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Inhibition of Acid Production in *Streptococcus mutans* NCTC 10449 by Sodium Ion Y. IWAMI*, N. GUHA-CIOWDHURY and T. YAMADA (Department of Oral Biochemistry, Tohoku University, School of Dentistry, Sendai, Japan)

Sodium ion is known to inhibit acid production by streptococci (I. Luoma, 1969; P. D. Marsh, 1982), but the mechanism of inhibition is unclear. The aim of this study was to identify the inhibitory step of sugar metabolism in *Streptococcus mutans* by sodium ion. *S. mutans* NCTC 10449 was grown under glucose-limited and strictly anaerobic conditions. The cells were harvested, washed and suspended in 0.0-0.3 M NaCl solution. The rate of acid production by the cells in the presence of glucose was measured following incubation at 35°C at a fixed pH of 7.0. Acids were determined by a carboxylic acid analyzer, and the intracellular levels of glycolytic intermediates were estimated enzymatically. In the presence of 0.15 M NaCl, the intracellular pH decreased and total acid production decreased by 31%. The intracellular level of fructose 1,6-bisphosphate (FBP) increased by 58% while levels of 3-phosphoglycerate (3PG) and pyruvate decreased by 46% and 12% respectively. However, from investigations using cell-free extracts of *S. mutans*, sodium ion appeared not to have any direct inhibitory effect on the enzymes, aldolase, triose phosphate isomerase, glyceraldehyde 3-phosphate dehydrogenase and phosphoglycerate kinase, involved in the conversion of FBP to 3PG. Therefore, it is possible that the inhibition of acid production by sodium ion could be an indirect effect resulting from the decrease in intracellular pH which could affect the activity of the enzymes involved in the steps converting FBP to 3PG.

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Acid-Induced Protection against Acid-Impairment in *Streptococcus sanguis* N. TAKAHASHI* and T. YAMADA (Department of Oral Biochemistry, Tohoku University School of Dentistry, Sendai, Japan)

The pH in dental plaque decreases to about 4 within a few minutes after sugar intake. Previously we reported that the rapid acidification to pH 4.0 impaired glycolysis and growth ability in *S. sanguis* but not in *S. mutans* (73rd IADR, #849, 1995). The aim of this study was to examine whether *S. sanguis*, one of the predominant bacteria in dental plaque, could modify the ability to protect itself against acid-impairment through acid adaptation. *S. sanguis* ATCC 10556 was grown in trypticase soy broth containing 0.5% yeast extract and 1% glucose (TSBYG) at pH 7.0 until the exponential phase of growth (control [C] cells). A part of the culture was pre-acidified to pH 5.5 for 30 min (pre-acidified [PA] cells). The C and PA cells were then acidified to pH 4.0. After 60- and 100-min of acidification the cells were examined for glycolytic activity by measuring rate of acid-production from glucose at pH 7.0 with a pH-stat. After 60-min of acidification, the C and PA cells were transferred to new TSBYGs at pH 7.0 and the growth was followed at 660 nm. The glycolytic activity of C cells decreased to 19 and 4% after 60- and 100-min of acidification respectively, whereas the PA cells maintained 53 and 37% of glycolytic activity respectively. In addition, the C cells acidified for 60 min showed a lag of 85 min before they started to grow again, while the PA cells required only 42 min before re-growth. Furthermore, the acid-adaptation reached maximum within 30 min of pre-acidification and did not occur in the absence of nitrogenous sources. These results indicated that *S. sanguis* became more resistant to the effects of rapid acidification through pre-acidification, and suggest that a short period of pre-acidification can induce a system which protects the cells against acid-impairment. This study was supported by Grant-in-Aid for EYS 07771650 from Ministry of Education, Science and Culture, Japan

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Race, Immunosuppression, and Severe Periodontal Attachment Loss in HIV-Infected Adults. R.G. MCKAIG*, L.L. PATTON, R.P. STRAUSS, M.V. SHARPE, J.J. ERON. (University of North Carolina, Chapel Hill, NC, USA).

The objective of this study was to determine whether prevalence of severe periodontal attachment loss (PAL) in HIV-infected adults differs between blacks and whites in NC. The study population consisted of the first 96 dentate HIV-infected adults who enrolled in a longitudinal study of oral disease at UNC Hospitals. There were 51 blacks (32 men, 19 women; mean age=36, SE=1) and 45 whites (42 men, 3 women; mean age=38, SE=1). Periodontal pocket depth and PAL were measured by one clinician on a maximum of 28 teeth, 6 sites per tooth, using a manual probe. Severe PAL was defined as having ≥ 1 site per subject exhibiting ≥ 5 mm attachment loss. Severe PAL was found in 63 (65.6%) participants, 40 (78%) blacks and 23 (51%) whites. Blacks were 3.5 times as likely to have PAL as whites (95% CI = 1.5, 8.3). Stratified analysis based on CD4 count [$<200/\mu\text{l}$ n=51 (53%) vs $\geq 200/\mu\text{l}$ n = 45 (47%)] showed significant differences in severe PAL between blacks and whites; however, CD4 count was not a significant predictor in multivariate models. In multivariate logistic regression, the association of PAL with race increased to OR=5.2 (95% CI = 1.8, 15.1) when controlling for age, sex, smoking, and presence of oral candidiasis (pseudomembranous, erythematous, or angular cheilitis). From preliminary results of this study, we concluded that severe periodontal attachment loss is more prevalent in HIV-infected blacks than HIV-infected whites in NC, independent of CD4 category ($<200/\mu\text{l}$ vs $\geq 200/\mu\text{l}$). Supported by NIH Grants R29 DE11369 and 5T32DE07191.

