

Saraswati Dental College, Faizabad Road, Lucknow

Science Update Notice Board

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Link between hair disorders and susceptibility to dental caries

17 March 2015

At the 93rd General Session and Exhibition of the International Association for Dental Research, researcher Olivier Duverger, National Institutes of Health-National Institute of Neurological Disorders & Stroke, Bethesda, Md., USA, presented a study titled "Hair Keratins as Structural Organic Components of Mature Enamel: The Link Between Hair Disorders and Susceptibility to Dental Caries." IADR General Session held in conjunction with 44th Annual Meeting of American Association for Dental Research & 39th Annual Meeting of the Canadian Association for Dental Research.

Hair and teeth are ectodermal appendages that share common developmental mechanisms. However, **major structural components making up hair and teeth are very distinct**. Hair shaft is essentially made of keratin filaments that are highly cross-linked. Tooth enamel matrix is primarily composed of enamel proteins (amelogenin, ameloblastin) that are degraded and replaced by minerals during enamel maturation. **Fully mineralized enamel contains small fraction of cross-linked organic material that has not been fully characterized**. In this study, researchers assessed the presence and functionality of a specific set of hair keratins in this organic fraction of enamel.

Transcriptomic analysis was performed on the enamel organ from conditional knockout mice lacking transcription factor distal-less homeobox-3 (DLX3), previously shown to regulate hair keratin expression in the hair follicle. Immunolocalization of hair keratins was performed on mouse enamel organ and mature human enamel. Utilizing data from genetic and intra-oral examination, the researchers tested association of polymorphisms in hair keratins with dental caries susceptibility. Functional impact of hair keratin mutations on structural and mechanical properties of tooth enamel was assessed on extracted teeth using transmission and scanning electron microscopy, micro-computed tomography and micro-hardness testing.

Researchers found that several hair-specific epithelial keratins are expressed in murine enamel organ and are significantly down regulated in the absence of DLX3. Several of these epithelial hair keratins are produced by ameloblasts in mouse and are constituents of organic material present in mature human enamel. Polymorphisms in hair keratins, associated with hair disorders, are also associated with increased susceptibility to caries. Functional analyses revealed that mutations in hair keratins result in altered enamel structure and reduced enamel micro-hardness. Researchers' findings determined that epithelial hair keratins are crucial components of tooth enamel and mutations in these keratins increase risk for dental defects and caries.

QUOTE OF THE DAY

In order to carry a positive action we must develop a
positive vision - *Dalai Lama*

<http://www.medicalnewstoday.com/releases/290781.php>

Graphene: A new tool for fighting cavities and gum disease?

15 March 2015

Dental diseases, which are caused by the overgrowth of certain bacteria in the mouth, are among the most common health problems in the world. Now scientists have discovered that a material called **graphene oxide** that is effective at eliminating these bacteria, some of which have developed **antibiotic resistance**. They report the findings in the journal *ACS Applied Materials & Interfaces*.

Zisheng Tang and colleagues point out that dentists often prescribe traditional antibiotics to get rid of bacteria that cause tooth decay or **gum disease**. But with the rise in antibiotic resistance, new approaches are needed to address these problems, which can lead to tooth loss. Previous studies have demonstrated that graphene oxide -- **carbon nanosheets studded with oxygen groups** -- is a promising material in biomedical applications. It can inhibit the growth of some bacterial strains with minimal harm to mammalian cells. Tang's team wanted to see if the nanosheets would also stop the specific bacteria that cause dental diseases.

In the lab, the researchers tested the material against three different species of bacteria that are linked to tooth decay and gum disease. By **destroying the bacterial cell walls and membranes**, graphene oxide **effectively slowed the growth** of the **pathogens**. The researchers conclude that the nanosheets could have potential uses in dental care.

QUOTE OF THE DAY

*Do not go where the path may lead, go instead
where there is no path and leave a trail.*

Ralph Waldo Emerson

<http://www.rediff.com/getahead/report/health-night-owls-more-likely-to-develop-diabetes/20150402.htm>

Night owls more likely to develop diabetes

April 02, 2015 15:25 IST

People who stay awake late are more likely to develop diabetes and metabolic syndrome than early risers, even when they get the same amount of sleep, according to a new study.

"Regardless of lifestyle, people who stayed up late faced a higher risk of developing health problems like diabetes or reduced muscle mass than those who were early risers," said one of the study's authors, Nan Hee Kim, of Korea University College of Medicine in Ansan, South Korea. "This could be caused by night owls' tendency to have poorer sleep quality and to engage in unhealthy behaviours like smoking, late-night eating and a sedentary lifestyle," Kim said.

