

**Inflammatory Remarks:  
Oral and Systemic Ramifications of the Inflammatory Process**

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**Presenter Disclosures for Betsy Reynolds, RDH, MS**

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The past twenty years has seen a dramatic increase in our understanding of the oral inflammatory process and its ramifications for systemic health and well being

Several systemic conditions are dramatically impacted by the presence of inflammation

Additionally, many systemic conditions enhance the inflammatory process producing negative sequelae in the oral cavity

Many research studies define 'periodontal disease' as periodontitis and gingivitis—almost half of adults in the United States aged 35 to 44 have gingivitis

Similar proportions are believed to exist in Canada although data are lacking--Review of the Oral Disease-Systemic Disease Link. Part 1: Heart Disease, Diabetes. Canadian Journal; of Dental Hygiene, November-December 2006, 40(6):288-342

**Cardiovascular Disease**

Cardiovascular disease is a term that refers to more than one disease of the circulatory system including the heart and blood vessels—whether the blood vessels are affecting the lungs, the brain, kidneys or other parts of the body

Cardiovascular diseases ('CVDs') account for ~30% or >17 million deaths or ~30% of all deaths globally each year—this figure is expected to grow to 23.6 million by 2030

Noncommunicable diseases—of which CVDs are the most prevalent—cause the greatest morbidity and mortality worldwide

Ischemic heart disease ('IHD') is the most common type of cardiovascular disease in Canada and other industrialized countries around the world

IHD refers to problems with the circulation of blood to the heart muscle—a partial blockage of one or more of the coronary arteries can result in a lack of enough oxygenated blood (ischemia) thus causing symptoms such as angina (chest pain) and dyspnea (shortness of breath)

A complete blockage of an artery causes necrosis or a myocardial infarction (commonly known as a heart attack)

Remarkable progress has been made tackling cardiovascular disease in Canada over the past 60 years with death rates declining by more than 75%—largely due to research advances in surgical procedures, drug therapies and prevention efforts--Source: Heart and Stroke Foundation; accessed 4/2/2016 at: <http://www.heartandstroke.com/site/c.ikiQLcMWJtE/b.3483991/k.34A8/Statistics.htm>

Yet heart disease and stroke remain leading causes of death and hospitalization and the biggest driver of prescription drug use in Canada

An estimated 1.6 million Canadians are living with heart disease or the effects of a stroke

More than 400,000 Canadians are living with long-term stroke disability

In 2012, more than 66,000 Canadians died from heart disease or stroke—one person every 7 minutes

- Almost 14,000 Canadians died as the result of a heart attack
- More than 13,000 Canadians died as the result of a stroke

Each year more than 350,000 Canadians are hospitalized for heart disease or stroke

In 2011, more than 305,000 Canadians were hospitalized for heart disease and more than 46,500 Canadians were hospitalized for stroke

Heart disease and stroke costs the Canadian economy more than \$20.9 billion every year in physician services, hospital costs, lost wages and decreased productivity

By adopting healthy behaviours, one can delay the onset of heart disease or stroke by as much as 14 years—up to 80% of premature heart disease and stroke is preventable by adopting healthy behaviours

### **Tobacco and Smoking**

16% of Canadians (~4.4 million people) smoke—smoking is responsible for close to 15% of all heart disease and stroke deaths in Canada

Smoking triples the risk of dying from heart disease and stroke in middle-aged men and women

Choosing not to smoke can add more than two years to life expectancy

**Headliners: Nicotine Patches Don't Help Pregnant Smokers, Study Finds; Rachael Rettner, MyHealthNewsDaily Staff Writer; 2/29/12; accessed on 10/1/13 at:**

**<http://www.livescience.com/36176-nicotine-patch-pregnancy-quit-smoking.html>**

In this ground-breaking investigation (the largest of its kind to address the issue of patch use and smoking cessation during pregnancy), researchers found that pregnant women who used nicotine patches as a smoking cessation aid were just as likely to continue smoking until their delivery date as women who used a placebo

**Headliners: Study Casts Doubt on Nicotine Replacement; As reported by Benedict Carey for New York Times; appearing in the Idaho Statesman; 1/10/12**

A multi-year investigation followed nearly 2,000 smokers, recent quitters, and young adults to see whether nicotine replacement affected their odds of kicking the habit over time—the results found that it did not (even if the smoker received counseling in addition to nicotine replacement)

'We were hoping for a very different story. I ran a treatment program for years, and we invested some \$6 million in treatment services.'--Dr. Gregory N. Connolly; study co-author and director of the Harvard Center for Global Tobacco Control

Nicotine replacement products came under fire in 2002 when researchers from the University of California (San Diego) reported that they appeared to offer no benefit

A government-appointed panel that included nicotine replacement as part of federal guidelines for treatment also came under fire several years ago—panel members had received payments from the products' manufacturers

**Headliners: Are e-cigs the new 'gateway' drug to...real cigarettes?; Research conducted by the University of Pittsburgh Center for Research on Media, Technology and Health and the Dartmouth-Hitchcock Norris Cotton Cancer Center; study funded by the National Cancer Institute; as reported by Dan Mangan; Health Care Reporter; CNBC; appearing 9/8/2015; accessed on 9/23/2015 at:**

**<http://www.cnb.com/2015/09/08/are-e-cigs-the-new-gateway-drug-to-real-cigarettes.html>**

Early in September 2015, researchers reported that young people who use electronic cigarettes were much more likely to begin smoking traditional tobacco cigarettes within a year than others their age who did not use e-cigs

Investigators looked at a national sample of almost 700 nontobacco smokers ages 16 to 26—the study participants had all responded 'definitely no' when asked if they would smoke a traditional tobacco cigarette offered by a friend or if they thought they would use such a cigarette within the year

Because of those answers, the sample was considered 'nonsusceptible' to traditional smoking. The sample included some young people who smoked electronic cigarettes and others who did not. After one year, 38% of the e-cig users had started smoking traditional cigarettes—compared to 10% of the young people who did not use e-cigs and had started smoking tobacco cigarettes. 'The differences remained statistically significant and robust even when we controlled for multiple known risk factors for initiating cigarette smoking, such as age, sex, race, ethnicity, socio-economic status, sensation seeking, parental smoking and friend smoking.'--Dr. Brian Primack, lead author of the study.

The analysis—scheduled for publication in JAMA Pediatrics (11/15)—joined other investigations in raising questions about whether the increasingly popular e-cigarettes present potential health pitfalls for young users even as their advocates tout them as a healthier alternative to tobacco cigarettes. In August 2015, the JAMA published a study which also suggested that e-cigs could serve as a gateway to traditional tobacco for young users—out of a study population of ~2,500 high school students, 31% of e-cig users said they had ended up using combustible tobacco products (including cigarettes, cigars and hookah pipes) in the following six months.

