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Chemokine RANTES in gingival crevicular fluid of adult patients with periodontitis

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Abstract

Background, aims: This study presents the first evidence on the presence of the chemokine RANTES in the gingival fluid crevicular (GCF) of patients with periodontitis. RANTES is a chemokine that selectively attracts and activates macrophages and lymphocytes. Leucocytes play a critical rôle in the host response to the subgingival microflora.

Method: In this study, the presence de RANTES in GCF was determined in samples obtained from adult patients with periodontitis and from control subjects with clinically healthy gingiva. GCF was collected from different probing depths (<3 mm, 4–6 mm, >6 mm) (n=72); and active (n=12) and inactive sites (n=12). An active site was defined as attachment loss >2 mm, as determined by sequential probing and the tolerance method. GFC was collected for 30 s using Periopaper® strips, and RANTES was quantified by ELISA.

Results: The presence of RANTES was detected exclusively in the group of patients with periodontitis, presenting a total amount of 40.43±16 pg and a concentration 67.80±41 pg/μl. RANTES concentration was significantly higher in probing depth <3 mm than in probing depth >6 mm (87.24 versus 51.87, p= 0.014). Total amount and concentration in the GCF samples from active sites were higher that in inactive sites (p>0.05).

Conclusions: The finding that RANTES is found only in patients with periodontitis, may represent a general feature of chronic inflammatory in periodontal diseases. Finally, RANTES may be implicated in the biological mechanisms underlying the pathogenesis and progression of periodontal disease.

Key words: periodontitis; chemokines; RANTES; gingival crevicular fluid

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Chronic inflammatory periodontal disease (CIPD) is initiated by accumulation of bacteria on the tooth surface and activates the destruction of attachment connective tissue and alveolar bone (Socransky & Haffajee 1992). Multiple bacterial species, mainly anaerobic Gram-negative rods have been directly involved in periodontal inflammation (Slots 1986). Components of the microbial plaque are able to induce the initial infiltrate and the activation of inflammatory cells including lymphocytes, macrophages, and polymorphonuclear leukocytes (PMN); it has been observed that there is an increase in the number of monocyte/macrophage cells in active periodontal lesions compared with inactive sites (Socransky & Haffajee 1991, Zappa et al. 1991). Therefore, the presence of inflammatory cells and lymphocytes in the infiltrate and the chemotactic factors involved in the recruitment of these cells may be implicated in the pathogenesis and progression of periodontal disease.

During the past decade, a superfamily of leukocyte chemotactic proteins, known as chemokines has been identified. Chemokines selectively attract and activate different leukocyte subpopulations and are key mediators of a variety of patho-physiological conditions, including inflammation (Bacon & Schall 1996, Howard et al. 1996, Ward et al. 1998). Chemokines comprise a large superfamily of proteins (more than 40), which are remarkably homogeneous. All of them have low molecular weight (around 8–12 Kd) and are grouped in 4 subfamilies that contain between 2 and 4 highly conserved NH_2-terminal cysteine amino acid residues. The CXC and CC families are distinguished according to the position of the first two cysteines, which are either adjacent (CC) or separated, by one

amino acid (CXC). In contrast, the C family has a single NH_2-terminal cystein residue and CX3C family has these cysteines separated by 3 intervening amino acids (Baggiolini 1998, Ward et al. 1998).

5 receptors for CXC chemokines and 8 for CC chemokines have already been characterized (Murphy 1996). Among each family, most receptors recognize more than one chemokine, and certain chemokines interact with more than one receptor, reflecting that redundancy and versatility are important features of the chemokine system. Chemokine receptors are selectively expressed in leukocytes. Thus, IL-8, a CXC chemokine, is a chemoattractant for neutrophils, that express CXC receptors (Baggiolini et al. 1997). RANTES, a member of CC chemokines, activates monocytes, eosinophils and basophil leukocytes (Murphy 1996), inducing chemotaxis and the release of other cell mediators (Baggiolini & Dahinden 1994). Both families of chemokine receptors, CXC and CC, are present in activated T-lymphocytes (Bonecchi et al. 1998, Loetscher et al. 1998, Qin et al. 1998).

