

Saraswati Dental College, Faizabad Road, Lucknow

Science Update Notice Board

November 2015

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<http://earthquakecountry.info/dropcoverholdon/>

<http://timesofindia.indiatimes.com/india/Dos-and-donts-during-an-earthquake/articleshow/47048951.cms?gclid=CMGHk-mt58gCFYKWvAodHaQDnA>

<http://www.india.com/top-n/earthquake-again-top-9-safety-tips-to-save-your-life-during-an-earthquake-381406/?gclid=CNqH9YCu58gCFUkAvAodWOSomg>

http://www.conservation.ca.gov/index/Earthquakes/Pages/qh_earthquakes_what.aspx

<http://www.geo.mtu.edu/UPSeis/bda.html>

<http://www.getprepared.gc.ca/cnt/rsrscs/pblctns/rthqks-wtd/index-en.aspx>

<http://www.ready.gov/get-involved>

What to do Before, During and After an Earthquake?

An earthquake is the perceptible shaking of the surface of the Earth, which can be violent enough to destroy major buildings and kill thousands of people. They result from the sudden release of energy in the Earth's crust that creates seismic waves. The seismicity, seismism or seismic activity of an area refers to the frequency, type and size of earthquakes experienced over a period of time

Earthquakes are measured using observations from seismometers. The **moment magnitude** is the most common scale on which earthquakes larger than approx. 5 are reported for the entire globe. More numerous earthquakes smaller than magnitude 5 reported by national seismological observatories are measured mostly on local magnitude scale, also referred to as the **Richter magnitude scale**. These two scales are numerically similar over their range of validity.

Magnitude 3 or lower earthquakes are mostly almost imperceptible or weak and magnitude 7 and over potentially cause serious damage over larger areas, depending on their depth. The largest earthquakes in historic times have been of magnitude slightly over 9, although there is no limit to the possible magnitude. The most recent large earthquake of magnitude 9.0 magnitude was in **Japan in 2011** and it was the largest Japanese earthquake since records began. Intensity of shaking is measured on the modified Mercalli scale. The shallower an earthquake, the more damage to structures it causes, all else being equal.

At the Earth's surface, earthquakes manifest themselves by shaking and sometimes displacement of the ground. When the epicenter of a large earthquake is located offshore, the seabed may be displaced sufficiently to cause a tsunami. Earthquakes can also trigger landslides, and occasionally volcanic activity. An earthquake's point of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter.

Earthquakes are sudden rolling or shaking events caused by movement under the earth's surface. Earthquakes happen along cracks in the earth's surface, called fault lines, and can be felt over large areas, although they usually last less than one minute. Earthquakes can happen just about anywhere and at any time of the year. Earthquakes cannot be predicted, but chances of survival are much better if we **prepare in advance and know what to do before, during and after** an earthquake strikes.

Before an Earthquake

- Look around for places where you spend time. Identify safe places such as under a sturdy piece of furniture or against an interior wall in your home, office or school so that when the shaking starts, you Drop to the ground, Cover your head and neck with your arms, and if a safer place is nearby, crawl to it and Hold On.
- Have emergency supplies including food and water stockpiled.
- Make sure you have a fire extinguisher, first aid kit, a battery-powered radio, a flashlight, extra batteries, blankets, clothes, shoes, money, medication, an adjustable or pipe wrench to turn off gas or water, if necessary; baby and pet food and an alternate cooking source at home.
- Learn how to turn off the gas, water and electricity.
- Make up a plan of where to meet your family after an earthquake.
- Don't leave heavy objects on shelves (they'll fall during a quake).
- Anchor heavy furniture, cupboards, and appliances to the walls or floor.
- Learn the earthquake plan at your school or workplace.
- Learn first aid.
- Discuss earthquake insurance with your agent. Depending on your financial situation and the value of your home, it may be worthwhile.

During an Earthquake

- First and foremost, **KEEP CALM**. Do not panic, as it will only worsen the situation.
- Minimize your movements to a few steps to reach a nearby safe place.
- Do not run outside or to other rooms during shaking.
- Stay inside if you are inside, and outside if you are outside.
- Douse all fires. There are chances that the fire may spread and/or lead to an explosion.

If indoors

- If you are inside a building at the time of an earthquake, stay indoors.
- Drop down onto your hands and knees. This position protects you from falling but allows you to still move if necessary and take cover under sturdy furniture, such as tables or a bed while keeping one arm over your head and hold on until the shaking stops. Be prepared to move with your shelter if the shaking shifts it around.
- If there is no shelter nearby, only then should you get down near an interior wall (or next to low-lying furniture that won't fall on you) and cover your head and neck with your arms and hands and crouch in an inside corner of the building to protect your head and upper body.
- Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load bearing doorway.