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Periodontal Disease in HIV positive Children: 1 year findings. D. SCHOEN*, P. MURRAY, E. NELSON, J. JANDINSKI, N. TOPSKY, E. VARAGIANNIS, AND F. CATALANOTTO. (UMDNJ-Dental School, U of FL).

The overall aim of this study is to assess the progression of oral disease in HIV+ children. The purpose of this 12 month report is to present the prevalence and severity of periodontal disease in a population of HIV+ children enrolled in Children's Hospital AIDS Program in Newark. Of the original subjects in the study (100 HIV+, 87 HIV-), 80% (N=134) were examined for periodontal disease 1 year after baseline at NJ Dental School. Of the 134 subjects examined, 75 were HIV+, and 59 were HIV- children residing in the same households who served as controls. The children ranged in age from 2-15 years with a mean age of 7.1 ± 3.8 yrs, with 55% being males. The majority of the children (95%) were minorities: 79% African-Americans and 16% Hispanics. Plaque assessment (PHP-M) showed a significantly greater increase in plaque for the HIV+ subjects at 1 year than the HIV- controls. Mean PHP-M/site for HIV+ subjects was $.71 \pm .11$, a mean increase of $.07 \pm .15$ from baseline. Mean PHP-M/site for HIV- controls was $.64 \pm .14$, a mean increase of $.004 \pm .17$ from baseline. There were no significant differences in mean changes for Gingival Index, Papillary Bleeding Index, or Pocket Depth scores. Prevalence of Bleeding on Probing increased for both groups with 56% of HIV+ subjects and 53% of the control group scoring 2 or greater. 13% of HIV+ and 17% of HIV- subjects presented with at least one site of gingival recession, a slight increase over baseline. Although there was no increase in the number of HIV+ subjects exhibiting Linear Gingival Erythema, there was an increase in the number of subjects exhibiting LGE at 7 or more sites (21.2% at 1 yr. vs 14.6% at baseline). HIV+ and HIV- children exhibited an increased incidence of gingivitis; the HIV+ group are at higher risk for increased plaque accumulation and increased incidence of Linear Gingival Erythema over time. Support: NIDR grant # DE10592, the Northeastern Minority Oral Health Research Ctr.

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Mothers' poor periodontal health and infant's low birth weight. A. P. DASANAYAKE*, T. PARDTHAISONG & S. CHEN (University of Alabama at Birmingham School of Dentistry and Medicine, Birmingham, AL & Chiangmai University, Thailand).

Pregnancy can cause changes to the periodontium of the pregnant woman. This apparent association between pregnancy and oral health may have led to the belief ("loss of a tooth for every child"), held by many women around the world. Conversely, poor oral health of the pregnant mother can adversely affect her pregnancy outcome. To evaluate this hypothesis, we conducted a matched case-control study and investigated the association of mother's caries status (DMFT) and periodontal health (CPITN) with low birth weight (LBW) of the infant while controlling for the known risk factors for LBW. Cases (N=55) were the mothers who delivered LBW babies (<2500 gm) in June 1988 at Nakorn Maharak and Mother and Child Hospitals in Chiangmai, Thailand. Controls (N=55) were the mothers who delivered normal birth weight babies within 24 hours of the case mother's delivery. Controls were individually matched with cases for age, marital status, race, gravidity, parity, and hospital. Correlation coefficients, t-test, linear regression, and conditional logistic regression were used in the data analyses. In general, compared to controls, mothers of LBW infants had statistically significantly lower number of healthy sextants (mean = 0.4 vs. 1.1; $p = 0.001$), higher number of bleeding sextants (mean = 5.6 vs. 4.9, $p = 0.001$), and higher number of sextants with calculus (mean = 4.0 vs. 3.2; $p = 0.01$). These mothers were also shorter (mean = 150 cm vs. 153 cm; $p = 0.01$), and were less educated (mean = 6.1 yrs vs. 7.4; $p = 0.07$). Case mothers gained less weight during pregnancy (mean = 6.7 kg vs. 9.9 kg, $p = 0.0001$) as expected. Conditional logistic regression analyses indicated that mothers with more healthy sextants in the mouth (Odds Ratio [OR] = 0.3, $p = 0.01$) and those who were taller (OR = 0.86, $p = 0.04$) had a lower risk of giving birth to a LBW infant. Risk of LBW was higher in mothers who initiated prenatal care late (OR = 3.9, $p = 0.02$). We conclude that poor periodontal health of the mother is a potential independent risk factor for LBW. This finding is biologically plausible, because periodontal pathogens can have an indirect effect on the developing fetus (Offenbacher et al., 1992 & 1993). Findings such as reduction of pre-term delivery by mid-trimester treatment of other bacterial infections in the mother (i.e., bacterial vaginosis) (Hauth & Goldenberg, 1994) may shed further light on the observed association between mothers' poor periodontal health and LBW of the infant.