Another study appearing in the September 2015 journal Pediatrics surveyed more than 3,800 students at five high schools in Connecticut—the Yale researchers found that almost 28% of the students had reported using e-cigs.

Of those users, almost 19% had used the devices to vaporize pot or related substances that contain THC. 'This is a relatively novel way of using marijuana, and kids are using it at a fairly high rate. The smell of vaping marijuana isn't as strong as smoking it, plus the similarity in appearance of hash oil and nicotine solutions make this a really inconspicuous way of using marijuana.'--Meghan Morean; lead author of the report; Yale University.

**Headliners: More Than One Way To Quit Tobacco; Meghan Rosen; reporting for Science News; 3/5/2016**

For people trying to stop smoking, the how might not really matter—six months after quitting, only about one in four people still abstained from smoking.

Those results held true regardless of the study participants used a nicotine patch, twice daily varenicline (Chantix™) or a combo nicotine lozenge and patch to quit--T.B. Baker et al. Effects of nicotine patch vs varenicline vs combination nicotine replacement therapy on smoking cessation at 26 weeks. JAMA. Vol. 315, January 26, 2016, p. 371.

### **Quit Strategies**

The U.S. Preventive Services Task Force recommends that primary care clinicians provide interventions, including education or brief counseling, to prevent initiation of tobacco use among school-aged children and adolescents (ages 10-17).

### **quitSTART App**

- quitSTART is a free app (available for download on iTunes and Android) made for adolescents and teens who want to quit smoking (adults can use it, too)
- This app is designed to take the information the potential quitter provides about their smoking history and gives them tailored tips, inspiration, and challenges to help them become smoke-free and live a healthier life
- With the quitSTART app, a teen can:
  - Get ready to quit with tips and information for becoming smoke-free
  - Monitor their progress and earn badges for smoke-free milestones and other achievements
  - Get back on track if they slip and smoke
  - Manage cravings and bad moods in healthy ways
  - Distract themselves from cravings with games and challenges

- Store helpful tips, inspirations, and challenges in their Quit Kit
- Share your progress and favorite tips through social media
- quitSTART is a product of Smokefree Teen—a smoking cessation resource for teens created by the Tobacco Control Research Branch at the National Cancer Institute in collaboration with the U.S. Food and Drug Administration and input from tobacco control professionals, smoking cessation experts, and ex-smokers

### **High Blood Pressure**

Hypertension is a significant risk factor for stroke and, if left untreated, can lead to coronary artery disease, dementia, heart and kidney failure and other chronic diseases—if high blood pressure was eliminated, there would be 35% fewer cases of stroke and 18% fewer heart attacks

Six million Canadian adults (20% of the adult population) have high blood pressure—and 1 in 6 Canadians (762,000 individuals) with high blood pressure are unaware of their condition

**Maintaining five or more healthy behaviours (not smoking; maintaining a healthy weight, regular physical activity, eating a healthy diet while keeping high blood pressure, diabetes and cholesterol levels in control) is associated with an 88% reduction in the risk of death from heart disease or stroke**

**Headliners: Periodontal Disease Associated with Cardiovascular Risk in Large Multicentre Study; Dr. Ola Vedin et al; University of Uppsala (Sweden); published 16 Dec 2013; European Journal of Preventive Cardiology; posted 10 Apr 2014; accessed 3 Apr 2016 at: <http://www.escardio.org/The-ESC/Press-Office/Press-releases/Last-5-years/Periodontal-disease-associated-with-cardiovascular-risk-in-large-multicentre-stu>**

This study included more than 15,000 heart disease patients in 39 countries—study participants were assessed for tooth loss and followed for an average of 3.7 years

In the largest study of its kind to assess dental disease in coronary patients, researchers reported a demonstrable heavier burden of cardiovascular disease ('CVD') risk factors and higher levels of biomarkers among those with more tooth loss and gingival bleeding—even after adjusting for confounders such as age, smoking, diabetes and education level

'The risk increase was gradual, with the highest risk in those with no remaining teeth. For example the risks of cardiovascular death and all-cause death were almost double to those with all teeth remaining. Heart disease and gum disease share many risk factors such as smoking and diabetes but we adjusted for these in our analysis and found a seemingly independent relationship between the two conditions.'

'Indeed, the evident and consistent relationship between self-reported dental status and CV risk in this population could point towards periodontal disease being a risk factor for incident CHD. However, the observation that poor dental health among chronic coronary patients is linked to a heavier cardiovascular risk burden does not prove a causal link between the two conditions. It is still a matter of debate whether periodontal disease is an independent risk factor for coronary heart disease. Some studies point to a moderate association while others are contradictory. Our findings show an association between self-reported periodontal disease and several cardiovascular risk factors and as such lend support to a possible association between the conditions.'--Dr. Ola Vedin; lead author

Men often develop and die from heart disease at a younger age than women

While more women die of heart disease than men, they die at a later age

**Headliners: Triglycerides & Stroke; Results of the Women's Health Initiative; as reported in Nutrition Action Newsletter; May 2012**

The body converts any dietary calories it does not need to use right away into triglycerides—which are stored in adipocytes

Later, hormones release triglycerides for energy between meals

If more calories—especially ‘easy carbs’—are consumed than are needed on a regular basis, hypertriglyceridemia results

In women, high blood levels of triglycerides may signal an increased risk of stroke—a growing number of studies are suggesting that high triglycerides are more dangerous for women than men

Researchers analyzing results from ~1500 WHI participants found that women with the highest triglyceride levels ( $\geq 192$  mg/dl) were 56% more likely to have an ischemic stroke over an 8-year period than those females with the lowest triglyceride levels ( $\leq 104$  mg/dl)

Something to think about: Ischemic strokes—which are typically caused by a blood clot that gets lodged in a partially clogged artery in the brain—are more common in the United States than strokes caused by hemorrhage

#### **Conditions which can raise triglyceride levels:**

- Obesity
- Poorly controlled diabetes
- An underactive thyroid (hypothyroidism)\*\*\*
- Kidney disease
- Excessive alcohol consumption

#### **Certain medicines may also raise triglycerides:**

- Tamoxifen\*\*\*
- Steroids
- Beta-blockers
- Diuretics
- Estrogen\*\*\*
- Birth control pills\*\*\*

A simple blood test can identify triglyceride levels

- Normal: Less than 150 milligrams per deciliter (mg/dL), or less than 1.7 millimoles per liter (mmol/L)
- Borderline high: 150 to 199 mg/dL (1.8 to 2.2 mmol/L)
- High: 200 to 499 mg/dL (2.3 to 5.6 mmol/L)
- Very high: 500 mg/dL or above (5.7 mmol/L or above)

