv. Immunol. 54: 393-425.
- Seymour,G.J. 1987. Possible mechanisms involved in the immunoregulation of chronic inflammatory periodontal disease. J. Dent. Res. 66: 2-9.
- Seymour,G.J. 1991. Importance of the host response in the periodontium. J. Clin. Periodontol. 18: 421-426.
- Seymour,G.J., Boyatzis,S., and Powell,R.N. 1986. The autologous mixed lymphocyte reaction (AMLR) as a possible indicator of immunoregulation in chronic inflammatory periodontal disease. J.Clin.Periodontal. 13: 639-645.

Seymour,G.J., and Greenspan,J.S. 1979a. The Phenotypic characterization of subpopulation in establish human periodontal disease. J. Periodont. Res., 14: 39-46.

Seymour,G.J., Powell,R.N., and Davies,W.R. 1979b. Conversion of a stable T-cell lesion to a progressive B-cell lesion in the pathogenesis of chronic inflammatory periodontal disease: a hypothesis. J. Clin. Periodontol., 6: 267-277.

Skerka,C., Irving,S.G., Bialonski,A., and Zipfel,P.F. 1993. Cell type specific expression of members of the IL-8/NAP-I gene family. Cytokine 5:112-116.

Slots,J. 1977a. Microflora in the healthy gingival sulcus in men. Scand. J. Dent. Res. 85: 247-254.

Slots,J. 1977b. The predominant cultivable microflora of advanced periodontitis. Scand. J. Dent. Res. 85: 114-122.

Slots,J. 1982. Importance of black-pigmented *Bacteroides* in human periodontal disease. In: Host- Parasite Interactions in Periodontal Disease. Genco, R.J.,(ed) Washington D.C.: American society for microbiology. Pp.27-45.

Slots,J., and Dahlen,G. 1985. Subgingival microorganisms and bacterial virulence factors in periodontitis. Scand. J. Dent. Res. 93: 119-127.

Slots,J. 1999. *Actinobacillus actinomycetemcomitans* and *Porphyromonas gingivalis* in periodontal disease: introduction. Periodontol. 2000 20: 7-13.

Socransky,S.S., and Haffajee,A.D. 1991. Microbial mechanisms in the pathogenesis of destructive periodontal disease.: A critical assessment. J. Periodont. Res. 26: 195-212.

Socransky,S.S., and Haffajee,A.D. 1992. The bacterial etiology of destructive periodontal disease. Current Concepts 63(suppl.): 322-331.

Sparwasser,T., Miethke,T., Lipford,G., Erdmann,A., Häcker,H., Heeg,K., and Wagner,H. 1997a. Macrophages sense pathogenesis via DNA motifs: induction of tumor necrosis factor-alpha-mediated shock. Eur. J. Immunol. 27: 1671-1679.

Sparwasser,T., Miethke,T., Lipford,G., Borschert,K., Hacker,H., Heeg,K., and Wagner,H. 1997b. Bacterial DNA causes septic shock. Nature 386: 336-337.

- Stashenko,P., Dewhirst,F.E., Peros,W.J., and Kent, R.L. 1987. Synergistic interactions between interleukin-1, tumor necrosis factor and lymphotoxin in bone resorption. J. Immunol. 138: 1464-1468.
- Stashenko,P., Jandinski,J.J., Fujiyoshi,P., Rynar,J., and Socransky,S.S. 1991a. Tissue levels of bone resorptive cytokines in periodontal disease. J. Periodontol. 62: 504-509.
- Stashenko,P., Fujiyoshi,P., Obernesser,M.S., Prostak,L., Haffajee,A.D., and Socransky,S.S. 1991b. Levels of interleukin 1 β in tissue from sites of active periodontal disease. J. Clin. Periodontol. 18: 548-554.
- Stoll,P., Huber,H., Pelz,K., and Weingart,D. 1993. Antimicrobial effects of the tetrachlorodecaoxxygen-anion complex on oropharyngeal bacterial flora: an *in vitro* study. Chemotherapy 39: 40-47.
- Sun,S., Zhang,X., David,D.F., and Sprent,J. 1998. Type I interferon-mediated stimulation of T cells by CpG DNA. J. Exp. Med. 12: 2335-2342.
- Suzuki,J.B., Martin,S.A., Vincent,J.W., and Falkler,W.A.Jr. 1984. Local and systemic production of immunoglobulins to periodontopathogens in periodontal disease. J. Periodont. Res. 19: 559-603.