The study examined sleeping habits and metabolism in 1,620 participants in the population-based cohort Korean Genome Epidemiology Study (KoGES). The study subjects were between the ages of 47 and 59. Participants responded to questionnaires about their sleep-wake cycle, sleep quality and lifestyle habits such as exercising. Researchers took blood samples to assess participants' metabolic health. In addition, the study subjects underwent scans to measure total body fat and lean mass, and CT scans to measure abdominal visceral fat.

Based on the questionnaire results, 480 participants were classified as morning chronotypes, and 95 were categorised as evening chronotypes. The remaining participants had a sleep-wake cycle between the two extremes. Even though the evening chronotypes tended to be younger, they had higher levels of body fat and triglycerides, or fats in the blood, than morning chronotypes.

Night owls also were more likely to have **sarcopenia**, a condition where the body gradually loses muscle mass. Men who were evening chronotypes were more likely have diabetes or sarcopenia than early risers.

Among women, night owls tended to have more belly fat and a great risk of metabolic syndrome, a cluster of risk facts that raise the risk of heart disease, stroke and diabetes. "Considering many younger people are evening chronotypes, the metabolic risk associated with their circadian preference is an important health issue that needs to be addressed," Kim said.

QUOTE OF THE DAY

*Start by doing what's necessary; then do what's possible;
and suddenly you are doing the impossible.*

Francis of Assisi

<http://www.rediff.com/getahead/report/health-is-cholesterol-really-bad-for-you/20150309.htm>

Is cholesterol really bad for your health?

March 09, 2015 14:05 IST

Cholesterol has long been associated with poor eating choices. But new US guidelines say that dietary cholesterol has very little impact on one's health. The author looks at the debate. Cholesterol has, for as long as most of us would remember, been a bad word. Consuming cholesterol-rich food means inviting trouble and playing with the health and well-being of our heart. We have formed such a clear-cut opinion of cholesterol that even the food industry now takes great pains to put the stamp of "no cholesterol" on the items it serves us.

But just when we had it all worked out, the US Dietary Guidelines Advisory Committee has turned the idea of cholesterol upside down. The panel of experts has said that **"available evidence shows no appreciable relationship between consumption of dietary cholesterol and serum [blood] cholesterol."** What this means is that the cholesterol we consume in food does not affect the level of cholesterol in our blood. At least that's what existing proof indicates.

This total turnaround is being taken seriously because the guidelines of this committee provide basis for US federal food and nutrition policy. This is the committee that gives recommendations that are meant to encourage Americans aged two and above to consume "foods and beverages that help achieve and maintain a healthy weight, promote health, and prevent disease". Earlier dietary guidelines recommended that cholesterol intake should be limited to not more than 300 mg in a day. This time round, the panel has done away with this restriction because **"cholesterol is not a nutrient of concern for overconsumption"**.

So does that mean that red meat, eggs and other high-cholesterol foods that we have always been wary of are not so bad after all? Since the report came out, the conclusion being drawn is that it is safe to consume cholesterol-rich food. It's true that cholesterol has been made out to be a bigger villain than it is, but it is also true that **Indians are genetically more prone than Americans to cardiovascular diseases and diabetes.** So, they still need to approach cholesterol with some caution. "Cholesterol is critical for the body," says Ajay Mittal, a cardiologist with Max Super Speciality Hospital in New Delhi. "It is needed for cell regeneration and is used to produce [steroid] hormones needed for the normal development and functioning of the body." The human body, he explains, generates 80-8% of cholesterol. "Only 15 to 20 per cent comes from dietary sources." The body, Mittal explains, has a way of maintaining a healthy cholesterol balance. "If you consume more cholesterol in your diet, the body will produce less to keep the balance healthy," he explains. However, this holds true for people who have normal blood cholesterol levels. Those who have high blood cholesterol levels, suffer from a coronary condition or are diabetic should restrict their consumption of cholesterol-rich food like eggs and red meat.

