

# Chromogranin A in Saliva – a Possible Marker for Aggressive Periodontitis?

Hady Haririan, Kristina Bertl, Markus Laky, Michael Matejka, Oleh Andrukhov and Xiaohui Rausch-Fan

Department of Periodontology, Medical University of Vienna, Austria

greiner bio-one



## OBJECTIVES

Saliva testing has become more interesting as a diagnostic tool for local and systemic diseases since it is a non-invasive way of collection of a biological fluid. Many biomarkers have already been detected in saliva and some of them were shown to be associated with periodontal disease. Chromogranin A (CgA), a stress marker, has already been investigated in human saliva in health and chronic periodontitis. So far, only two human studies could show an association of higher CgA levels in chronic periodontitis<sup>1,2</sup>. Aggressive periodontitis is a rapidly progressing disease affecting younger people and its pathogenesis is related to a specific microbial flora. A few risk factors are supposed to influence the onset and progression of this disease, and among them, stress is of particular interest. In the present study, we determined CgA levels in saliva and serum of patients with aggressive and chronic periodontitis in comparison to healthy controls in order to assess its potential role as a stress marker in association with periodontitis.

## METHODS

A total of 79 subjects participated in this study: 30 periodontally healthy subjects (mean age: 32.70 ± 6.37; 17 females and 13 males; 12 smokers and 18 non-smokers); 28 chronic periodontitis patients (mean age 43.71 ± 3.87; 15 females and 13 males; 13 smokers and 15 non-smokers); 21 aggressive periodontitis patients (mean age 28.71 ± 4.55; 9 females and 12 males; 12 smokers and 9 non-smokers). After an overnight fast, whole saliva was collected with the SCS® (Greiner-BioOne) in the morning to avoid circadian rhythm effects. At the same time, peripheral blood samples were collected and serum was immediately isolated.

CgA concentrations in samples of saliva and serum were analyzed using CgAYK070 ELISA kit (Yanaihara Institute, Japan) and LDN® CgA ELISA kit (Labor Diagnostika Nord, Germany), respectively.



Fig. 1. Panoramic radiograph of one participant (24 y) of the aggressive periodontitis group.

## RESULTS

Our results showed significantly higher CgA levels in saliva of patients with aggressive periodontitis compared to patients with chronic periodontitis ( $p < 0.05$ ) and to the healthy group ( $p < 0.05$ ), but no differences of salivary CgA levels between patients with chronic periodontitis and the healthy group. Serum CgA levels were found to be similar in all clinical groups. There was no correlation between salivary CgA and serum CgA levels.