#### **Headliners: Gender Gap 911; Good Housekeeping; 9/10**

Recently, it was reported that 80% of women polled would immediately call 911 if they thought someone else was having a heart attack—compared to only 53% of respondents who would call for emergency help for themselves

Why Women Do Not Call 911: Often, women are embarrassed, doubtful that medical professionals will listen, or concerned an ambulance will disturb neighbors

What Women Do Instead: Women report calling a friend or their doctor, taking an aspirin and waiting to feel better, or driving themselves to the hospital

#### **Inflammation in Review**

Lacking tools to describe interactions among cells and molecules, early doctors defining inflammation had to focus on what they could see and feel

Today we know that the outward signs of inflammation reflect a pitched struggle playing out on a microscopic battlefield

Chronic wound states—such as periodontal inflammation—fail to progress through the normal pattern of wound repair and instead remain in a state of chronic inflammation predominantly characterized by abundant macrophage and neutrophil infiltration

## Macrophages

These are the 'garbage collectors' of the cellular world

Ingested bacteria are killed within these vacuoles (usually through the generation of toxic inorganic radicals) and then are excreted—unless the macrophage becomes constipated

Macrophages also secrete MANY cytokines which are important in the inflammatory process

Among the few:

- Tumor Necrosis Factor (especially 'TNF- $\alpha$ ')
- Interleukin-1 ('IL-1')
- Interleukin-6 ('IL-6')

Persisting inflammatory cells play a major role in the generation of proinflammatory cytokines (IL-1, TNF- $\alpha$ , and IL-6) and a protease rich and pro-oxidant hostile microenvironment\*\*\*\*

Having BOTH inflammation and high cholesterol together is especially dangerous—resulting in a NINE-FOLD increase in cardiovascular risk

A 'healing' process also accompanies the more chronic, low-level kind of inflammation that operates in atherosclerosis

By carefully examining vessel walls of people who have died from heart attacks, pathologists have demonstrated that most attacks occur after a plaque's fibrous cap breaks open, prompting a blood clot to develop over the break

**Headliners: Heart Drug Lacks Long-Term Benefit; Bangalore, Sripal; study co-author; interventional cardiologist; New York University School of Medicine; study results appearing in JAMA;10/3/12; as reported in Science News; 11/17/12**

Researchers recently reported that beta blockers fail to protect against strokes and heart attacks even while helping to control heart rate and blood pressure

The study team examined thousands of patients with a history of heart attack, coronary artery disease or coronary artery disease risk factors—when results for the nearly 22,000 participants were compared, those receiving beta blockers demonstrated little or no difference in rates of subsequent heart attacks, strokes or death from a cardiovascular cause

The American Heart Association previously discouraged the long-term use of beta blockers in those with heart risk factors or as a post-heart attack treatment beyond three years—this study further discourages the long term use of these drugs following a cardiovascular event

## Diabetes

In 2015, 3.4 million Canadians (9.3%) had been diagnosed with diabetes—another one million had diabetes but did not know it because they had not been diagnosed

An additional 5.7 million Canadians have prediabetes

Today, of 37 million Canadians, more than 10 million have diabetes or prediabetes

Even more alarming is the fact that the number of Canadians with diagnosed diabetes will rise to 5 million people (12%) by 2025

While 29% of Canadians now have diabetes, undiagnosed diabetes, or prediabetes, this will rise to 33% by 2025 if current trends continue

Diabetes is a leading cause of blindness, end-stage renal disease ('ESRD') and lower limb non-traumatic amputation in Canadian adults

Individuals with diabetes are 2 to 4 times more likely to die of cardiovascular disease (CVD) than people without diabetes

People with diabetes are over three times more likely to be hospitalized with CVD, twelve times more likely for ESRD, and over twenty times more likely for a non-traumatic lower limb amputation compared to the general population

Complications account for 80% of diabetes costs

Diabetes was estimated to have cost the Canadian health-care system and economy \$14 billion in 2015 and is projected to cost \$16 billion annually by 2020

**Headliners: Canada's Diabetes Rate Worse Than the U.S.; Allison Vuchnich; Senior Network Correspondent; Global News; posted 4 Nov 2015; accessed 4 Apr 2016 at:**

**<http://globalnews.ca/news/2318187/canadas-diabetes-rate-worse-than-the-us-report/>**

The prevalence of diabetes in Canada is now slightly higher than in the United States—in fact, among the 34 Organization for Economic Cooperation and Development (OECD) countries, Canada is higher than all other countries except New Zealand

'Diabetes is the epidemic of our time along with the obesity epidemic.'--Dr. Ronald Goldenberg; endocrinologist; LMC Diabetes and Endocrinology; in a statement to Global News

'We know that obesity is a key factor in [type 2] diabetes, that the very rapidly changing obesity rate—one of the impacts will be as time goes on, more and more people [will be living] with diabetes as a result of this.'--Source: Kathleen Morris, CIHI's vice president of research and analysis; in a comment to Global News

Almost 90% of people with diabetes have type 2 diabetes—the vast majority of type 2 diagnoses could have been avoided or delayed with healthy eating and leading an active life--Source: Canadian Diabetes Association

In addition, 5.7 million Canadians have pre-diabetes—that means they are not diabetic yet and can potentially avoid full-blown diabetes with lifestyle modifications

'There is great research and quite a few clinical trials that show intensive lifestyle changes can prevent the progression from pre-diabetes to type 2 diabetes. These lifestyle changes are not that difficult to institute. We're talking about 5% reduction in your body weight, 150 minutes of a brisk activity every week (that's 30 minutes five times a week), along with healthier nutrition choices, and just by doing that you can reduce your chances of converting from pre-diabetes to diabetes by 60%.'--Source: Goldenberg

The **Canadian Diabetes Association** urges all federal parties to commit to:

- A tax on sugar-sweetened beverages (SSBs) given evidence of the link between excessive consumption of these drinks and type 2 diabetes
- Establish a national pharmacare program to ensure access to needed medications for people with diabetes and related complications
- Expand the disability tax credit (DTC) to include people with type 1 diabetes

Source: [www.diabetes.ca/how-you-can-help/advocate/why-federal-leadership-is-essential#sthash.gICloj2U.dpuf](http://www.diabetes.ca/how-you-can-help/advocate/why-federal-leadership-is-essential#sthash.gICloj2U.dpuf) (accessed on 4/4/2016)

The worldwide epidemic of obesity is now causing a spike in Type 2 diabetes—the occurrence is often referred to as '**diabesity**'

Type 2 diabetes used to be seen almost exclusively in adults, but in the past decade, cases in people under 20 years of age have increased to tens of thousands in the United States

About 3,700 Americans under age 20 are diagnosed with type 2 diabetes annually--Centers for Disease Control and Prevention

