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Specific Egg Yolk Antibody (Ovalgen PG) as a Novel Supportive Immunotherapy for Periodontitis

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Periodontitis



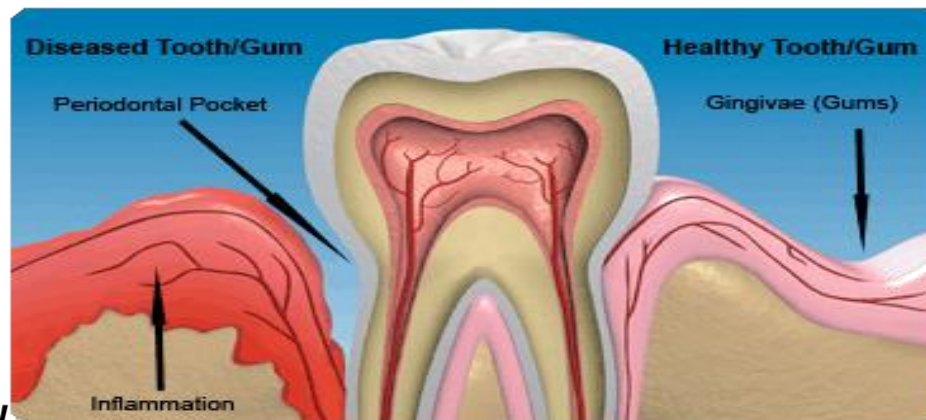
Healthy gums
and teeth



Moderate
periodontitis



Advanced
periodontitis



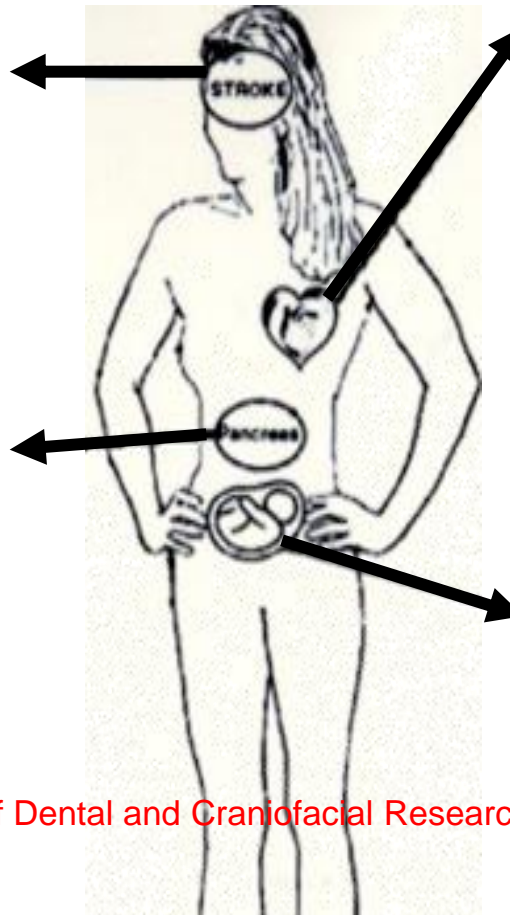
Periodontitis is associated with systemic diseases

Stroke

Increase the risk of stroke by over **50%** in adults.

Diabetes

Periodontal (gum) disease **disrupts** glycemic control.



Heart disease

Risk of fatal heart disease is **twice as high** for individuals with severe gum disease.

Preterm birth

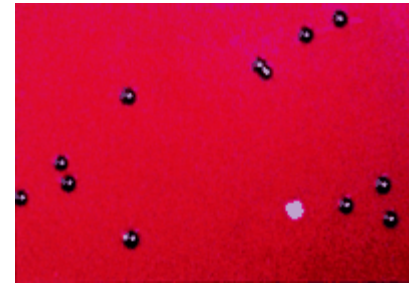
Pregnant women with severe gum disease are **seven times more likely** to have a premature baby.