Different chemokines have been previously implicated in CIPD. Several authors have described the presence of IL-8 chemokine in gingival crevicular fluid (GCF) (Mathur et al. 1996, Payne et al. 1993, Tsai et al. 1995) and in association with β-glucuronidase, a marker of the presence of PMN leukocytes (Chung et al. 1997). Among the members of the CC subfamily, only macrophage inflammatory protein-1 (MCP-1) has been directly implicated in CIPD. MCP-1, an active chemoattractant of monocytes/macrophages, has been detected in human GCF and inflammatory gingival tissue (Hanazawa et al. 1993, Tonetti et al. 1994, Xiaohui et al. 1993). However, to our knowledge, RANTES, has not been associated with CIPD. RANTES interacts with CCR3 and CCR5 chemokine receptors, which are present in monocytes, eosinophils, basophil leukocytes and activated T-cells (Bacon & Schall 1996, Dairaghi & Schall 1996, Greaves et al. 1998, Schall & Bacon 1994, Strieter et al. 1996).

Moreover, an interesting feature of RANTES in the study of CIPD is supported by recent data demonstrating that CCR5, is expressed almost exclusively by T-helper type 1 (Th1) cells (Loetscher et al. 1998). RANTES is an efficient chemoattractant of Th1 cells, inducing their dose response transmigration, whereas Th2 cells are not attracted by this chemokine (Siveke & Hamann 1998).

The aim of our study was to determine the presence of RANTES in GCF samples from adult patients with periodontitis. Therefore, RANTES, a specific chemoattractant of macrophages and lymphocytes, may be involved in the recruitment of inflammatory cells from towards periodontal tissues.

Materials and Methods

Patients

Patients for this study were selected from Primary Attention Service, Faculty of Odontology, Universidad Complutense de Madrid. Criteria for entry were a minimum of 14 natural teeth, excluding 3rd molars, and including at least 10 posterior teeth. Patients with chronic inflammatory periodontal disease (CIPD) had moderate to advanced periodontal disease (at least 5–6 teeth had sites with probing depth >6 mm and with attachment loss ≥ 3 mm and extensive radiographic bone loss), and had received no treatment at the time of examination. Subjects did not suffer from systemic illness and they had not received antibiotics or non-steroid anti-inflammatory therapy in the 6-month period prior to the study. The control group was selected from normal volunteers with no evidence of periodontal disease. Patients were monitored over a period of 4 months from the beginning of the study until at least two sites showed activity, determined by >2 mm attachment loss. The protocol was explained to all patients and Institutional Review Board-approved informed consents were signed. Within 2 weeks of the detection of disease activity all patients were provided with periodontal treatment.

Clinical measurement

Prior to the beginning of the study, all subjects received a supragingival prophylaxis to remove gross calculus and allow probing access. All teeth, with the exception of third molars were scored for probing depth and clinical attachment level. A 2nd measurement of the attachment level and probing depth was taken within 7 days of the first measurement. They were obtained from 6 sites per tooth every 2 months, by a single calibrated investigator. Measurements were made at the mesiobuccal, buccal, distobuccal, distolingual, lingual and mesiolingual positions. Dichotomous measurement of supragingival plaque accumulation (PI) and bleeding on probing (BOP) were also made at 6 sites per tooth 1× every 2 months. Attachment level (AL) and pocket depth (PD) measurements were taken with two models of the Florida Probe (Florida Probe Corporation, Gainesville, Fl). The Florida Disk Probe was used for relative attachment level recordings and the pocket depth probe was used to make probing depth recording. Disease activity was defined by the tolerance method (Haffajee et al. 1983). The active sites exhibited attachment loss >2 mm during the following 2-month period, considering the site threshold. Population and subject thresholds were not considered because no differences were observed.

Collection of gingival crevicular fluid (GCF)

If patients met entry criteria, GCF samples were collected from selected sites in all patients according to probing depth groups: <3 mm ($n=24$), 4 to 6 mm ($n=24$), or >6 mm ($n=24$) and following a simple aleatory sampling. From each patient, 6 samples were collected at the beginning of the study (baseline) ($n=36$ samples) and 6 samples two months later ($n=36$ samples) and they were always obtained from active and inactive sites. GCF was collected from active sites by the time that attachment loss was >2 mm. Simultaneously, GCF was collected from inactive sites, which were defined as those sites showing similar probing depth as active sites but in the absence of attachment loss. GCF samples in control groups were collected in the mesiobuccal gingival sulci at teeth 16 and 26 ($n=12$ per group).