- Try to stay indoor until the shaking stops and it is safe to go outside. Do not exit a building during the shaking.
- If you cannot Drop to the ground, try to sit or remain seated so you are not knocked down.
- If you are in a wheelchair lock your wheels.
- Experts agree that "**Drop, Cover, and Hold On**" is the appropriate action to reduce injury and death during earthquakes.
- Stay away from glass, lighting fixtures, loose hanging objects, bookshelves, furniture, windows, fireplaces and appliances, exterior doors and walls, and anything that could fall.
- Kitchen is a particularly dangerous spot. If you are in the kitchen, quickly turn off the stove and take cover at the first sign of shaking.
- Stay in bed if you are there when the earthquake strikes. Hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.
- If you are in school/office building, stay away from windows and outside walls and do not use the elevator. Follow the emergency plan or the instructions of the person In-charge.
- If you are in a high-rise building, try and get out as safely as possible using the stairs or the fire escape. Do not use the elevator.
- Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.

If in a crowded Indoor Public Place

- Drop, cover, and hold on.
- Do not rush for the doorways.
- Others will have the same idea.
- Move away from display shelves containing objects that may fall.
- If you can, take cover and grab something to shield your head and face from falling debris and glass.

If in a Stadium or Theater

- Stay at your seat and protect your head and neck with your arms, or any way possible.
- Do not leave until the shaking is over. Then walk out carefully watching for anything that could fall in the aftershocks.

If in a garage or multilevel parking lot

- Get out of the car immediately and crouch down next to the car

If in a lift

- Get out of it quickly.

If outdoors

- If you are outside, avoid moving. However, move away from buildings, trees, steep slopes, streetlights, utility wires, sinkholes, fuel and gas lines, flying glass, falling objects and anything else that could fall on you.
- If you are in an open space, stay there until the shaking stops. The greatest danger exists directly outside the buildings: At exits and alongside exterior walls.
- Find a clear spot or an open ground and drop to the ground covering your head and neck with your hands.
- If you are in a crowded public place, avoid panicking and do not rush for cover or exit. It may cause panic among others and lead to a stampede. Stay low and cover your head and neck with your hands and arms.
- If you're in a mountainous area, beware of the potential for landslides. Get to high ground.

If in a moving vehicle

- Slow down, move the vehicle out of traffic and stop in a safe manner as soon as possible. Stay in the vehicle and set the parking brake till the shaking stops.
- Avoid stopping near or under buildings, trees, bridges and overpasses. Try to get clear of trees, light posts, signs and power lines.
- If a power line falls on the car, stay inside until a trained person removes the wire.
- Once the earthquake has stopped proceed cautiously. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.
- If you are on a bus, stay in your seat until the bus stops. Take cover in a protected place. If you can't take cover, sit in a crouched position and protect your head from falling debris.

If near the Shore

- Drop, cover and hold on until the shaking stops.
- Estimate how long the shaking lasts. If severe shaking lasts 20 seconds or more, immediately evacuate to high ground as a tsunami might have been generated by the earthquake.
- Move inland 3 kilometers or to land that is at least 30 meters (100 feet) above sea level immediately.
- Walk quickly, rather than drive, to avoid traffic, debris and other hazards.

If below a Dam

- Dams can fail during a major earthquake.
- If you live downstream from a dam, you should know flood-zone information and have an evacuation plan.

If in a Tunnel

- Try to move out of it quickly.

If trapped under Debris

- Stay calm
- Do not light a match.
- Do not move about or kick up dust.
- Cover your mouth with a handkerchief or clothing.
- Tap on a pipe or wall so rescuers can locate you. Use a whistle if one is available. Shout if you have no other way to communicate. Shouting can cause you to inhale dangerous amounts of dust, so be careful.