- Swain,S.L., 1991. Regulation of the development of helper T cell subsets. Immunol. Res. 10:177-182.
- Takeshita,A., Imai,K., and Hanazawa,S. 1999. CpG motifs in *Porphyromonas gingivalis* DNA stimulate interleukin-6 expression in human gingival fibroblasts. Infect. Immun. 67: 4340-4345.
- Tatakis,D.N. 1993. Interleukin-1 bone metabolism: A review. J. Periodontol. 64: 416-431.
- Taubman,M.A., Stoufi,E.D., Ebersole,J.L., and Smith,D.J. 1984. Phenotypic studies of cells from periodontal disease tissues. J. Periodont. Res. 19: 587-590.
- Taubman,M.A., Stoufi,E.D., Seymour,G.J., Smith.D.J., and Ebersole,J.L. 1988. Immunoregulatory aspects of periodontal disease. Adv. Dent. Res. 2: 328-333.
- Trinchieri,G. 1993. Interleukin-12 and its role in the generation of Th1 cells. Immunol. Today 14: 335-337.
- Van der Pluijm,G., Most,W., Van der Wee-Pals,L., De Groot,H., Papapoulos,S., and Lowik,C. 1991. Two distinct effects of recombinant human tumor necrosis factor- α on osteoblast development and subsequent resorption of mineralized matrix. Endocrinol. 129: 1596-1604.

- Van Winkelhoff,A.J., Van der Velden,U., and De Graaff,J. 1988. Microbial succession in recolonized deep periodontal pockets after a single course of supra-and subgingival debridement. J. Clin. Periodontol. 15: 116-122.
- Williams,R.C. 1990. Periodontal disease. N. Eng. J. Med. 322: 373-382.
- Woerly,G., Lombard,Y., and Poindron,P.1987. Candida phagocytosis of murine macrophages: enhancement by a novel type of oxidant. Advances in the biosciences. 66: 109-112.
- Yamazaki,K., Nakajima,T., Kubota,Y., Gemmell,E., Seymour,G.J. and Hara,K. 1997. Cytokine messenger RNA expression in chronic inflammatory periodontal disease. Oral Microbiol. Immunol. 12: 281-287.
- Youngman,R.J., Wagner,G.R., Kühne,F.W., and Elstner,E.F. 1986. Time kinetics of hemoglobin and myoglobin activation by tetrachlorodecaoxide (TCDO). Free Rad. Res. Comms. 1: 311-319.

APPENDIX

Table 6. Effect of WF10 on CD69 expression in PBMC cultures of subject A.

Population	% Positive cells			
	<i>Control</i>	WF10 1:900	WF10 1:300	WF10 1:100
CD4+CD69+	1.10	3.72	9.32	13.59
CD8+CD69+	1.81	3.17	8.57	2.87
CD56+ CD69+	23.93	35.65	59.58	73.41
$\gamma\delta$ +CD69+	8.43	20.04	54.82	67.44
CD20+CD69+	10.12	22.67	58.47	84.82

Table 7. Effect of WF10 on CD69 expression in PBMC cultures of subject B.

Population	% Positive cells			
	<i>Control</i>	WF10 1:900	WF10 1:300	WF10 1:100
CD4+CD69+	1.66	2.88	10.34	21.01
CD8+CD69+	6.08	5.81	12.33	16.51
CD56+ CD69+	46.37	55.48	90.91	84.47
$\gamma\delta$ +CD69+	1.38	4.14	46.85	39.22
CD20+CD69+	9.84	40.71	58.08	75.39

Table 8. Effect of WF10 on CD69 expression in PBMC cultures of subject C.

Population	<i>Control</i>	% Positive cells		
		WF10 1:900	WF10 1:300	WF10 1:100
CD4+CD69+	0.71	1.91	23.14	10.10
CD8+CD69+	6.49	10.87	34.19	21.08
CD56+ CD69+	19.32	24.76	78.43	70.02
$\gamma\delta$ +CD69+	0.69	1.91	49.29	31.97
CD20+CD69+	7.34	16.51	76.55	77.09

Table 9. Effect of WF10 on CD69 expression in PBMC cultures of subject D.