After isolating the tooth with a cotton roll, supragingival plaque was removed with curettas (Hu Friedy, Gracey, USA), avoiding touching the marginal gingiva. The crevicular site was then gently dried with an air syringe. GCF was collected with filter paper strips Periopaper® (ProFlow, Amityville, New York). Strips were placed into the sulcus/pocket until mild resistance was felt and left in place for 30 s. Strips contaminated by saliva or blood were excluded from the sampled

Table 1. Clinical characteristics (mean±SD) from periodontitis and control groups

	Periodontitis group (n=6)	Control groups (n=6)
age (years)	47.16±11.15	40.16±3.71
% males	33.33	33.33
mean probing depth (mm)	3.17±0.53	–
mean attachment level (mm)	3.6±1.15	–
mean probing depth at active sites	4.97±0.43	–
% sites with plaque	81.50±11.1	45.40±8.7
% sites with BOP	56.28±15.7	–
GCF volume (μl)	0.72±0.33*	0.26±0.10*

* p-value=0.0001.

group. A calibrated Periotron-6000® (ProFlow, Amityville, New York) was used for volume determination of the strips. The Periopaper® strips were then immediately placed inside a sterile vial and stored at −70°C until analysis.

Analysis of GCF

Following collection of GCF, the volume of the sample on the Periopaper® strips was measured using a calibrated Periotron-6000®. A standard curve correlating digital readout to volume was constructed for each calibration with standard human serum. Each volume was applied 3 times to a Periopaper® and the corresponding periotron units were recorded. No re-calibration of the Periotron-6000® was necessary throughout the study period. The readings from the Periotron-6000® were converted to an actual volume (μl) by reference to the standard curve.

After GCF collection, strips were placed in eppendorff vials with 50 μl of phosphate buffered saline with 0.05% Tween-20 (PBS-T). GCF was extracted by centrifugation at 10.000 g for 5 min at 4°C (Heraeus SEPATECH Biofuge 17RS), and the procedure was repeated three times (Chung et al. 1997).

Quantification of RANTES

Aliquots of each GCF sample were assayed by an enzyme linked immunosorbent assay (ELISA) to determine the levels of RANTES using matched antibody pairs and according to the manufacturer's recommendations (ENDOGEN Inc., Cambridge, USA). Briefly, plates (F16 Maxisorp Loose, Nunc A/S Roskilde, Denmark) were coated with the anti-human monoclonal RANTES antibody (M-421B-E) overnight at 4°C. Plates were blocked with PBS 4% BSA and washed 3×. 10 μl of GCF samples in 90 μl PBS-T were added to the plate in duplicate and incubated 1 h at room temperature (RT). 100 μl of appropriate diluted biotin-labeled antibody (M-420B-B) was added to each well, covered and incubated for 1 h at room temperature (RT). Plates were washed 3× and incubated with 100 μl HRP-conjugated Streptavidin (ENDOGEN) 1:32,000 for 30 min at RT. After extensive washing, 100 μl TMB (ENDOGEN) substrate solution were added. The reaction was stopped after 30 min by the addition of 50 μl de 0.18 M sulfuric acid, and color measured at 450 nm using an automated microplate spectrophotometer (Labsystems Multiskan, BICHROMATIC, UK). RANTES concentration in the samples was calculated with a standard curve (15–1000 pg) obtained with recombinant RANTES chemokine (ENDOGEN Inc., Cambridge, USA). Values below 15 pg were not considered. RANTES concentration was calculated according to the following formula: RANTES concentration (pg/μl)=total RANTES (pg)/volume (μl).

Statistical methods

The clinical parameters as well as the amounts and concentrations of RANTES at healthy and diseased sites were calculated as subject means±standard deviation. The unpaired Student t-test was used to analize differences in clinical and biochemical parameters between patients from periodontitis and control group. Differences in clinical and biochemical parameters inside each group were also analyzed with the unpaired Student t-test. The significance (α=0.05) of differences was assessed using the Turkey test. The correlation of RANTES levels with clinical parameters, probing depth and degree of

Table 2. RANTES in gingival crevicular fluid from periodontitis and control groups (means±SD)

	Periodontitis group				Control group			
	baseline (n=36)	2 months (n=36)	range	total	baseline (n=12)	2 months (n=12)	range	total
RANTES (pg)*	42.02±20.6	38.67±9.7	28.80–126.00	40.43±16.3	bkg	nd		
RANTES (pg/μl)**	64.86±39.3	70.90±44.7	19.22–249.23	67.80±41.8				
GCF (μl)	0.74±0.3	0.70±0.3	0.11–1.54	0.72±0.33	0.26±0.10		0.11–0.48	0.26±0.10

* Total amount of RANTES (pg). ** Concentration of RANTES (pg/μl). bkg under detection level. nd, not done.