After an Earthquake

- Check yourself and others for injuries. Provide first aid for anyone who needs it.
- Help the injured, especially the young and the elderly. They need special care, and there is no exception to this.
- Check for fire or fire hazards.
- If you smell gas, shut off the main gas valve. If there's evidence of damage to electrical wiring, shut off the power at the control box.
- If the phone is working, only use it in case of emergency.
- Avoid driving, if possible, to keep the streets clear for emergency vehicles.
- Be aware that items may fall out of cupboards or closets when the door is opened, and also that chimneys can be weakened and fall with a touch. Check for cracks and damage to the roof and foundation of your home.
- Listen to the radio/TV for important information and instructions.
- Remember that aftershocks, sometimes large enough to cause damage in their own right, generally follow large quakes.
- Stay out of damaged buildings.
- Be careful around broken glass and debris.
- Wear boots or sturdy shoes to keep from cutting your feet.
- Stay away from beaches. Tsunamis and seiches sometimes hit after the ground has stopped shaking.
- If you leave home, leave a message telling friends and family your location.
- If you have pets, try to find and comfort them. If you have to evacuate, take them to a pre-identified pet-friendly shelter.
- Expect aftershocks. Be aware that some earthquakes are actually foreshocks and a larger earthquake might occur.

Thought of the week

Our prime purpose in this life is to help others. And if you can't help them, at least don't hurt them..... Dalai Lama

Help make November a Diabetes Awareness Month to remember

01 November marks the beginning of Diabetes Awareness Month. It's a month to raise awareness and talk about diabetes. World Diabetes Day takes place on November 14 - the birthday of Frederick Banting.

World Diabetes Day

World Diabetes Day has grown from humble beginnings to become a globally-celebrated event to increase awareness about diabetes. Comprising hundreds of campaigns, activities, screenings, lectures, meetings and more, World Diabetes Day is proving internationally effective in spreading the message about diabetes and raising awareness for the condition. Each year, World Diabetes Day, which is coordinated by the International Diabetes Federation (IDF), carries a particular theme and between 2009 and 2013 the theme has been 'education and prevention'.

'For 2015, World Diabetes Day's key message is healthy living'

World Diabetes Day 2014-2016: Healthy living starts at breakfast

The theme of World Diabetes Day, from 2014-2016 will be healthy living and diabetes and this year, there's a focus on starting each day right by having a healthy breakfast. A healthy breakfast should help blood sugar levels from getting too high and should keep you full through the morning. Whilst cereal and toast may be cheap, these options typically raise blood sugar levels rapidly and may leave you hungry again before lunch. If you drink fruit juice for breakfast, consider cutting the juice out or having a smaller glass of it. For reference, a 150 ml glass of unsweetened orange juice contains around 15g of carbohydrate and 13g of sugar.

Who introduced World Diabetes Day?

World Diabetes Day was introduced jointly by the World Health Organisation (WHO) and the International Diabetes Federation (IDF). The global diabetes awareness campaign was introduced amidst concern over an escalating diabetes epidemic.

Why is November 14th World Diabetes Day?

November 14th is a significant date in the diabetes calendar because it marks the birthday of the man who co-discovered insulin, Frederick Banting. Banting discovered insulin in 1922, alongside Charles Best. World Diabetes Day is internationally recognised and is now an official United Nations Day.

World Diabetes Day logo



The logo of World Diabetes Day is a blue circle, and this is recognised by hundreds of thousands of people with diabetes throughout the world. World Diabetes Day is a truly international event, and having a distinctive logo is an essential part of spreading the message about diabetes to as wide audience as possible.

Where is World Diabetes Day celebrated?

World Diabetes Day is celebrated throughout the world. A truly global event, World Diabetes Day occurs in over 200 diabetetic member associations, in over 160 different countries. Further associations, medical professionals, and individuals all over the world join together to celebrate World Diabetes Day.

World Diabetes Day blue buildings

Each World Diabetes Day famous buildings and monuments all over the world are lit up in blue. This powerful and striking image helps to spread the message about World Diabetes Day to diabetetics and non-diabetetics alike.

Is World Diabetes Day the same every year?

World Diabetes Day is different every year, because each year a theme is decided upon to help those most in need. The theme for World Diabetes Day since 2009 has been diabetes education and prevention.

Where can I learn more about World Diabetes Day?

To learn more about World Diabetes Day, visit worlddiabetesday.org

Frederick Grant Banting



Nobel Prize winner Frederick Grant Banting (born 14 Nov 1891 at Alliston, Ontario, Canada) developed the idea of insulin into a practical treatment on humans, marking one of the biggest medical discoveries of the 20th century. Alongside Charles Best, Banting chose to make insulin available to diabetes patients without charge, which led to insulin therapy and production spreading across the world.