Sources: National Institute of Dental and Craniofacial Research and American Heart Association

Major Responsible Bacteria

Porphyromonas gingivalis

- Gram negative
- Anaerobic
- Black shiny and smooth colony on blood agar



Gingipain is the main pathogenic factor of *P. gingivalis*

Functions of Gingipain

- Causes damages to various tissues and systems (intercellular proteins, immune cells & cytokines, fibrin & fibrinogen, vv).
- Helps *P. gingivalis* invade into host cells (cell invasion).
- Helps *P. gingivalis* to agglutinate with other bacteria forming biofilm.
- Absorbs into blood causing systemic effects (heart diseases, early birth, etc)

Ovalgen PG contains specific IgY
against gingipain of *P. gingivalis*

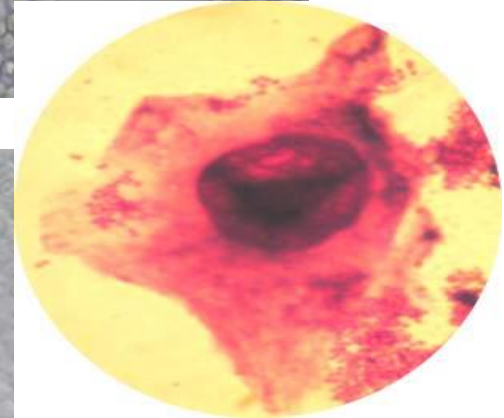
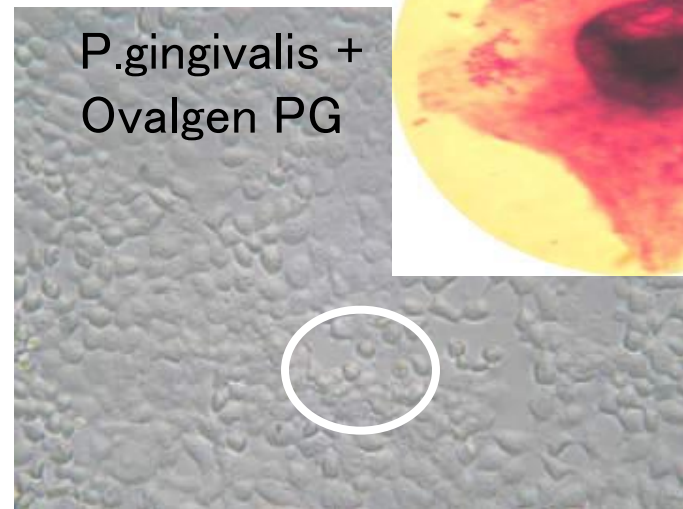
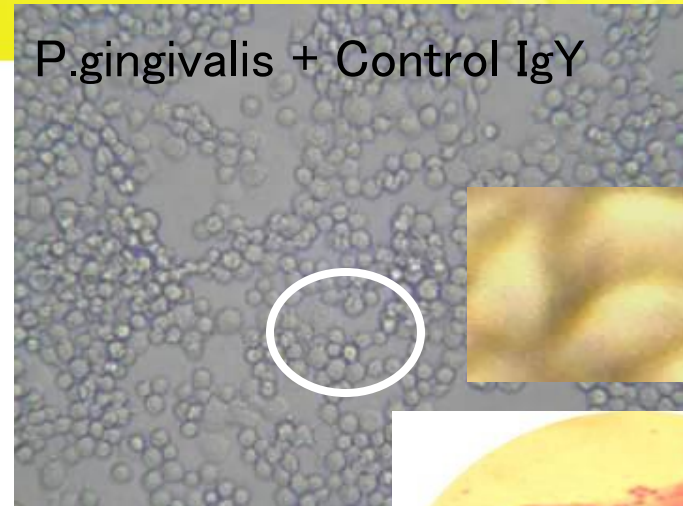
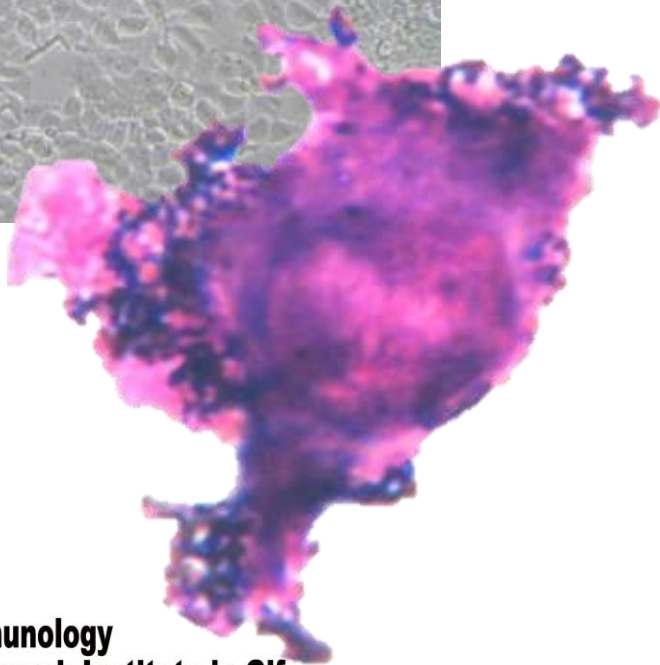
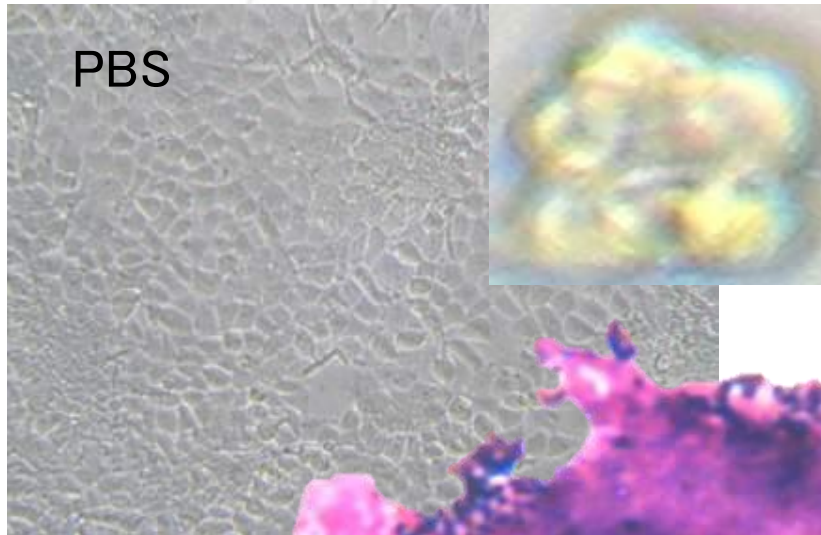
In-vitro test 1