Table 3. RANTES in GCF from periodontitis group according to probing depth (mean±SD)

Probing depth (mm)	Total amount (pg)			Concentration (pg/μl)			GCF (μl)		
	baseline	2 months	total	baseline	2 months	total	baseline	2 months	total
<3	42.11±28.2	30.46±17.3	39.68±21.8	65.82±45.3	86.86±68.4	87.24±53.2#	0.60±0.3	0.41±0.2	*0.50±0.2&,*
4 a 6	38.68±20.0	42.68±11.5	42.45±13.9	63.57±44.0	61.55±29.5	65.27±34.7	0.69±0.3	0.82±0.2	0.75±0.2&
>6	41.68±16.0	29.98±14.2	39.07±12.1	54.39±35.8	40.71±23.7	51.87±28.0#	0.92±0.3	0.89±0.2	0.90±0.3*

p-value=0.014. & p-value=0.012. * p-value=0.0005.

activity in healthy and diseased subjects was examined using Pearson's correlation.

Results

The clinical characteristics of patients included in this study are grouped in Table 1. 4 males and 8 females were studied, with age range 35–67 years old (mean age 47.16±11.05 for periodontitis group; mean age 40.16±3.71 for control group). No statistically significant differences in age or gender existed between the two groups. As expected, significantly lower amounts of GCF were obtained from control subjects as compared with periodontitis patients (p-value=0.0001).

Mean variations of total amount and concentration of RANTES in the periodontitis group and in the control group at the beginning of the study and after two months, are shown in Table 2. RANTES in GCF was analyzed in 72 samples from patients with periodontal disease. In this group mean values of 40.43±16.3 and an estimated concentration of 67.80±41.8 pg/μl were obtained. In the control group, all samples tested had RANTES values below detection levels (<15.62 pg).

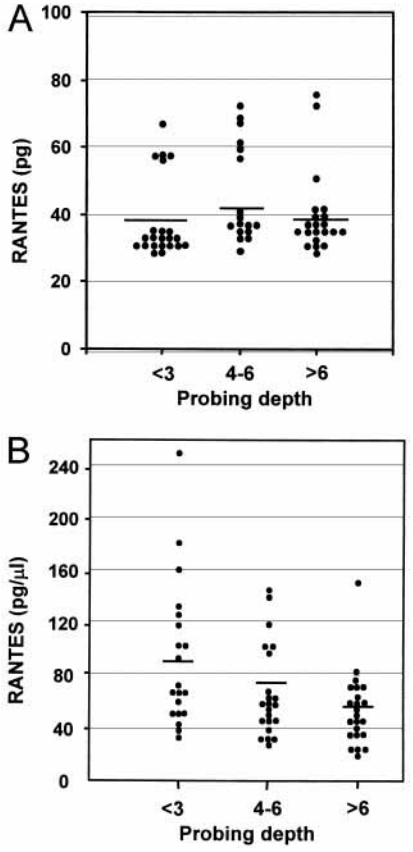

Fig. 1. (A) Presence of RANTES in GCF obtained from different sites of periodontitis patients and according to probing depth. GCF from each site was evaluated by ELISA and probing depth evaluated as previously described. (B) RANTES concentration measured in GCF obtained from each site in patients with periodontitis and according to probing depth. RANTES concentration was calculated according to the formula described in *Material and Methods*.

Table 4. RANTES in GCF from periodontitis group in active and inactive sites

Site designation	No. observations	Total amount (pg)	Concentration (pg/μl)	GCF (μl)
active	12	47.30±14.51	49.64±19.06	1.03±0.30
inactive	12	37.55±14.25	47.53±17.71	0.83±0.21

Interestingly, total amount of RANTES was independent of the probing depth. As shown in Table 3 and Fig. 1A, no significant differences were observed between sites with <3 mm, 4–6 mm and >6 mm in any of the patients analyzed. RANTES concentration in GCF at sites with <3 mm probing depth was significantly higher (87.24 pg/μl) than that observed at sites with >6 mm (51.87 pg/μl; p=0.014) (Table 3 and Fig. 1B).