There is a history behind the new US guidelines, adds Aparna Jaswal, senior cardiologist and electrophysiologist at Fortis Escorts Heart Institute in Delhi. Since the 1980s, dietary recommendations have been against the consumption of cholesterol. As a result, sugar consumption had increased. But sugar does not satiate hunger the way cholesterol does. An egg, for example, is more filling than a sweet. So, if you are trying to steer clear of cholesterol, you tend to consume more sugar. **"There was perhaps the realisation that the past guidelines have made the population sicker and fatter,"** explains Jaswal. So, it was thought that may be easing the cholesterol myth would help people cut down on sugar, she adds. Only a minority of the population, after all, comprises "hyper-responders -- people who will have a problem if they consume an egg daily," she adds. She too is of the opinion that US dietary recommendations cannot be applied blindly to Indians. Even so, it is incorrect to link all heart diseases with high cholesterol. "About 20% of heart patients who come to me have normal cholesterol levels," says Jaswal. "That's because coronary disease is multi-factorial. Diabetes, hypertension and obesity are the other factors."

Maintaining a healthy cholesterol balance helps. "A person can optimise his or her cholesterol level through regular exercise, lifestyle modifications and a healthy diet that includes fruits and vegetables," says Mittal. The cooking oil you use at home also matters. Jaswal recommends a mix of different kinds of oils to cook your food. "You should be consuming a bit of sunflower oil, which is rich in polyunsaturated fatty acids, some rice bran oil, a bit or corn oil and olive oil," she says. "About 20-30% of your cooking should be done in olive oil." As for red meat, make that an occasional indulgence -- if your cholesterol levels are normal -- and not a rule.

While the human body cannot do without cholesterol, it is important to maintain healthy blood cholesterol levels. Annual cholesterol screening is recommended for men starting at 40 and for women at 45. If there is a family history of high cholesterol, start the screening earlier. Screen yourself for high-density lipoprotein (HDL) also called good cholesterol; low-density lipoprotein (LDL) or bad cholesterol; and triglycerides (a type of fat in the blood). Here's what is considered the healthy range:

Total cholesterol: Less than 200 mg/dL

Desirable: 200-239 mg/dL

Borderline high: 240 mg/dL and above. This doubles the person's risk of heart disease.

LDL or bad cholesterol: 70-130 mg/dL

Lower the limit, the better it is

More than 190 mg/dL: Extremely high

HDL or good cholesterol: Below 40: Low and, therefore, undesirable.

60 mg/dL and above: Desirable.

The higher the limit, the better it is.

Triglycerides: 10-150 mg/dL: Normal.

The lower, the better.

500 mg/dL and above: Very high and unhealthy

What improves good cholesterol:

Walnuts: High in polyunsaturated fatty acids, they help reduce accumulation of fat around the internal organs. People who include walnuts in their diet tend to feel more satiated.

Almonds: Their skin helps reduce the risk of developing cardiovascular disease.

Avocados: Lower "bad" cholesterol and increase "good" cholesterol

Flaxseed: Rich in Omega-3 essential fatty acids, antioxidants and fibre, this 'wonder food' helps fight heart disease, stroke, diabetes and also cancer. "Called also in Hindi, flaxseed is very good and highly underestimated," says Aparna Jaswal of Fortis.

Eggs: They might have a bad reputation, but studies indicate eggs boost good cholesterol. Repeated studies have found little or no link between frequent egg consumption and heart disease. "In fact, eggs contain a good amount of essential vitamins and minerals, such as selenium, which has antioxidant properties," says Ajay Mittal of Max Super Speciality Hospital. Eating an egg a day is not a problem and is even recommended if your cholesterol levels are normal, but people with diabetes and heart ailments should go easy on them, says Mittal.

Dark chocolate: Studies have found that 100 gm a day of dark chocolate, which is rich in antioxidants, raises good cholesterol by 9 per cent.

Fish: Salmon and trout particularly are good, though they are not easily available everywhere.

Moderate consumption of alcohol: Drinking a glass of wine improves good cholesterol levels and reduces the risk of heart ailments. "Check your alcohol intake - - no more than 30 ml for women and 60 ml for men," says Jaswal.

Exercise: "People can optimise their cholesterol levels by exercising regularly and making lifestyle changes," says Mittal. This includes giving up cigarettes and slimming the waistline.

No red meat if...A person has cardiovascular disease and Type 2 diabetes or is obese. In such cases, a higher intake of vegetables, fruit, whole grain, low-fat dairy and sea food is recommended. Regular consumption of nuts and legumes helps. Go for less red and processed meat, refined grain, sugar-sweetened foods, high-fat dairy products and beverages. Diet lower in saturated fat, cholesterol and sodium and richer in fibre, potassium, and unsaturated fats is advised.

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QUOTE OF THE DAY

Life is really simple, but we insist on making it
complicated **Confucius**