In-vitro inhibitory effects of OVALGEN PG on Porphyromonas gingivalis

In-vitro inhibitory effects of OVALGEN PG on Porphyromonas gingivalis

- Materials:**
- Human gingival epithelial cells (KB cell line)
 - P.gingivalis strain ATCC 33277
 - Anti-P.gingivalis IgY and non-immunized IgY

- Protocol:**
- Grow KB cells in a 24-well plate until a confluent monolayer is formed.
 - Mix P.gingivalis with IgY samples, incubate at 37 C 1 h, add to the cells, incubate 2 h at 37 C.
 - Wash to remove dead cells, count the number of alive cells.



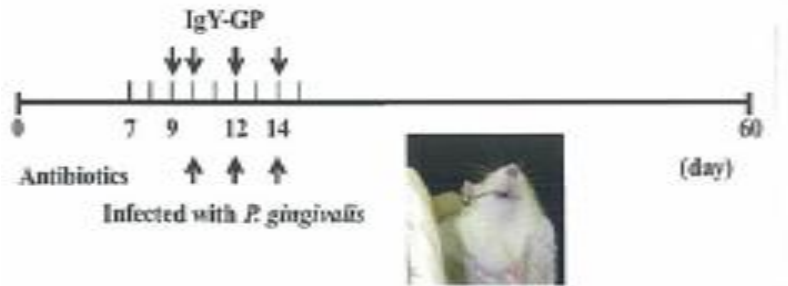
Results: Cell damage inhibition

Sample	total No. of Cells	Protection after	
		<u>P.gingivalis</u> treatment: alive cells	(%)
PG only	15.8	2.2	14
PG + Control IgY	14.8	4.1	28
PG + Ovalgen IgY	15.9	13.7	86

(number of alive cells x 10⁴)