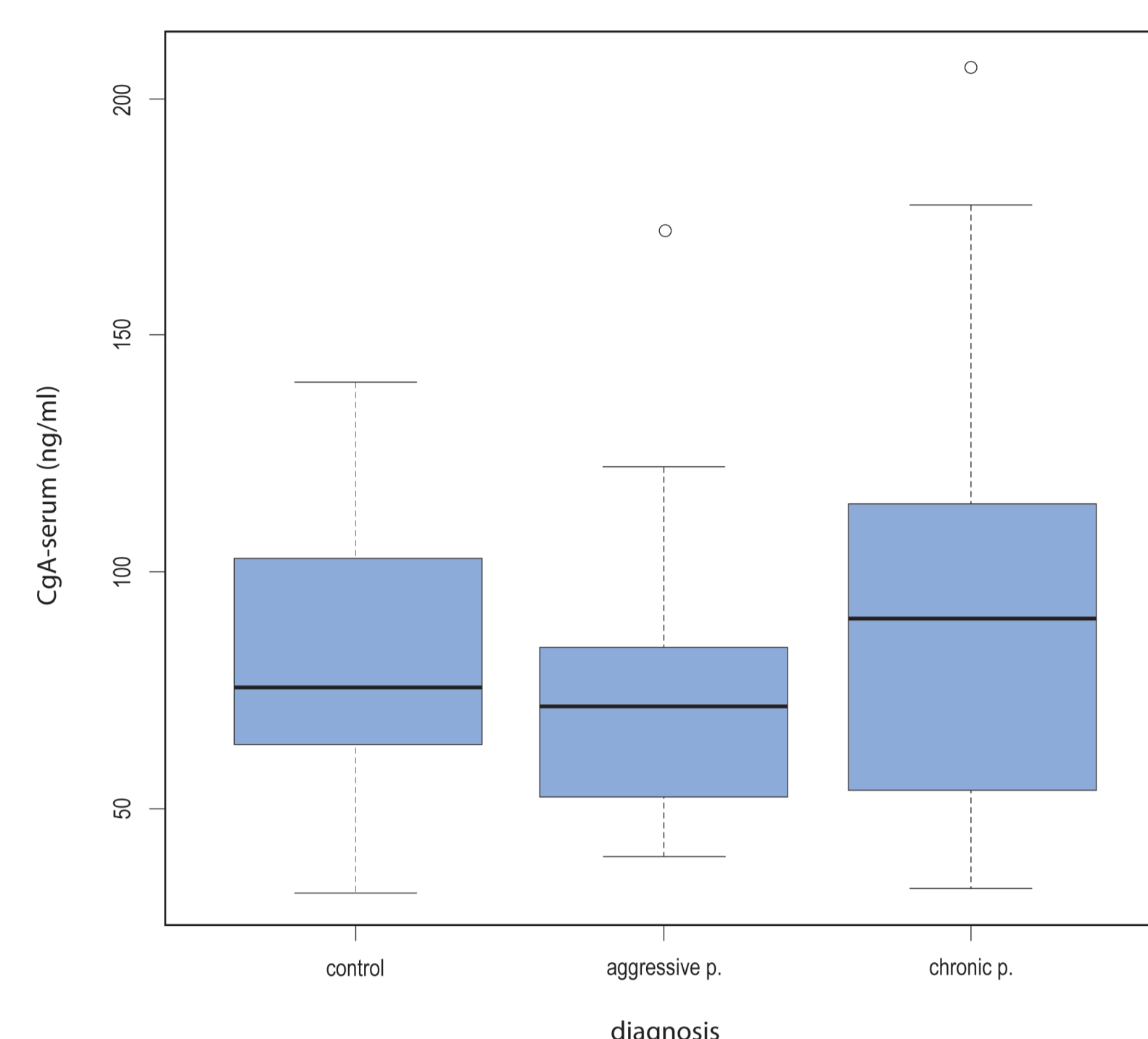


Fig. 2. Comparison of CgA-serum levels (ng/ml) between diagnosis groups.