'In a little more than 10 years, the numbers went from nothing to something. And that's something to worry about.'--Larry Deeb; pediatric endocrinologist and past president of the medicine and science division of the American Diabetes Association

**Headliners: Three-year-old Among Youngest Ever to be Diagnosed with Type 2 Diabetes; As reported by Allison Vuchnich; Senior Network Correspondent; Global News; posted 18 SEP 2015; accessed 4 APR 2016 at: <http://globalnews.ca/news/2228110/three-year-old-among-youngest-ever-to-be-diagnosed-with-type-2-diabetes/>**

At only three years old, an American toddler has become one of the youngest patients ever to be diagnosed with Type 2 diabetes—Type 2 diabetes is associated with obesity, poor diet and lack of exercise

'This is a global problem. Type 2 diabetes is no longer limited to adults. Now when I see any obese child I screen the patient for Type 2 diabetes.'--Dr. Michael Yafi; treating physician; in a comment to Reuters  
With the increasing number of young people being diagnosed, more pediatricians should be aware of the possibility of the disease and start to look for it

**KEY: Of the two types, Type 2 diabetes displays the closest medical link between chronic inflammation and diabetes**

**Historical perspective:**

Several decades ago scientists noticed that people with type 2 diabetes have overly active immune responses that generated an overabundance of inflammatory chemicals

In the early 1990s, researchers at Harvard University pinpointed one major immune player as TNF-alpha—a cytokine secreted by immune cells

Researchers have also shown that TNF- $\alpha$  activates and increases the expression of several proteins that suppress insulin-signaling pathways—making the human body less responsive to insulin and increasing the risk for insulin resistance

**Headliners: Inflammation Markers May Be More Accurate Than Weight at Predicting Type 2 Diabetes Diabetes.co.uk; posted 29 Aug 2013; accessed on 4 Apr 2016 at: <http://www.diabetes.co.uk/news/2013/Aug/inflammation-markers-may-be-more-accurate-than-weight-at-predicting-type-2-diabetes-93240187.html>**

Researchers from University College Cork evaluated data on 2,047 people who took part in the Cork and Kerry Diabetes and Heart Disease Study—specifically, the study reviewed data on a number of inflammatory markers including C-reactive protein, TNF- $\alpha$ , interleukin 6, plasminogen activator inhibitor-1, adiponectin levels and white blood cell counts

Their findings: Participants with higher white blood cell counts and levels of acute-phase response proteins were more likely to have metabolic disorders such as insulin resistance and evidence of heart disease than participants that were obese and non-obese

Additionally, those participants that were obese and healthy demonstrated healthy levels of inflammation markers

The researchers noted that the findings could point to the use of inflammation markers as an additional means of early screening for metabolic conditions such as heart disease, type 2 diabetes and impaired glucose tolerance (prediabetes)

**Headliners: Inflammatory Markers and Risk of Type 2 Diabetes: A systematic review and meta-analysis; Xia Wang, MD, PHD et al; received April 12, 2012; accepted July 26, 2012; posted on Diabetes Care (American Diabetes Association); accessed on 4 Apr 2016 at: <http://care.diabetesjournals.org/content/36/1/166.full>**

This meta-analysis provided further evidence that elevated levels of IL-6 and CRP are significantly associated with increased risk of type 2 diabetes

**Headliners: More Than 90% of People With Periodontal Disease Are at Risk for Diabetes; Dr. Shiela Strauss; Associate Professor of Nursing and Co-Director of the Statistics and Data Management Core for New York University's Colleges of Dentistry and Nursing; lead study author; appearing in the online version of the Journal of Public Health Dentistry; 12/15/09**

An overwhelming majority (93%) of people who have periodontal diseases are also at high risk for diabetes—the researchers determined that HALF of those at risk had seen a dentist in the previous year and concluded that the dental setting may be the ideal venue for diabetes screening

Diabetes screening in the dental environment would include evaluation of risk factors (obesity, high-risk ethnic group, smoking, elevated cholesterol, hypertension, familial diabetes incidence, and gestational diabetes)

Dental professionals could also use a glucometer—using blood obtained from the periodontal pockets of patients in their care

Earlier research demonstrated that the glucometer can provide reliable glucose-level readings for blood samples drawn from deep pockets and that those readings were highly correlated to glucometer readings for finger-stick blood samples

'The oral blood sample would arguably be more acceptable to dentists because providers and patients anticipate oral intervention in the dental office.'--Dr. Strauss

**Headliners: Oral Mucosal Lesions in Non-Oral Habit Diabetic Patients and Association of Diabetes Mellitus with Oral Precancerous Lesions; Rajan Sainia, lead study author; study results appearing in Diabetes Research and Clinical Practice; 89(3): p.320-326. September 2010**

Researchers found a significantly greater proportion of subjects with diabetes (45%) had one or more oral mucosal lesions ('OML') in comparison to non-diabetics (38.3%)

Diabetic patients demonstrated a significantly greater prevalence of geographic tongue, denture stomatitis and angular cheilitis than non-diabetics ( $p < 0.05$ )

The results also showed an association between occurrence of one or more OML and metabolic control of diabetic patients ( $p < 0.05$ )

**Headliners: Treatment of Gum Disease May Lower Blood Sugar Levels in Type 2 Diabetes; As reported in ScienceDaily; 5/11/10; accessed on 3/29/11 at:**

**<http://www.sciencedaily.com/releases/2010/05/100511192300.htm>**

Researchers at the University of Edinburgh and supported by colleagues at the Peninsula Dental School, the University of Ottawa and UCL Eastman Dental Institute, suggest that the treatment of serious periodontal diseases in diabetics with Type 2 diabetes may lower their blood glucose levels

The team looked at 690 papers and included seven studies in the review that fulfilled pre-specified criteria for inclusion

Their findings suggest that the treatment of periodontal diseases can reduce blood glucose levels in Type 2 diabetes—although there was not enough available evidence to support the same benefit for those with Type 1 diabetes

'It would be wise to advise patients of the relationship between treating periodontal disease and the possibility of lowering their blood sugar levels. Additionally, an oral health assessment should be recommended as part of their routine diabetes management.'--Terry Simpson; lead author; Edinburgh Dental Institute

'In this study we have helped confirm a link between the effective treatment of [periodontal] disease and lower blood sugar levels in those with Type 2 diabetes. Now what are required are larger randomized trials to further study dental treatment and its long term outcomes for those with diabetes, including the possibility of marrying dental care for diabetics with wider diabetes support and treatment networks and closer collaboration between doctors and dentists.'--David Moles; Professor of Oral Health Research and Director of Postgraduate Education and Research at the Peninsula Dental School

## Adverse Pregnancy Outcomes

Some interesting research has demonstrated distinct hormonal influences on the immune systems of pregnant women—which may contribute significantly to the etiology of pregnancy gingivitis

Among the ‘immune tidbits’:

- Lymphocytes have a decreased antigenic response (P. intermedia)
- Migration of inflammatory cells and fibroblasts is hampered
- Prostaglandin E2 increases in response to progesterone\*\*\*

During pregnancy, prostaglandin levels gradually increase—reaching their peak at the time of labor  
A woman’s body reacts to the infections in her mouth by producing prostaglandins—very potent inflammatory mediators

If extra prostaglandins are being produced—such as those associated with gingivitis—a woman’s body may interpret this as a sign it is time to go into labor (even though the baby is not at full term)

The researchers advised expectant mothers to increase their level of oral hygiene and seek regular professional care during pregnancies

### 2010

Researchers demonstrated that women produce less saliva during pregnancy—increasing caries and inflammation risks--Lukacs J; researcher; University of Oregon

Many pregnancy cravings involve sugars and fermentable carbohydrates—feeding caries-causing bacteria and fueling inflammation

Coupled with xerostomia, it is the perfect storm for increasing inflammation

**Headliners: First Oral Bacteria Found Linking a Mother and Her Stillborn Baby; Han Y; lead researcher; Department of Periodontics; Case Western Reserve University School of Dental Medicine; appearing in Obstetrics & Gynecology; 2/10; accessed 9/22/10 at:**

**[www.sciencedaily.com/releases/2010/10/100121171411.htm](http://www.sciencedaily.com/releases/2010/10/100121171411.htm)**

During the first pregnancy of a 35 y/o, the mother-to-be noticed severe gingivitis—excessive gingival bleeding allowed the bacteria normally contained in the mouth to enter the bloodstream and work its way into the placenta

Using DNA cloning technology, it was determined that the bacteria in the mother’s mouth matched the microbe in the baby’s infected lungs and GI tract—no matches were found for vaginal or rectal samples  
‘The testing strongly suggested the bacteria were delivered through the blood.’--Han

**Headliners: Good Oral Health Is Essential During Pregnancy; As reported in ScienceDaily: 5/17/10; accessed on 3/29/11 at: <http://www.sciencedaily.com/releases/2010/05/100517132849.htm>**

Despite the fact that good oral health is essential for the overall health of both mother and child, only 22% to 34% of women in the United States visit a dentist during pregnancy

‘Hormonal changes during pregnancy can result in several changes in the mouth. Reports show that the most common oral disease is gingivitis, which has been reported in 30% to 100% of pregnancies.’--Homa Amini, DDS; study co-author

‘Thus it can be concluded that periodontal disease appears to be an independent risk factor for PLBW and there is a need to expand preventive measures for pregnant women in harmonization with the gynecological and dental professions, and to provide professional oral hygiene measurements during pregnancy’--Source: Saini R, et al: Periodontitis: A risk for delivery of premature labor and low-birth-weight infants. Journal of Natural Science, Biology, and Medicine. 2010;1(1):40-42. Accessed on 3/30/2016 at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217279/>

## 2012

'Because periodontal disease is associated with local and systemic inflammation, treating periodontal disease during pregnancy may be too late to reduce the inflammatory burden that is associated with adverse pregnancy outcomes.'--Source: Kim A. Boggess, MD; Periodontal disease and preterm birth; 12/1/2012; Contemporary OB-GYN; accessed on 3/30/2016 at: <http://contemporaryobgyn.modernmedicine.com/contemporary-obgyn/news/modernmedicine/modern-medicine-feature-articles/periodontal-disease-and-pret?page=full>

## 2015

'Although some studies have shown a possible association between periodontal infection and preterm birth, evidence has failed to show any improvement in outcomes after dental treatment during pregnancy. Nonetheless, these studies did not raise any concern about the safety of dental services during pregnancy. To potentiate general health and well-being, women should routinely be counseled about the maintenance of good oral health habits throughout their lives as well as the safety and importance of oral health care during pregnancy.'--Source: American Congress of Obstetricians and Gynecologists; Committee on Health Care for Underserved Women; 8/2013 (reaffirmed 2015)

'There is a compelling body of evidence from basic science and clinical studies to demonstrate that intrauterine infection is strongly associated with fetal inflammation. There is also excellent data to suggest that the intrauterine inflammation that is implicated in the precocious initiation of labor also plays a role in the development of a number of the congenital pathologies that are commonly identified in preterm infants, such as bronchopulmonary dysplasia and white matter injury. Accordingly, identifying the...origins of intrauterine inflammation, and how it might differ on an individual, case-by-case basis, is likely an important requirement in our efforts to develop treatments that prevent PTB while ensuring the continued development of a healthy fetus.'--Source: Kemp MW. Preterm Birth, Intrauterine Infection, and Fetal Inflammation. *Frontiers in Immunology*. 2014;5:574; accessed 3/30/2016 at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4249583/>

## HIV

Good News: In 2014, there were an estimated 2,570 new HIV infections in Canada—down from 2,800 in 2011

But the number of people living with HIV in Canada continues to rise—in 2014, an estimated 75,500 people were living with HIV in Canada compared to the estimated 68,000 for 2011

An estimated 1 in 5 people living with HIV in Canada are unaware of their HIV infection:

- 28% of people infected via heterosexual sex are unaware of their HIV positive status
- 20% of people infected via injection drug use are unaware of their HIV positive status
- 18% of men infected via sex with other men are unaware of their HIV positive status

### Oral Manifestations of HIV Infection:

Linear gingival erythema ('LGE')

- Marginal band, diffuse erythema
- Often dashed-line appearance
- Non-responsive\*\*\*\*

HIV-associated necrotizing ulcerative periodontitis ('HIV-NUP')

- Necrosis of gingiva and alveolar bone
- Severe pain
- Spontaneous bleeding\*\*\*

Increased Recurrent Aphthous Stomatitis ('canker sore') incidence  
Increased incidence of candidiasis

**Headliners: Oral Bacteria Can Block HIV Infection; Lin Tao; study director; UIC College of Dentistry and Rush University Medical School; as reported at the 104th General Meeting of the American Society for Microbiology**

Researchers found that the oral bacteria latch onto the sugar coating of the HIV envelope (mannose)—when that happens, infection was blocked

The oral bacteria—specifically six strains of Lactobacillus—also bound the sugar coating on immune cells which caused them to clump and inactivated the T-cells already harboring HIV

Further screening identified two strains of lactobacillus capable of trapping HIV by binding with a specific glycoprotein receptor ('gp120') in the viral envelope—and inhibiting the virus in the process While HIV exists in many subtype forms because of frequent mutations, the sugar coating of the virus remains largely the same—presenting a ready target for lactobacilli to attack

## **Obesity**

Many organizations including the Canadian Obesity Network, the Canadian Medical Association, the American Medical Association and the World Health Organisation now consider obesity to be a chronic disease