Population	<i>Control</i>	% Positive cells		
		WF10 1:900	WF10 1:300	WF10 1:100
CD4+CD69+	0.65	2.65	5.35	57.57
CD8+CD69+	1.28	4.88	21.86	11.76
CD56+ CD69+	6.62	19.32	40.16	38.02
$\gamma\delta$ +CD69+	1.89	10.60	33.56	31.78
CD20+CD69+	10.61	17.61	65.32	75.20

Table 10. Cytokine production by WF10-treated PBMC of subject A.

WF10 Concentrations	Cytokine production (pg/ml)		
	TNF- α	IL-12	IFN- γ
0	78.01	5.964	12.163
1:900	133.17	6.547	12.681
1:300	460.69	10.143	19.735
1:100	682.09	20.972	35.941

Table 11. Cytokine production by WF10-treated PBMC of subject B.

WF10 Concentrations	Cytokine production (pg/ml)		
	TNF- α	IL-12	IFN- γ
0	41.38	3.694	11.320
1:900	59.28	6.547	12.335
1:300	336.06	26.972	28.670
1:100	285.80	15.142	45.263

Table 12. Cytokine production by WF10-treated PBMC of subject C.

WF10 Concentrations	Cytokine production (pg/ml)		
	TNF-α	IL-12	IFN-γ
0	143.98	11.994	12.663
1:900	319.42	29.685	11.926
1:300	461.19	63.132	12.219
1:100	1308.59	42.894	13.879

Table 13. Cytokine production by WF10-treated PBMC of subject D.

WF10 Concentrations	Cytokine production (pg/ml)		
	TNF-α	IL-12	IFN-γ
0	126.32	0.586	12.514
1:900	369.82	39.371	15.627
1:300	545.13	103.28	24.241
1:100	719.84	29.685	26.231

Table 14. TNF- α production(pg/ml) by PBMC stimulated with *P. gingivalis* and WF10 of subject E .

Sample	control	<i>P. gingivalis</i> concentrations ($\mu\text{g}/\text{ml}$)				
		<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>
		0.001	0.01	0.1	1	10
No WF10		29.85	34.05	147.45	2060.94	8800.27
With WF10 1:100 final dilution		905.27	777.78	2056.01	11971.30	15985.17
						21190.48

Table 15.TNF- α production(pg/ml) by PBMC stimulated with *P. gingivalis* and WF10 of subject F .

Sample	control	<i>P. gingivalis</i> concentrations ($\mu\text{g}/\text{ml}$)				
		<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>
		0.001	0.01	0.1	1	10
No WF10		123.35	124.99	1114.59	2222.54	6171.78
With WF10 1:100 final dilution		858.36	1075.51	2210.41	8232.84	10459.47
						13217.26

Table 16. IL-1 β production(pg/ml) by PBMC stimulated with *P. gingivalis* and WF10 of subject G .

Sample	control	<i>P. gingivalis</i> concentrations (μ g/ml)				
		<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>
		0.001	0.01	0.1	1	10
No WF10	52.15	50.98	898.26	5340.68	9732.42	13217.26
With WF10 1:100 final dilution	25.81	36.78	345.38	722.89	1888.36	2069.25

Table 17. IL-1 β production(pg/ml) by PBMC stimulated with *P. gingivalis* and WF10 of subject H.

Sample	control	<i>P. gingivalis</i> concentrations (μ g/ml)				
		<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>	<i>P.</i> <i>gingivalis</i>
		0.001	0.01	0.1	1	10
No WF10	14.98	1849	186.69	3010.14	9086.90	21190.48
With WF10 1:100 final dilution	10.00	15.49	106.63	889.80	2935.17	3754.48

BIOGRAPHY

Mr. Chat Jermnarong, was born 11th of April 1970 in Petchaburi. He graduated with D.D.S. (Doctor of Dental Surgery) from the faculty of dentistry, Khon Kaen University in 1995, and became a staff member of the faculty of Dentistry, Khon Kaen University, he studied in a Master degree programs in Periodontology at Graduate School, Chulalongkorn University in 1997.