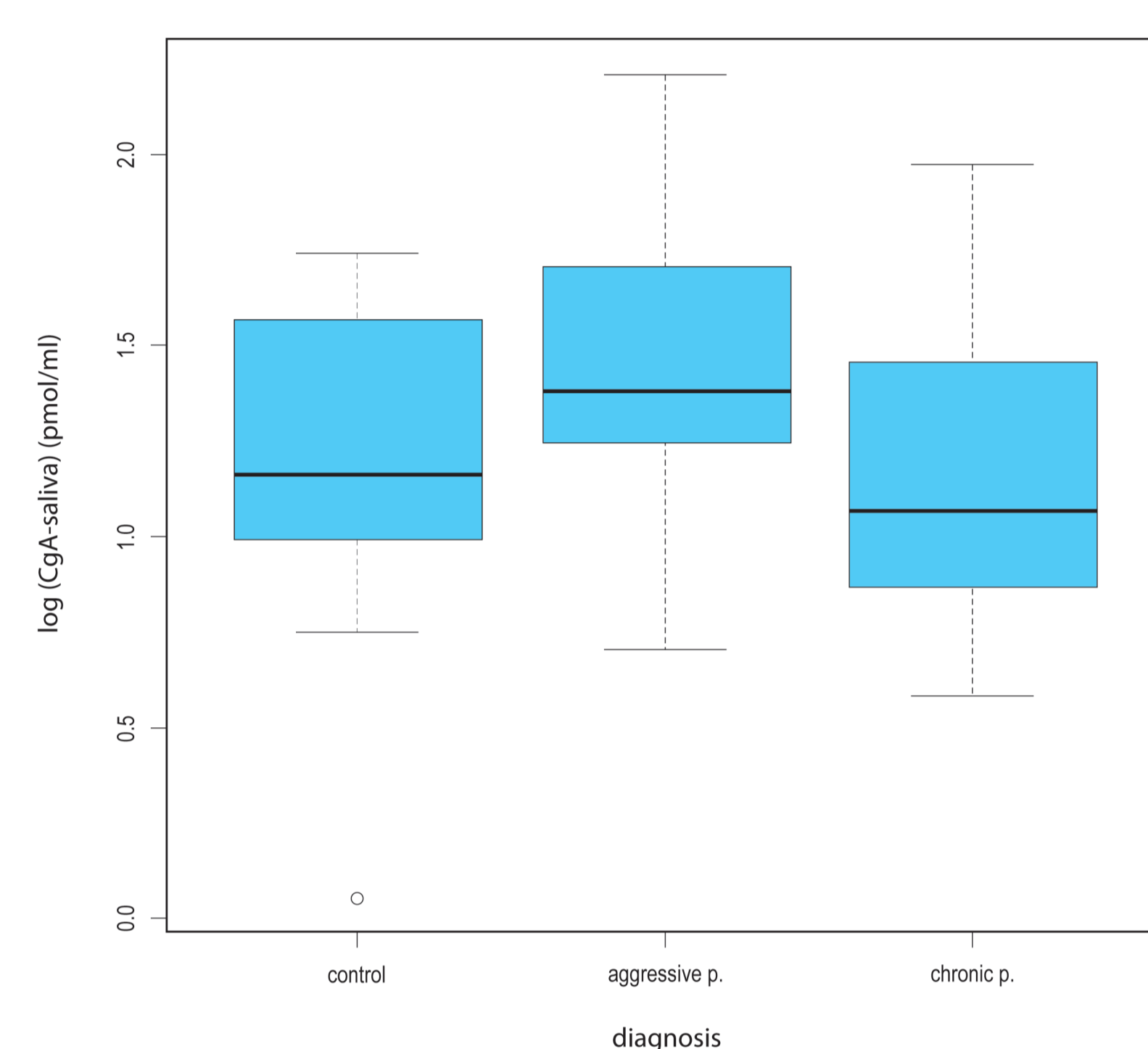


Fig. 3. Comparison of log [CgA-Saliva] levels (pmol/ml) between diagnosis groups.  $p < 0.05$  for aggressive p. vs. control and aggressive p. vs. chronic p.