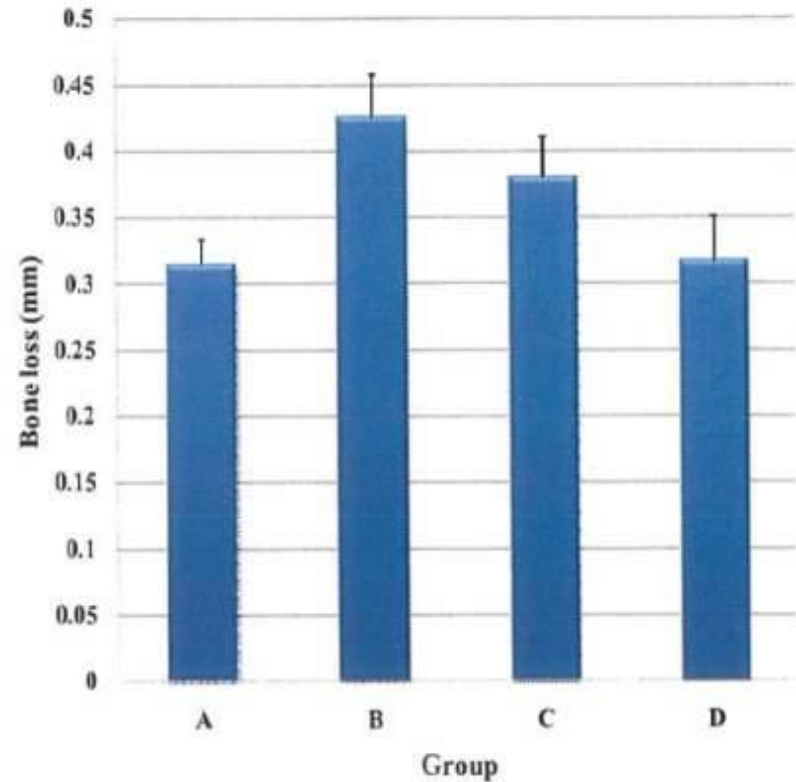
Trial on Sprague-Dawley rats

(by Prof. Hamada, Kanagawa Dental College)



Measurement of bone loss in an upper jaw.

Source: AAP/JSP 2010 Annual Meeting



- A: non-infected control
- B: infected, non-treated
- C: infected, treated with cont IgY
- D: infected, treated with IgY-PG

Clinical test: effect of Ovalgen PG in periodontitis patients

(Journal of Oral Science, vol. 49, 2007)



Effect of egg yolk antibody against *Porphyromonas gingivalis* gingipains in periodontitis patients

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Abstract: *Porphyromonas gingivalis* gingipains is suspected to be one of the most important causative agents of periodontitis. We postulated that the inhibition of gingipains may reduce the pathogenic nature of *P. gingivalis*. Anti-*P. gingivalis* egg yolk antibody (IgY-GP) was isolated from the yolks of hens immunized with purified gingipains. We applied IgY-GP gel subgingivally in periodontitis patients who harbored

periodontitis. (J. Oral Sci. 49, -, 2007)

Keywords: gingipains; igy; periodontitis;
Porphyromonas gingivalis.

Introduction

Periodontitis is an inflammatory disorder that results in

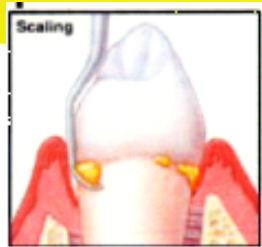
Protocol



- **Test sample:**
 - Neutral gel containing 20mg Ovalgen PG/syringe
- **Subject:** 5 periodontitis patients
- **Administration:** One dose of gel applied into pockets after scaling and root planing (SRP). Control pockets only treated by scaling and SRP.
- **Examination parameters:** (check before and 4 weeks after)
 - (1) Oral examination: Probing depth (PD), Bleeding on probing (BOP).
 - (2) Bacteria: number of *P. gingivalis* and total bacteria in periodontal pockets (by real-time PCR).