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Prevalence of Complex Periodontal Treatment Needs. M. Patiffo* (Department of Periodontics, Faculty of Dentistry, National University of Mexico).

The purpose of this study was to determine the extent and prevalence of complex periodontal treatment needs in a sample of 266 patients; 166 females, 100 males aged 30-89 (mean 44.87 years, SD 12.34) examined at the Admission Clinic of the Faculty of Dentistry, UNAM from June to September 10, 1995. Clinical data included PSR scores in which the analysis unit was the tooth non the sextant. To assess the extent of disease, it was calculated by the number of affected sites divided by the total number of sites multiply by 100. The 36% of examined subjects require complex periodontal treatment needs, the mean of extent was 5.62 (SD 11.67, median 0.000). There were not statistical differences between females and males related to extension ($t = -1.69$, $p = 0.09$). Similarly, the extension failed to indicate significant correlation between age ($r = 0.04$, $p > 0.05$) and years of study ($r = -0.01$, $p = 0.05$). No significant differences were found when the extent was considered by civil state (ANOVA $F = 0.99$, $p > 0.41$). In spite of a relatively high prevalence of complex periodontal treatment needs (36%) it can not be differentiated which patients require scaling and root planning or surgical treatment.

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Periodontal Status in a Group of Lithuanians with Untreated Periodontitis. A. PŪRIENĖ*, P.-Ö. SÖDER, B. SÖDER and L.-J. JIN. (Vilnius University, Vilnius, Lithuania; Karolinska Institute, Stockholm, Sweden).

The aim of the study was to determine the periodontal status in a group of middle-aged Lithuanians. 20 subjects were randomly selected from a group of untreated middle-aged Lithuanians, 9 males and 11 females (mean 36.3 \pm 4.4). Clinical parameters were recorded. Alveolar bone height on orthopantomograms were measured by a computer digitizing system and expressed in % of root length (BH%). The general clinical condition was as follows: on patients level, calculus was found in 82.2 \pm 21.4 % of sites; bleeding on probing in 62.2% of the sites; pus in 27.3 \pm 24.0 % of sites, deep pockets ≥ 6 mm in 28.5 \pm 12.2 % of sites. 75% of the subjects had a mean of plaque index >1 (1.4 \pm 0.5) and 85% had a mean of gingival index >1 (1.8 \pm 0.7). 18 subjects missed at least one tooth. A total of 30 teeth missed, of which 29 were molars or premolars. The mean of BH% was 40.1 \pm 8.2, ranged from 20.5 to 53.7. No significant difference was found between males and females. The subjects had a mean of 4.8 \pm 2.1 mesial sites and 3.9 \pm 2.6 distal sites with vertical distraction. No significant difference existed between the mesial and distal sites. The subjects had a mean of 5.9 \pm 2.2 with furcation. The present study shows that the untreated middle-aged Lithuanians had a poor periodontal status with substantial periodontal breakdown. The study was supported by the Swedish Institute and the Karolinska Institute.

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A survey on the periodontal conditions and their recognition among the faculty members of Chonnam National University. YJ Kim*, HJ Chung (Dept. of Perio. Chonnam Natl. Univ., Kwangju, Korea)

This survey was aimed to determine the prevalence of periodontal diseases and to investigate the association between subjective symptoms and clinical periodontal conditions in the faculty members of Chonnam National University. The written questionnaires were made about the subjective symptoms related to periodontal diseases and the experiences of professional periodontal care. The subjects were examined and diagnosed by 3 experienced dentists majoring in periodontics. A total of 895 subjects (807 males and 88 females, 23-65 years old in age) were recruited for this survey. The association between periodontal conditions and symptoms was analyzed with χ^2 -test at the probability level <0.05 . The prevalences of gingivitis and periodontitis were 42% and 37% respectively. According to the age, the prevalence of periodontitis increased. The most frequent subjective symptoms were tooth hypersensitivity and gingival bleeding. The sense of tooth extrusion, mobility and gingival swelling were significantly related to the periodontal diseases. Approximately 62% of the subjects were treated by scaling. Twenty six percent received the periodontal therapy for the periodontal problems. The subjective symptoms are not accurately related to the true periodontal condition, and only the one-third of the subjects diagnosed as having periodontal diseases received the periodontal therapy. Therefore, periodontal screening by dentists is essential for the early diagnosis and management of periodontal diseases.