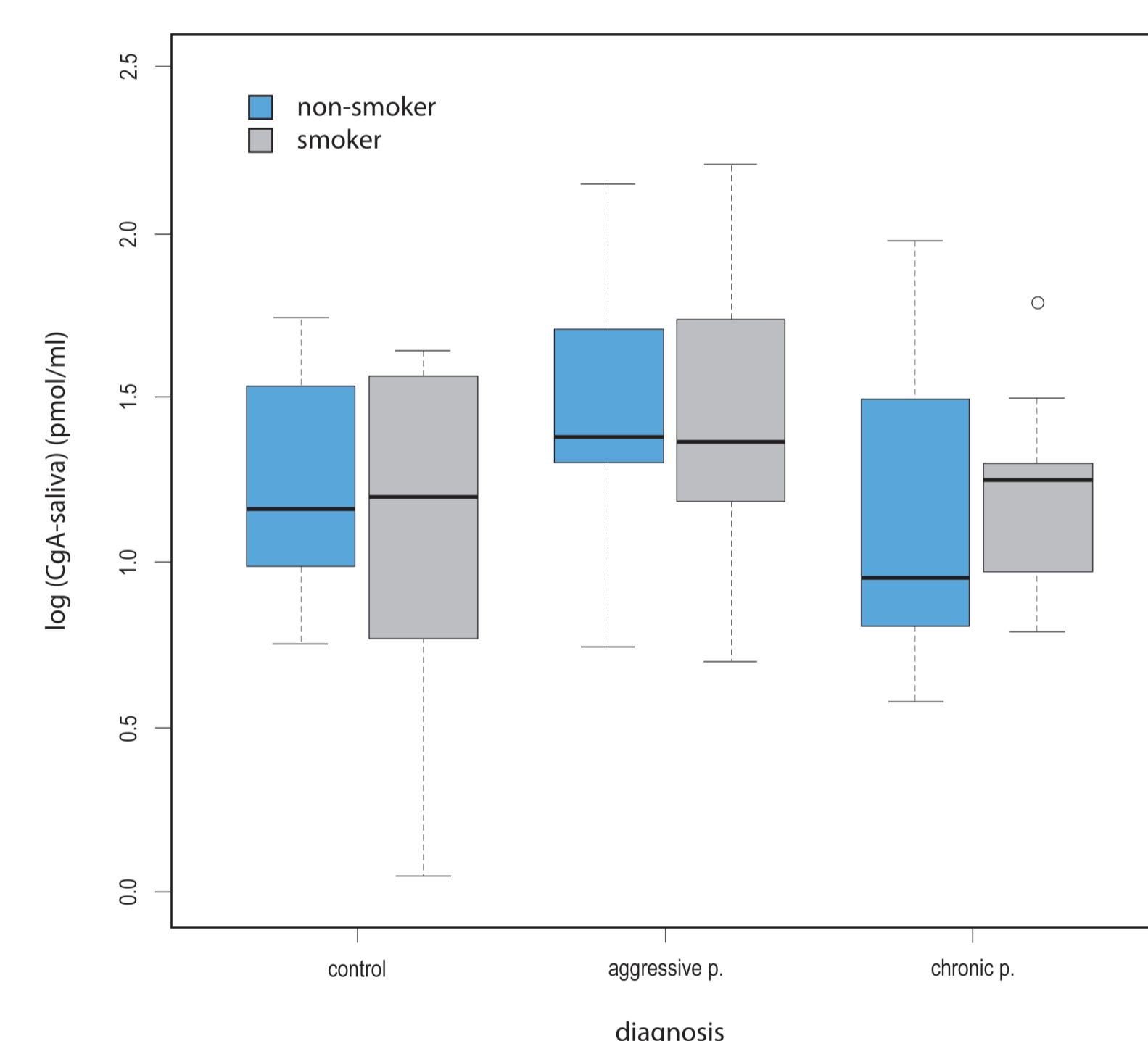


Fig. 4. Comparison of log [CgA-saliva] between non-smoker/smoker.