According to the Canadian Obesity Network, one in four adult Canadians and one in 10 children have clinical obesity—translating to six million Canadians living with obesity may require immediate support in managing and controlling their weight--Source: Canadian Obesity Network; accessed 4 Apr 2016 at: <http://www.obesitynetwork.ca/obesity-in-canada>

As a leading cause of type 2 diabetes, high blood pressure, heart disease, stroke, arthritis and cancer, the condition impacts those who have obesity, their families, employers, neighbours, health practitioners and governments

Obesity and overweight are a problem for Canada's youth—current estimates put children between the ages of 2 and 17 listed as overweight at 20% and 12% were considered obese--Source: Jayson MacLean: Canadian parents are bad at dealing with childhood obesity, study says; posted 19 Mar 2016; accessed on 4 Apr 2016 at: <http://www.cantechletter.com/2016/03/canadian-parents-are-bad-at-dealing-with-childhood-obesity-study-says/>

**Headliners: Obese Kids Risk Heart Disease; Dr. Geetha Raghuvver; lead researcher; University of Missouri at Kansas City; study results presented at a New Orleans meeting of the American Heart Association; reported in the Idaho Statesman; 11/12/08**

The arteries of many obese children and teenagers are as advanced as those of 45-year-olds—indicating these children could have SEVERE cardiovascular disease at a much younger age

'It is possible that they will have heart disease in their 20's and 30's.'--Raghuvver

**Headliners: Strokes Seen More Among Young People; Reported by Gracie Bonds Staples for the Atlanta Journal-Constitution; appearing in the Idaho Statesman; 7/7/14**

The Shepherd Center (Atlanta) rehabilitation program for younger patients has seen an upsurge in business recently

'Stroke is typically thought of as something that affects older people, but more and more young people are having them and we see that time and again reflected in the patients we admit. Here the average age of patients in our stroke program is 31.'--Dr. Ford Vox; staff physician; Shepherd Center

'This would not have happened 30 years ago. We're eating more processed foods, more salts and reaping the fruits of that. Problems that used to develop in older adults such as high blood pressure, diabetes and obesity, we're now seeing in people as young as 14.'--Vox

**Headliners: How To Get Kids To Do Anything; Tel Aviv University researchers; appearing in Woman's World; 3/15/10**

Children are not motivated by what drives adults—long-term benefits such as avoiding caries or being healthy does not inspire youngsters to embrace new behavior

Researchers have found that children will WANT to do things that are good for them if there is an immediate fun benefit—even if it is a small one like getting to use a fun toothbrush

**Meet the Fat Cell**

The average person has 40 billion adipose ('fat') cells

When calorie intake exceeds expenditures, fat cells swell (to as much as SIX TIMES their original size) and they begin to multiply (from 40 billion to 100+ BILLION)

Losing weight causes them to shrink in size and become less metabolically active but their number goes down only slowly—if at all

Adipose tissue requires a copious supply of blood in tiny capillaries—lean muscle mass is supplied by larger vessels

The microvasculature required to fuel adipose tissue puts a strain on the cardiovascular system

Additionally, adipose tissue attracts macrophages—which heightens the inflammatory response

Scientists have found that in an obese person's fat tissue, macrophages constitute up to 40% of the cells!!!

Macrophages penetrate adipose tissue causing BOTH sets of cells to literally spew out damaging inflammatory compounds—the same compounds associated with cardiovascular risk

Visceral fat in particular contributes to endothelial dysfunction through the direct effect of adipokines secreted by fat tissue after macrophage recruitment

IL-6 and TNF- $\alpha$  are manufactured by both fat cells and macrophages

Together, they contribute to the chronic, low-grade inflammation that underlies heart disease, type 2 diabetes and certain types of cancer

Cardiovascular risk is increased even more by two compounds produced by fat cells:

- Plasminogen activator inhibitor-1 (blocks the body's clot-busters)
- Angiotensinogen (leads to high BP)

'If you have excess fat, even in small amounts, the body starts mounting an immune response almost as if the body perceives excess calories as an invading organism.'--Dr. Gokhan Hotamisligil; Harvard School of Public Health

**Headliners: Research Links Big Bellies to Dementia; As reported by Rob Stein; The Washington Post; appearing in the Idaho Statesman; 3/27/08**

According to recent research, people who have excess abdominal weight in their 40's are much more likely to get Alzheimer's disease and other forms of dementia in their 70's

The study of 6000+ people found that those individuals with the most belly fat faced TWICE the risk of dementia when compared to their leaner counterparts

'A large belly independent of total weight is a potent predictor of dementia.'--Rachel Whitmer; research scientist; Kaiser Permanente Division of Research; Oakland, California;

## Stress

Physical symptoms of stress include:

- Headache\*\*\*
- Backache
- Indigestion
- Tight neck and shoulders\*\*\*
- Racing heart
- Tremors/Nervous tics
- Xerostomia\*\*\*
- Lethargy/Fatigue
- Bruxism
- Skin disorders
- Susceptibility to illness\*\*\*
- Heartburn/GI upset

Behavioral symptoms include:

- Increased smoking, alcohol or drug intake
- Compulsive eating
- Inability to get things done
- Reappearance or aggravation of phobias
- Avoidance of people or places
- Relationship problems
- Increased caffeine intake
- Impulsivity
- Overeating
- Bossiness

Emotional symptoms include:

- Crying
- Nervousness
- Edginess
- Loneliness
- Sense of powerlessness
- Low self-esteem
- Anger
- Guilt
- Suspicion
- Fear of failure
- Feelings of impending doom

Cognitive symptoms include:

- Trouble thinking clearly
- Forgetfulness
- Inability to make decisions
- Thoughts of escape
- Easily distracted
- Low threshold of frustration
- Anxiety and fears/ Incessant worrying
- Lack of creativity

## Susceptibility to Diseases

Over 60 years ago the first evidence of stress-induced immunosuppression was discovered. Scientists have discovered that a period of stress will disrupt a wide variety of immune functions such as:

- Formation of new lymphocytes and their release into the circulation
- The time preexisting lymphocytes stay in the circulation
- The manufacture of antibodies in response to an infectious agent
- Communication among lymphocytes ('cytokines')

In this current world, stress from relationships, financial problems, the evening news, our daily commute, or from our work seems to increase and decrease but rarely ceases

**Headliners: Longer Hours, More Stress: The New Reality in the Canadian Workplace; Paul Luke, reporting for The Province; 14 Mar 2014; accessed on 27 Aug 2014**

**at:<http://www.theprovince.com/travel/Longer+hours+more+stress+reality+Canadian+workplace/9374213/story.html>**

The combined weekly work hours of Canadian couples jumped to 64.8 in 2008 from 57.6 in 1976—the equivalent of almost another full day of work per week