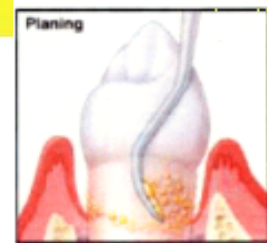
Control teeth
(Right half of mouth)

Scaling

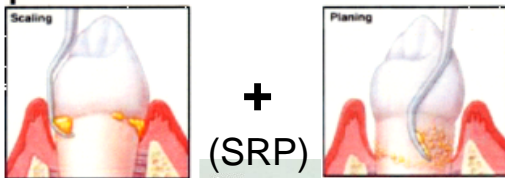


Root Planing
(SRP Only)

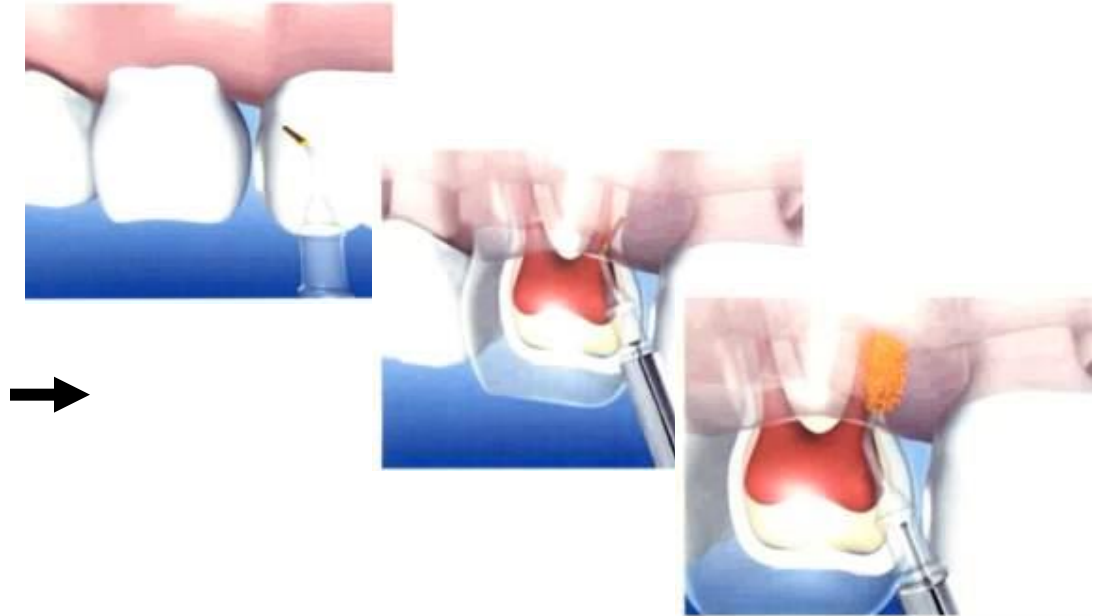