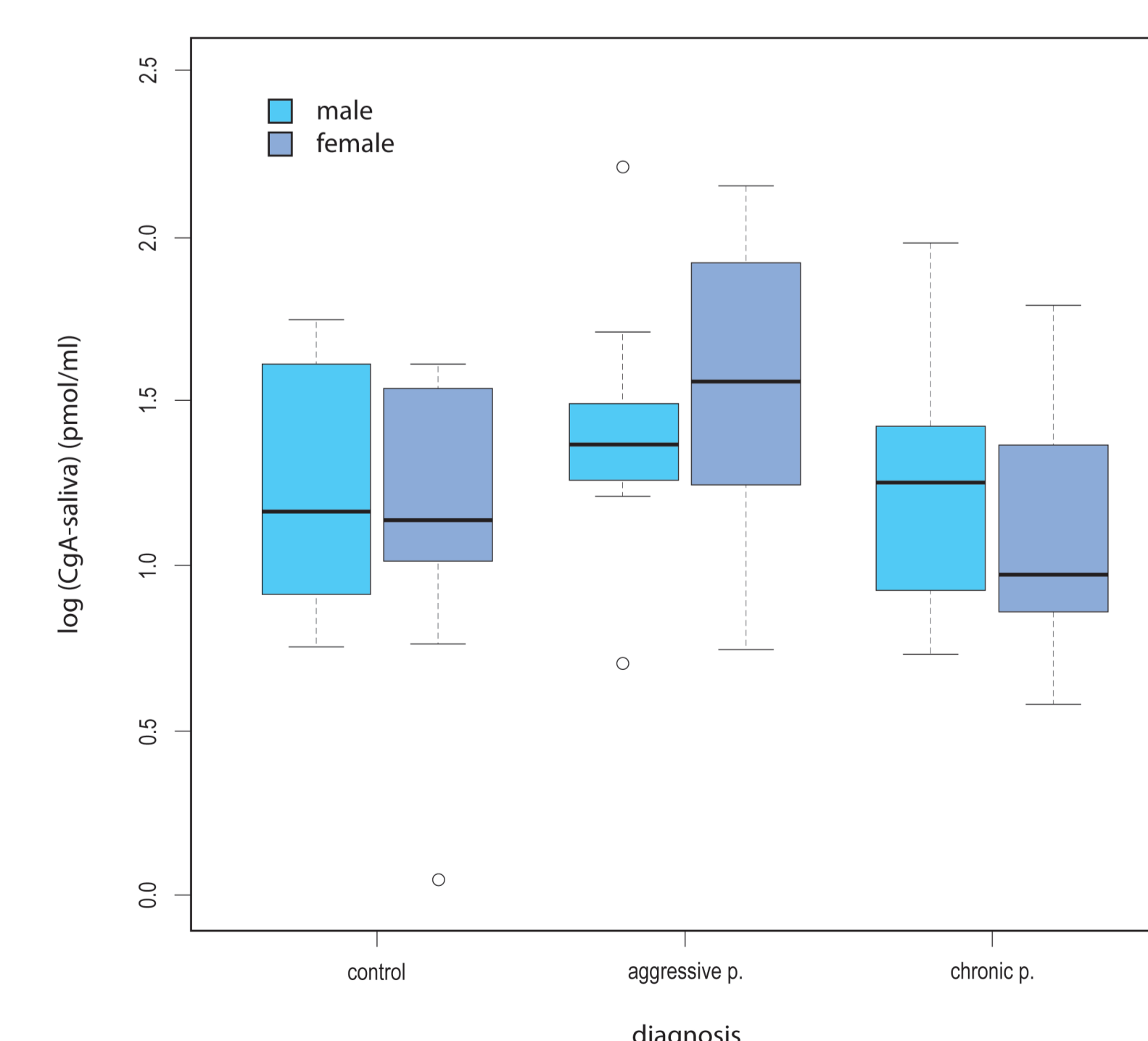


Fig. 5. Comparison of log [CgA-saliva] between male/female.

Chromogranin A-serum (ng/ml)					
diagnosis	n	minimum	maximum	mean	$\sigma$
control	30	32.28	140.25	80.56	±30.75
aggressive p.	21	40.22	172.18	74.20	±30.27
chronic p.	28	33.05	206.81	93.17	±43.00
total	79	32.28	206.81	83.34	±35.87

Chromogranin A-saliva (pmol/ml)				
diagnosis	n	minimum	maximum	median
control	30	1.12	55.29	14.54
aggressive p.	21	5.05	162.97	23.84
chronic p.	28	3.81	94.08	11.76
total	79	1.12	162.97	17.30