Work intensified as employees were expected to constantly upgrade their skills (whether or not the company trained them)—and they were being overloaded with difficult tasks

Carleton University business professor Linda Duxbury said Canada's workforce has splintered into three groups: knowledge workers (professionals and managers who work long hours); lower-end service-sector workers who cobble together several part-time jobs; and jobless people displaced by automation or outsourcing & are unable to find any work for which they are qualified

Work increasingly leaked into family time, forcing parents to 'outsource' family responsibilities—they paid for child care, bought meals instead of cooking them and sent kids to camp rather than take vacations as a family

Speaking of vacation: When 2013 ended, almost 70% of North Americans had not taken all of their vacation time—and the prediction is that the same percentage of North Americans will abandon vacation time in 2014--Source: Right Management; worldwide advisory company on workforce issues

A separate survey by Expedia.ca found that 52% of B.C. residents had cancelled vacations because of work—making them the most likely group of Canadians to do so

**Headliners: Internalizing and Externalizing Behaviors Predict Elevated Inflammatory Markers in Childhood; Slopena, N; Harvard University; Kubzansky, LD; Harvard University; and Koenen, KC: Department of Epidemiology, Columbia University, Mailman School of Public Health;**

**Psychoneuroendocrinology (online); 8/6/13; accessed 9/27/13 at:**

**<http://www.sciencedirect.com/science/article/pii/S030645301300262X>**

Definition Time:

- **Externalizing behaviors** constitute an acting-out style that is often described as aggressive, impulsive, coercive, and noncompliant
- Other behavior disorders are more accurately described as 'inward'—**internalizing behaviors** are typical of an inhibited style that could be described as withdrawn, lonely, depressed, and anxious

A recent long-term analysis of data involving more than 4000 participants found that children with behavioral problems may be at risk of many chronic diseases in adulthood including heart disease, obesity, diabetes, as well as other inflammatory illnesses

Previous research has shown that children with behavioral problems can go on to develop health problems during adulthood—this is the first time that a link has been found between mental health and inflammation in childhood

The researchers believe the link may be due to the fact that many behavioral problems are associated with how the hypothalamic pituitary adrenal (HPA) axis works—the HPA axis plays a major role in controlling reactions to stress and the immune system

If the HPA axis malfunctions, release of the two proteins that cause chronically elevated levels of inflammation—IL-6 and CRP—follows

The study findings document an association between behavior problems and elevated concentrations of CRP and IL-6 at 10 years—leading the researchers to conclude that heightened inflammation in childhood may be a pathway through which early behavior problems increase risk for adult chronic diseases

‘This new research shows for the first time that having behavioral problems in childhood can put children on the path to ill health much earlier than we previously realized. The important message for healthcare professionals is that they need to monitor the physical health as well as the mental health of children with behavioral problems in order to identify those at risk as early as possible.’--Karestan Koenen, PhD, senior study author

**Headliners: Stressful Times Have People Grinding Their Teeth; As reported by Camille Sweeney; New York Times News Service; appearing in the Idaho Statesman; 10/12/09**

‘We’re finding in a lot of double-income families, we have the people who have lost jobs and are worried, and then we have the spouse, who still has the job, with the added pressure and uncertainty. This can cause some real grinding at night.’--Dr. Gerald McCracken; San Diego dentist

Some grinders will brux up to 40 minutes of every hour during sleep—which can quickly erode enamel, fracture teeth, affect bite, damage the temporomandibular joint, and cause pain in the jaw, face, and ears

With or without economic hardship, 10% to 15% of adult Americans moderately to severely grind their teeth—and, along with genetics, stress has been recognized as a source for nocturnal bruxing--Source: Dr. Matthew Messina; dentist; consumer adviser for the American Dental Association

**KEY: Because the body reacts to stress with a spurt of energy that enables a person to run or fight, people who are under stress burn that excess energy off somewhere—some do it at night by clenching or grinding their teeth--Source: Messina**

Efforts to control stress can have a positive impact on the development and duration of temporomandibular joint disease

**Headliners: Chew Away Stress; As reported in Woman’s World; 3/19/12**

Chewing gum manufacturers are paying attention to their product’s positive effects on decreasing tension and stress and are now adding proven stress-busting ingredients to their gum

Examples:

#### **Vanilla**

Research at the Universities of Texas and Oklahoma demonstrated that vanilla is not only a ‘tamer of anxiety’ but made cigarette cessation efforts easier

#### **Calming Herbs**

The Bach Flower Rescue Gum for Stress Release contains a liquid center filled with the famous stress-busting elixir made of a blend of six flowers

#### **Vitamin C**

Vitamin C has been shown to decrease cortisol levels—get 10% of the recommended amount of this vitamin in every piece of Trident Vitality Vigorate

#### **Green Tea Extract**

Green tea is rich in l-theanine—an amino acid that studies have shown keeps you calm and alert

A recent study from the Pennington Biomedical Research Center and Louisiana State University found that chewing 3 sticks of sugar-free gum over the course of the afternoon reduced hunger and cravings and led snackers to eat fewer calories--Source: Study results published in Redbook; 3/10

**Headliners: Chewing Gum Improves Focus; Serge Onyper; St. Lawrence University Assistant Professor of Psychology (Canton, NY); as reported in First for Women; 3/26/12**

Researchers found that study participants who chewed gum for 5 minutes before taking a challenging test performed up to 50% better than non-chewers

Researchers theorized that the chewing motion activated ‘mastication-induced arousal’—a state of alertness in the brain that enhances information-processing speed, focus and memory recall

Some study highlights:

- The study determined that the effects last about 20 minutes—timing when to chew is important!
- Sugar-free or sugared varieties work the same (glucose does not seem to cause the increase in focus)
- Mint flavored gum seems to reduce sleepiness

**Ever notice how happy you feel after spending time outside?**

It may be due to negative ions that enter the bloodstream and increase the body’s output of serotonin To keep levels of this neurotransmitter high when an outside break is not an option, try placing several lumps of plain charcoal in a bowl in your work area

Charcoal emits infrared rays that morph moisture molecules in the air into negative ions—giving you a quick mood boost without leaving your chair!