However, the volume of GCF recovered with the periopaper is directly related to the probing depth in the periodontal pockets; as shown in Table 3, a volume of 0.50 μl GCF was obtained from probing depth <3 mm, 0.75 μl from periodontal pockets with probing depth of 4–6 mm and 0.90 μl from >6 mm. The volume variation observed between the different probing depths was statistically significant (p<0.05).

Therefore, considering that the total amount of RANTES remains fairly constant and is independent of probing depth, whereas GCF volume increases with probing depth, RANTES concentration in GCF at sites with <3 mm probing depth was significantly higher (87.24 pg/μl) than that obtained at sites with >6 mm (51.87 pg/μl; p=0.014) (Table 3).

As shown in Table 4, the amount of RANTES measured in an active site showed no significant variation (p>0.05) as compared with inactive sites presenting similar probing depth. Active sites showed no significant increase in RANTES concentration (49.64 pg/μl) compared with inactive sites (47.53 pg/μl) (p>0.05). Moreover, GCF volume in active sites (1.03 μl) was not significantly higher than in inactive sites (0.83 μl). Consequently, active disease could not be correlated with the presence of RANTES.

Because of the difference between total amount and concentration, the relationship between the GCF volume and these two parameters were examined. Table 2 and Table 3 showed the GCF volume increased in subjects with periodontitis with probing depths from <3 mm to >6 mm. Table 4 showed that GCF values were reduced in inactives sites. A negative correlation (r=−0.647, p<0.05) between the total amount of RANTES and the GCF volume was found. Similarly, positive correlation was found between concentration of RANTES and the GCF volume (r= 0.678, p<0.05). The results of our study found no correlation between levels of RANTES with clinical parameters.

Discussion

This study examined the total amount and concentration of the chemokine RANTES in GCF of adult patients with chronic inflammatory periodontal disease. Our data demonstrates that chemokine RANTES is present in GCF of patients with periodontitis and is undetectable in healthy subjects. RANTES is a member of a superfamily of proinflammatory cytokines designates chemokines implicated in selective attraction of different leukocyte subsets (Baggiolini 1998, Ward et al. 1998). RANTES belongs to a subfamily of chemokines characterized by conservation of the firsts two adjacent cystines in the primary protein structure (Schall & Bacon 1994, Schall et al. 1990). It is, a 68 amino acid protein, originally identified as a T-cell specific gene (Schall et al. 1988). Subsequent studies demonstrate that RANTES is more broadly expressed than originally thought, and is inducible in a variety of tissues by specific stimuli (Schall et al. 1988). CC chemokines are considered to promote inflammation by the selective chemoattraction of specific subsets of haematopoietic cells; RANTES in particular is a chemoattractant of eosinophils (Kame-

yoshi et al. 1992), monocytes (Wiedermann et al. 1995) and for T-lymphocytes of the CD45RO + 'memory'-helper phenotype (Schall et al. 1990). In addition, RANTES is released from thrombin stimulated platelets (Kameyoshi et al. 1992), and induces histamine release by basophils (Kuna et al. 1992). These observations suggest a role for RANTES in both acute and chronical inflammation. Considering the levels of RANTES found in GCF of periodontitis patients, it is possible to speculate that this chemokine is involved in the development of the gingival inflammatory response by mediating the recruitment and activation of leukocytes.

Our findings demonstrate that total amount and concentration of RANTES in periodontitis subjects was stable along the study period, and that the level of RANTES is higher in actives sites versus inactives sites, although differences were not significant ($p>0.05$). Our data demonstrate that sulci <3 mm contains high concentration of RANTES, which decrease progressively with the increase of the gingival sulcular depth, and directly related to the increment in GCF volume (Dairaghi et al. 1998, Schall & Bacon 1994). The biological activity of mediators, such as cytokines, whose function depends on the binding to cell surface receptors, is closely related to local concentrations. In fact, it has been reported that, in vitro, different responses are obtained depending on RANTES concentration. Concentration below 100 nM RANTES induces a predominant chemotatic response, whereas concentrations above 100 nM induce T-cell activation, as occurs with antigen stimulation of T cells (Dairaghi et al. 1998). This suggest that both types of chemokine response, depending on RANTES concentration, could play an independent role in the progression of periodontitis.