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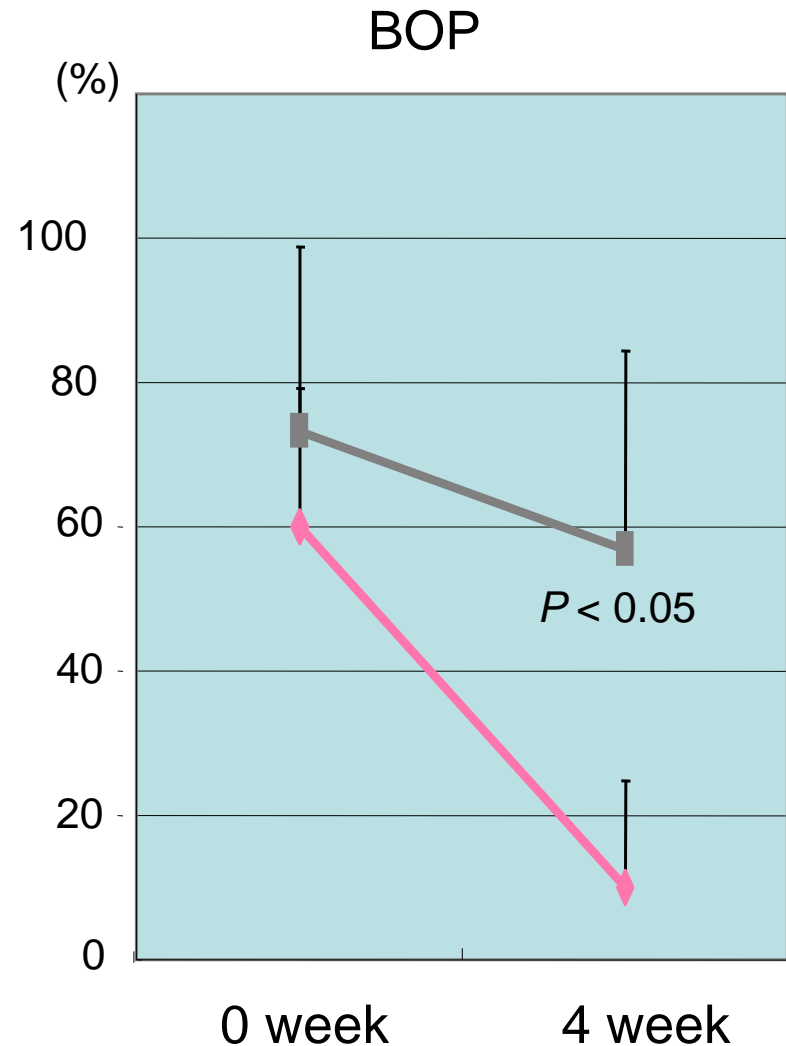
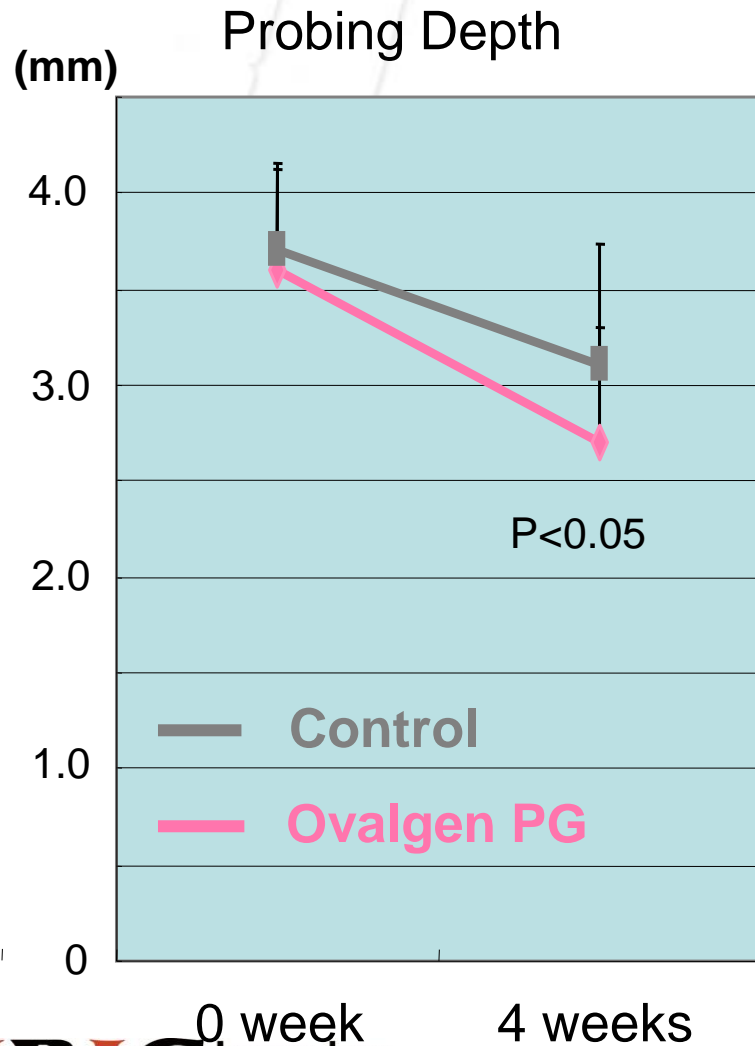
Test teeth
(Left half of mouth)