Table 1. CgA levels in serum and saliva

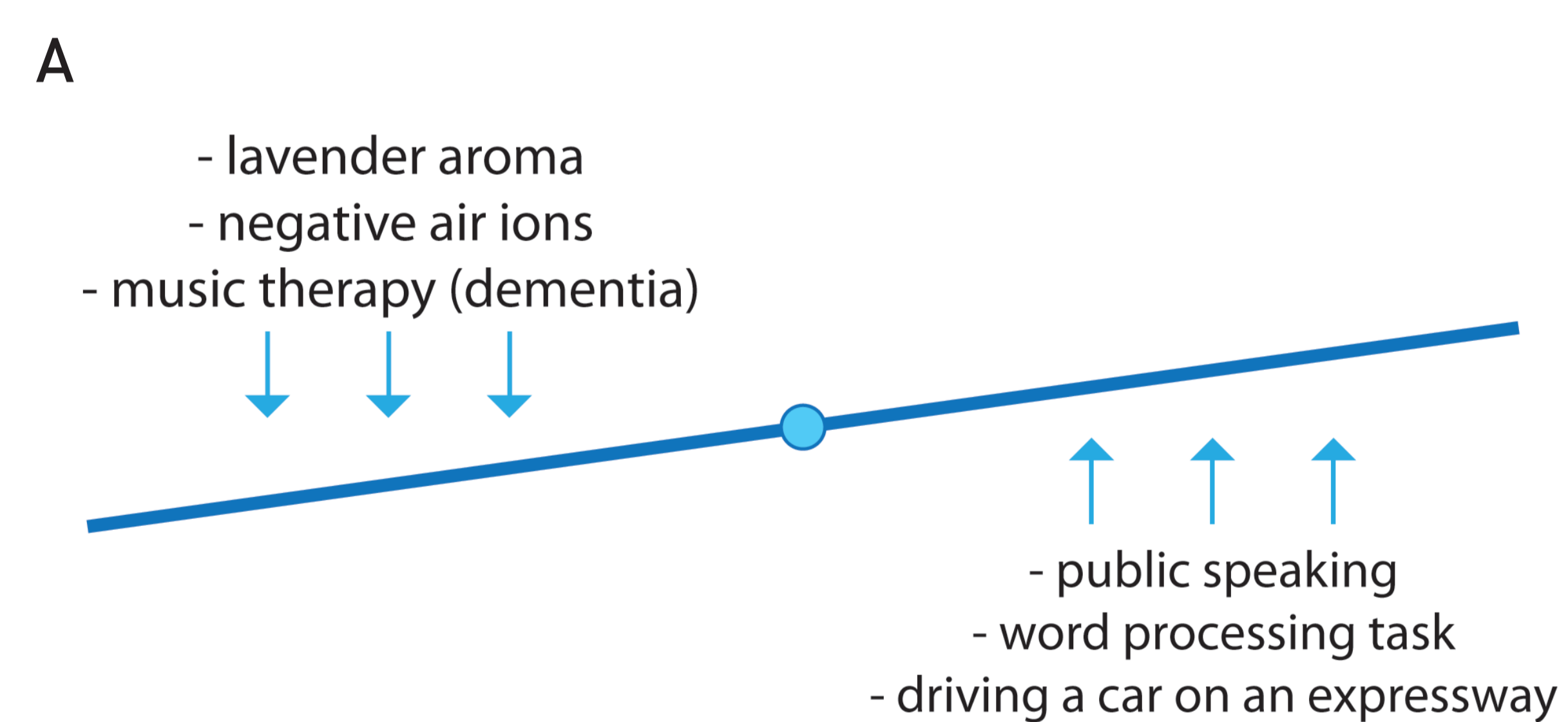
## CONCLUSION

Salivary CgA levels in aggressive periodontitis are higher compared to chronic periodontitis or healthy conditions. Further studies are necessary to analyze local and systemic stress effects on CgA levels in periodontitis patients and to assess if CgA could be a potential marker for aggressive periodontitis.

## CHROMOGRANIN A

- CgA is an acidic phosphorylated secretory glycoprotein
- CgA is stored and co-released with catecholamines from the adrenal medulla as well as sympathetic nerve endings
- CgA is expressed in serous and ductal cells of the human submandibular gland

Salivary CgA concentrations changed under following circumstances...



... and may be influenced in periodontitis by ...