In the present study, we were unable to establish an association between levels of RANTES and probing attachment loss, considered as a marker of activity progression. However, episodic periodontal probing attachment loss may be associated with variations in the supracrestal inflammatory cell populations where significantly more mast cells, monocytes/macrophages and plasma cells are present in activity sites as compared with inactive sites (Zappa et al. 1991). In part, our observations may be explained because the impossibility to determine whether mechanisms underlying attachment loss were active at the time of sampling, which was performed at 2-month intervals.

In our study, the correlation between the levels of RANTES and clinical parameters was determined in the sampled sites, and although total amount and concentration in GCF obtained from inflamed sites was much greater than that from healthy sites, our results showed no correlation of RANTES with clinical parameters. Examination of gingival tissue for bleeding following probing or the presence of suppuration are indicators of the degree of inflammation. However, these clinical parameters are subject to the variability inherent in clinical evaluation, therefore, the lack of relationship between RANTES in GCF and clinical parameters could be explained by this fact. In our study, we have observed a significant decrease in RANTES concentration in GCF of probing depth >6 mm compared to probing depth <3 mm. However, considering that the volume of GCF produced in sites with >6 mm was significantly higher than in sites with probing depth <3 mm. It explains the lower RANTES concentration detected in sites with higher probing depth.

RANTES is produced locally at inflammatory sites, it binds to activated endothelium (Pattison et al. 1994), and is capable of attracting monocytes (Wiedermann et al. 1995). Monocytes/macrophages play a central rôle in mobilizing the host defense mechanisms against bacterial infection, because they are involved both in the initial responses as antigen-presenting cells and in the effector phase as inflammatory, tumoricidal and microbicidal cells. Early studies (Attstrom 1970, Sinden & Walker 1979) have shown that monocytes markedly infiltrate periodontal tissues in adult periodontal patients. Monocytes/macrophages produce multiple regulatory factors such as inflammatory cytokines and growth factors, and also release arachidonic acid metabolites, oxygen radicals, and proteases. Considering the multifunctional abilities of monocytes/macrophages, these cells could be involved in initiation and development of the inflammatory reactions and alveolar bone loss observed in adult periodontal disease. Therefore, analysis of the mechanism that induce monocyte recruitment into periodontal tissues represent an important step toward understanding the pathogenesis of this disease.

On the one hand, RANTES is an efficient chemoattractant for Th1 cells (but not for Th2 cells), inducing a dose response transmigration of Th1 (Siveke & Hamann 1998). Th1 and Th2 cells define 2 forms of the specific CD4+Th cell-mediated immune response based on their differential cytokine secretion (Mosmann & Coffman 1989). Th1 or Th2 cell cytokines have been detected in periodontal diseases by several investigators (Ishikawa et al. 1997). However, diverse periodontal pathogens cause different periodontal disease, and furthermore variable host response are observed among patients or even during the various stages of the disease. Recently, CCR5, the receptor for RANTES and MIP-1α and β chemokines, has been reported to be preferentially expressed during human Th1 responses (Loetscher et al. 1998, Qin et al. 1998). Moreover, activated T cells, expressing CCR3 and CCR5, are specifically attracted by RANTES, MCP-1 and MIP-1β chemokines, which were describe reported to be ligands for these receptors (Qin et al. 1998). Thus, several findings suggest the existence of dynamic programs in the differentiation/activation process of human Th1 and Th2 cells. The understanding of genetic and environmental mechanisms responsible for these associations may provide new insights into the functional regulatory of the specific effector cells.

Several authors have previously described the presence of IL-8 and MCP-1 chemokines in GCF (Chung et al. 1997, Mathur et al. 1996, Murphy 1996, Tonetti et al. 1994). We have determined that higher levels of RANTES are found in GCF from patients with CIPD as compared to healthy subjects. Considering that gingival inflammation develops in parallel to increasing infiltrating of monocytes/macrophages and lymphoid cells, it suggests that in CIPD, the migration and accumulation of these cells in inflammatory loci might be related to the release of chemokines, such as RANTES, providing a potential mechanism to account for the recruitment of inflammatory cells observed in bacterially induced inflammatory processes in human gingiva.