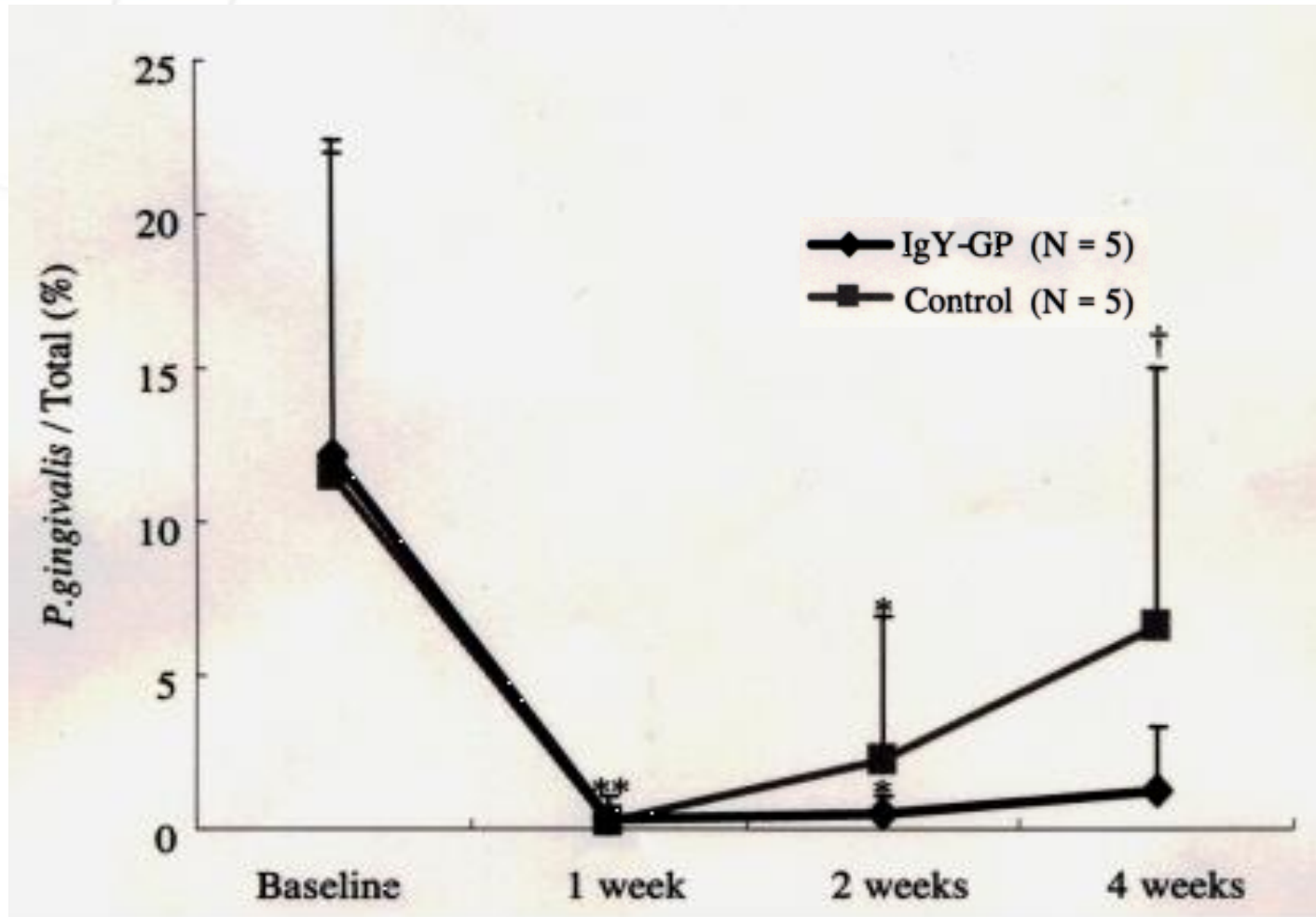
Root Canal Syringe
filled with OVALGEN **PG** gel



Oral examination



Result: ratio of *P. gingivalis* in periodontal pocket



Wilcoxon signed-rank test * $P < 0.05$
Mann-whitney U test † $P < 0.05$

Remarks

- Ovalgen PG can prevent periodontitis development.
- To achieve better effects, IgY should easily reach periodontal pockets. Gel, chewing gums, etc., are among the most suitable forms of delivery.

Products containing Ovalgen PG

Haregard and ultraHaregard launched by BeanStalk Snow Co.



Combines Ovalgen DC and Ovalgen PG in each tablet

New product: lozenges containing Ovalgen

IgYGate DC-F: Lozenges fortified with Ovalgen DC and Ovalgen F (Influenza IgY). The product aims to reduce risks of catching influenza, and to support healthy teeth, prevent tooth decay.

IgYGate DC-PG: Lozenges containing Ovalgen DC and Ovalgen PG. This product helps strengthen teeth and gums and is ideal for use as a supporting tool during and after caries and gingivitis treatment.