## **Alzheimer’s Disease**

In the 12/5/05 ‘The Year in Medicine’ issue of Time magazine, it was reported that researchers at the University of Southern California found that inflammation caused by lost or loose teeth QUADRUPLED the risk of developing Alzheimer’s

It was further suggested that treating ‘those inflammatory episodes could help stave off the disease’

**Headliners: Gingival Inflammation Linked to Alzheimer’s Disease; Dr. Angela Kamer; Assistant Professor of Periodontology & Implant Dentistry; lead researcher; findings presented at the 2010 Annual Meeting of the International Association for Dental Research; 7/16/10; Barcelona, Spain; as reported by ScienceDaily; 8/4/10; accessed 9/20/10 at:**

**[www.sciencedaily.com/releases/2010/08/100803112811.htm](http://www.sciencedaily.com/releases/2010/08/100803112811.htm)**

A research team examined 20 years of data that apparently supported the hypothesis of a possible causal link between periodontal diseases and Alzheimer’s Disease

Building on a 2008 investigation that demonstrated those study subjects with Alzheimer’s disease had a significantly higher level of antibodies and inflammatory molecules associated with periodontal disease in their plasma compared to healthy people, the study team found that periodontal inflammation at age 70 was strongly associated with lower measures of adult IQ

**Headliners: Can oral infection be a risk factor for Alzheimer’s disease?; Source: Olsen I and Singhrao SK; results published in Journal of Oral Microbiology; 9/2015; accessed on 4 Apr 2016 at:**

**<http://www.journaloforalmicrobiology.net/index.php/jom/article/view/29143>**

According to investigators, systemic inflammation may predict the onset of dementia—organisms such as spirochetes\*\*\*, P. gingivalis\*\*\*, Herpes simplex type I virus, and Candida\*\*\* are among the prime candidate pathogens in Alzheimer’s diseased brains

‘The most convincing evidence for a causal relationship between oral bacteria and AD is noted for spirochetes which are both neurotropic and motile.’

The researchers stressed that ‘...it is important to recognize that infection can occur decades before the manifestation of dementia’

'If anaerobes of periodontitis play a major role in AD, dental hygiene and treatment will provide the AD prophylaxis from an early age as periodontitis is modifiable. However, improving oral hygiene and treating periodontal disease in the AD patient can be challenging since patients are often uncooperative. There is also need for training caregivers to assist with oral care in such patients.'--Researchers conclusion

## Cancer

Recent research has documented that the higher the levels of CRP, the poorer the prognosis for a variety of malignancies (multiple myeloma, melanoma, lymphoma, sarcoma as well as cancer of the ovaries, kidney, pancreas and gastrointestinal system)

According to the National Cancer Institute: 'Over time, chronic inflammation can cause DNA damage and lead to cancer'

'Summarizing the review, the studies done by various authors throw light on the fact that compromised oral health may prove a risk factor for carcinogenesis.'--Authors' conclusion

A recent investigation demonstrated that Porphyromonas gingivalis was present in 61% of study participants with esophageal squamous cell carcinoma (ESCC)--Source: Gao S et al: Presence of Porphyromonas gingivalis in esophagus and its association with the clinicopathological characteristics and survival in patients with esophageal cancer; Infect Agent Cancer (2016); 11: 3. Published online 2016 Jan 19; accessed on 3/14/16 at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4717526/>

The researchers also found the presence of P. gingivalis correlated with other factors—including cancer cell differentiation, metastasis and overall survival rate

There are two likely explanations: either ESCC cells are a preferred niche for P. gingivalis to thrive or the infection of P. gingivalis facilitates the development of esophageal cancer

'These findings provide the first direct evidence that P. gingivalis infection could be a novel risk factor for ESCC and may also serve as a prognostic biomarker for this type of cancer. These data, if confirmed, indicate that eradication of a common oral pathogen may contribute to a reduction in the significant number of people suffering with ESCC. It would suggest that improving oral hygiene may reduce ESCC risk; screening for P. gingivalis in dental plaque may identify susceptible subjects; and using antibiotics or other anti-bacterial strategies may prevent ESCC progression.'--Source: Huizhi Wang; University of Louisville; School of Dentistry

**Headliners: Researchers Find Biomarkers in Saliva for Detection of Early-Stage Pancreatic Cancer; Dr. David Wong; senior study investigator; University of California (Los Angeles); Felix and Mildred Yip Professor of Dentistry and Associate Dean of Research; in collaboration with investigators from the UCLA School of Dentistry, the David Geffen School of Medicine at UCLA, the UCLA School of Public Health and UCLA's Jonsson Comprehensive Cancer Center; results published in Gastroenterology; reported by ScienceDaily; 2/17/10; accessed at:**

**[www.sciencedaily.com/releases/2010/02/100216163343.htm](http://www.sciencedaily.com/releases/2010/02/100216163343.htm) on 9/20/10**

Pancreatic ductal adenocarcinoma—the most common type of cancer of the pancreas—is also the most lethal of ALL cancers

Because mortality rates are approximately the same as incidence rates, early detection is especially important and extremely difficult owing to the fact that pancreatic cancer presents typical symptoms (abdominal pain and jaundice) only in the advanced stages of the disease

'Worldwide, the prevalence of pancreatic cancer is so high, and the disease is so deadly, that it calls out for a reliable means of early diagnosis. The ability to implement safe, cost-effective, widespread screening could be the answer to saving thousands of lives each year—and that's what we are after.'--

Wong et al

In the study, researchers successfully linked changes in the molecular signatures found in human saliva to the presence of EARLY-STAGE pancreatic cancer

Wong and his team successfully demonstrated that the salivary diagnostic device correctly identified patients with oral cancer based on elevated levels of two biomarkers with a 90% accuracy--Results published in Clinical Cancer Research; 2009

Besides pancreatic cancer, studies show that diseases such as breast cancer, type 2 diabetes, Sjögren syndrome, oral cancer and Alzheimer's leave specific and identifiable signatures in saliva

Such findings—combined with the fact that saliva is quick, easy and painless to collect—may make spit the body fluid of choice to get an inside view of health

In the not-so-distant future, dental offices might be equipped with salivary diagnostic devices which would position the dental team to evaluate patients seeking their care for maladies far beyond caries and periodontal diseases

## **MICROBIAL CHALLENGES**

Once a pathogenic biofilm has been established, it is tough to control!

While in a biofilm, *Porphyromonas gingivalis* has been shown to be 60 and 160 times more resistant to doxycycline and metronidazole (respectively) than when it is existing in a planktonic state

Increasingly, researchers and oral healthcare providers are recognizing the relative lack of efficacy of systemic antibiotic therapy and use of oral antimicrobials for periodontal diseases and emphasize the need for alternative methods for control of dental plaque-related diseases

The trouble is, researchers are finding that most of the microbes that are killed with antibiotics, antibacterials, and other measures are the 'good guys'—leaving behind a less diverse, more pathogenic bacterial population

In order to remove plaque biofilm, shear force must overcome the adherence force attaching the microbial mass to the tooth surface

Ultrasonic (office) and sonic (home) technology may just be our best weapon against biofilms

## **Lesson for the day: Decreased oral inflammation = Increased overall health**

Integrate true PREVENTIVE care into dental and dental hygiene practice—'cardiac prophylaxis' put the 'heart' into the clinical setting

The dental team has never been in a better position to make a difference in the health and well-being of their patients

## **THANK YOU!**