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Zusammenfassung

Das Chemokin RANTES in der Sulkusflüssigkeit erwachsener Parodontitispatienten

Einleitung: Diese Studie präsentiert die ersten Beweise für das Vorkommen des Chemokins RANTES in der Sulkusflüssigkeit (SF) von Patienten mit Parodontitis. RANTES ist ein Chemokin, das Makrophagen und Lymphozyten selektiv anzieht und aktiviert. Leukozyten spielen eine wichtige Rolle in der Wirtsabwehr gegenüber der subgingivalen Mikroflora.

Methoden: In dieser Studie wurde RANTES in SF untersucht, die erwachsenen Parodontitispatienten und Kontrollprobanden mit klinisch gesunder Gingiva entnommen wurde. SF wurde an Stellen mit unterschiedlichen Sondierungstiefen (ST <3 mm, 4–6 mm, >6 mm; $n=72$) und an aktiven ($n=12$) sowie inaktiven ($n=12$) Stellen gewonnen. Stellen wurden als aktiv betrachtet, wenn ein Attachmentverlust von >2 mm vorlage, der durch sequentielle Messungen und die Toleranzmethode bestimmt worden war. SF wurde mittels Periopaper-Streifen über 30 Sekunden gesammelt und RANTES mittels ELISA quantifiziert.

Ergebnisse: RANTES konnte lediglich in der Gruppe der Parodontitispatienten nachgewiesen werden mit einer Gesamtmenge von 40.43±16 pg und einer Konzentration von 67.80±41 pg/μl. Die RANTES-Konzentration war an Stellen mit ST <3 mm signifikant höher als an solchen mit ST >6 mm (87.24 zu 51.87 pg, $p=0.014$). Die Gesamtmenge und Konzentration von RANTES in SF-Proben von aktiven Stellen unterschied sich nicht signifikant von inaktiven Stellen.

Schlußfolgerungen: Die Beobachtung, daß RANTES ausschließlich bei Parodontitispatienten gefunden wurde, könnte darauf hindeuten, daß es sich dabei um ein generelles Characteristikum chronischer Entzündung bei marginaler Parodontitis handels. RANTES könnte eine Rolle in den biologischen Mechanismen der Pathogenese und Progression der Parodontitis spielen.

Résumé

La chimiokine RANTES (Regulated on Activation, Normal T cell Expressed and Secreted) dans le fluide gingival de patients adultes atteints de parodontite

Cette étude présente la première preuve de la présentc de la chimiokine RANTES dans le fluide gingival de patients atteints de parodontite. RANTES est une chimiokine qui attire et active sélectivement les macrophages et les lymphocytes. Les leucocytes jouent un rôle critique dans la réponse de l'hôte à la microflore sous gingivale. Dans cette étude, la présence de RANTES dans le fluide gingival fut determinée à partir d'échantillons obtenus chez des patients adultes atteints de parodontite, et chez des sujets contrôles présentant une gencive cliniquement saine. Le fluide gingivale fut collecté dans des sites ayant des profondeurs au sondage differences (<3 mm, 4–6 mm, >6 mm) ($n=72$) et dans des sites actifs ($n=12$) ou inactifs ($n=12$). On définissait les sites actifs comme présentant une perte d'attache >2 mm, déterminée par des sondages répétés et une méthode de tolérance. Le fluide gingival fut récolté pendant 30 s avec des bandelettes de Periopaper et RANTES fut quantifiée par ELISA. La présence de RANTES fut détectée exclusivement dans le groupe des patients atteints de parodontite, en quantité total de 40.43±16 pg et une concentration de 67.80±41 pg/μl. La concentration de RANTES était significativement plus élevée dans les poches <3 mm que dans les poches >6 mm (87.24 contre 51.87, $p=0.014$). La quantité totale et la concentration de RANTES dans les échantillons de fluide gingival des sites actifs étaient plus élevée que dans les sites inactifs ($p=0.05$). Le fait que RANTES soit retrouvée seulement chez les patients présentant une parodontite, peut représenter un tableau général d'inflammation chronique au cours des maladies parodontales. Enfin, RANTES peut être impliquée dans les mécanismes biologiques de la pathogénie et de la progression des maladies parodontales.

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