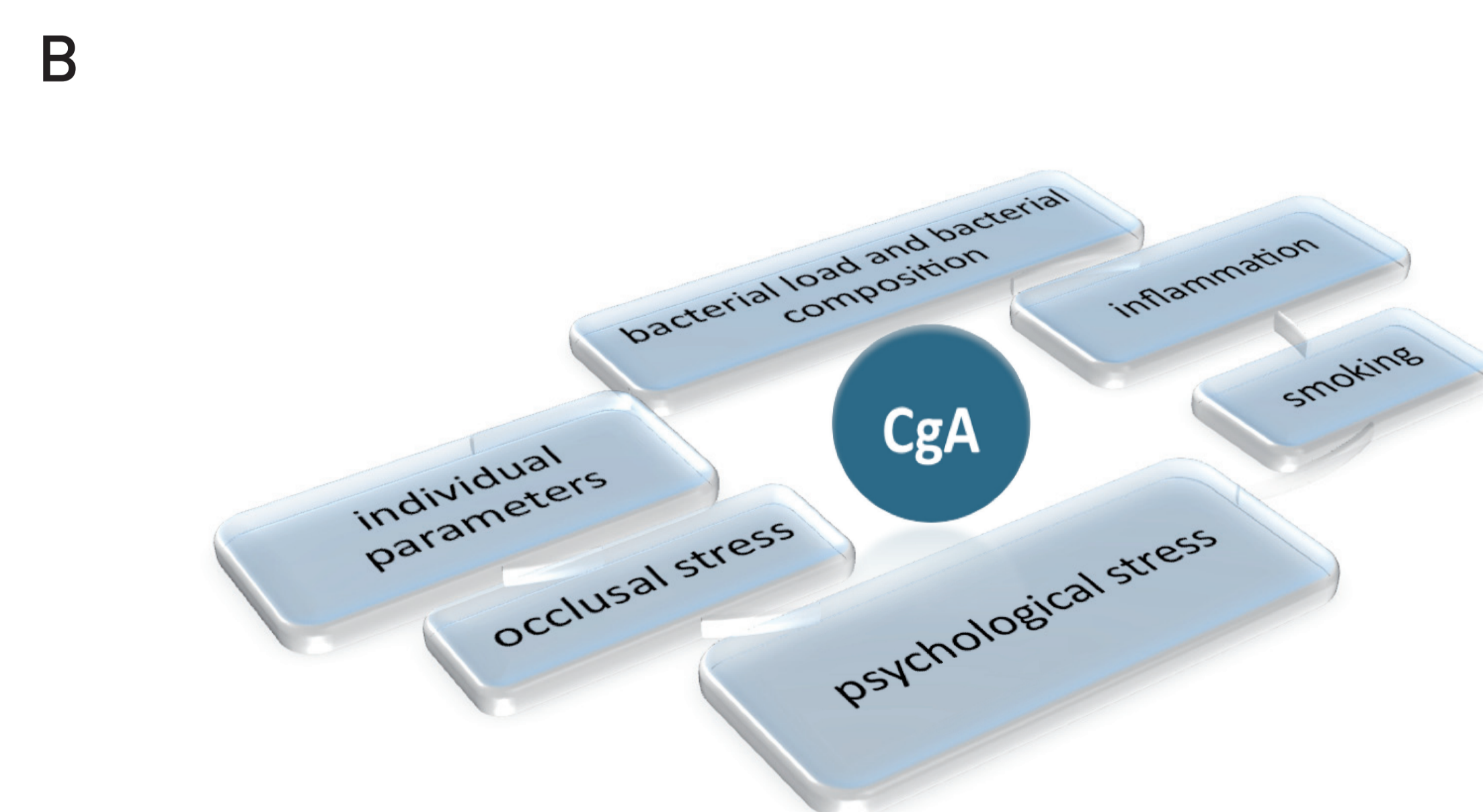


Fig. 6. **A** Salivary CgA levels have already been investigated under stressful or stress-relieving conditions. **B** Possible implications of local and systemic factors on salivary CgA levels in periodontal disease.

## References

- Hironaka M, Ansai T, Soh I, Ishisaka A, Awano S, Yoshida A, Hamasaki T, Sonoki K, Takata Y, Takehara T. Association between salivary levels of chromogranin A and periodontitis in older Japanese. *Biomed Res* 2008;29(3):125-130
- Rai B, Kaur J, Anand SC, Jacobs R. Salivary Stress Markers, Stress and Periodontitis: A Pilot Study. *J Periodontol* 2010 Aug 19 [Epub ahead of print]

## Acknowledgements

The authors thank Mrs. Nguyen Phuong Quynh and Mrs. Rutschek Hedwig (Periodontology Department, Medical University of Vienna/Austria) for their help in performing the experiments as well as Mrs. Womastek Irene (Core Unit for Medical Statistics and Informatics, Medical University of Vienna/Austria) for statistical analysis.