Discovery of insulin

Banting was educated at the University of Toronto, where he first studied divinity, but transferred to medicine shortly after. After being injured serving in the First

World War – he was awarded the Military Cross from heroism under fire – he became fascinated with diabetes. Building on existing research that reported a hormone named insulin controlled the metabolism of sugar, Banting investigated why a lack of it led to increased sugar in the blood and urine. Previous attempts to insert patients with pancreatic extracts or a fresh pancreas failed. Banting’s research at the University of Toronto led him, though, to create a pancreatic extract, which after weeks of experimentation, resulted in thousands of islet cells being left behind. Extracts of insulin were then taken from these islets. First, the insulin was tested on dogs, which regulated their blood glucose levels. Later in 1922, it was tested on Leonard Thompson, the first human being to be administered with insulin. The first dose failed, as it was too impure, but a second dose purified by James B. Collip, proved successful. Banting further developed the insulin alongside laboratory director John MacLeod, and the two of them were awarded the Nobel Prize in Physiology of Medicine in 1923. They shared the prize money with their entire team, who were not recognised by the Nobel committee.

Diabetes legacy

Banting later investigated problems from silicosis and cancer, before serving in the British and North American services during the Second World War. In 1941, he was killed in an air crash during a mission. In 1989, the Queen Mother lit a flame of hope in Banting’s honour, commemorating all the people who died from diabetes. **The flame will only be extinguished when a cure for diabetes is found.**

Next week: 8 Tips for a Healthy Lifestyle

Thought of the week

Eat Good, Look Good, Feel Good.

November - a Diabetes Awareness Month

Healthy Living: 8 Tips for a Healthy Lifestyle

It's important to live a healthy lifestyle which includes physical activity. Whether we like it or not, diabetes affects our lifestyle and we have to be careful to keep our lifestyles healthy as a result. Medication may help keep our sugar levels down but other factors can play a part too. We all know eating healthily and regular activity will help us to keep our body happy. What's more, cutting out some of the following evils will make a big difference:

Getting exercise

A contributing factor to general health is your level of fitness. Whether you're down the gym 3 times a week or simply going for a walk - physical activity is essential in order to keep your fitness levels up. The government advises people to exercise at least 3 times a week for 30 minutes.

Eat away from your workdesk or TV

A study from the University of Bristol in 2010 showed that people who ate whilst using their computer were less aware of what they had eaten and also felt less full than participants who were not using their computer. It is thought that eating whilst working or watching TV is linked with overeating and snacking, which help to promote weight gain. Concentrate on your eating and you may find you are less prone to snacking.

Diabetes and smoking

Smoking carries a number of dangers such as an increased risk of cancer, heart disease and stroke. Smoking is even more dangerous if you have diabetes because it affects circulation and can double the chance of developing diabetic complications. What's more, you can save a considerable amount of money if you give up smoking.

Regularly go for a stroll

A good walk is beneficial in a number of ways. It helps to get oxygen into our lungs, it is beneficial for metabolism, helps to burn calories, can reduce stress, and helps promote better sleep. **The NHS advises trying to get 10,000 steps into your day.** This works out as about 5 miles but is quite achievable over the course of the day. Adding a stroll outside to your day will certainly help to meet the target.

Alcohol

Excessive alcohol affects the body in a number of ways. Alcoholic drinks have a high calorific value which means that weight gain is commonly associated with drinking.

Drinking affects the body's small blood vessels (capillaries) which becomes detrimental to many of the body's functions such as the kidneys, eyes and is also a leading cause of sexual dysfunction. In short term, alcohol will also make blood sugar control harder to manage.

Fast food and takeaways

One of the best ways to stay healthy is to ensure fast food and takeaways are not a regular part of your diet. The occasional visit is not going to harm you but you need to be honest with yourself about whether the occasional visit is becoming a regular event. Fast food and takeaways are usually high in refined carbs and/or sugar, salt and poor quality cooking oil. These factors help to increase insulin resistance, raise blood pressure and increase cholesterol levels, which over the long term contribute to more difficult blood glucose control and increase risk of diabetic complications.

Write down your blood sugar levels

They say ignorance is bliss, but for diabetes this can only be a short term effect. If you get a nasty surprise when you see the levels, don't let this put you off. Taking steps to control your levels will start to give you more assurance.

Stress management

Take a break from stress wherever you can. Often we react to stress by trying to beat it only to get drawn in further. Try not get consumed by stress. During times of pressure, allowing your mind freedom of thought can be helpful. Going for a walk or leaving a decision until the next day can be effective ways to reduce stress and a number of other methods are available. These include:

- Taking regular exercise or joining a sports team
- Going on holiday
- Listening to music
- Practicing Yoga and breathing exercises
- Mindfulness meditation

The ultimate aim of these exercises/activities is relaxation, which is the key to controlling stress.

Thought of the week

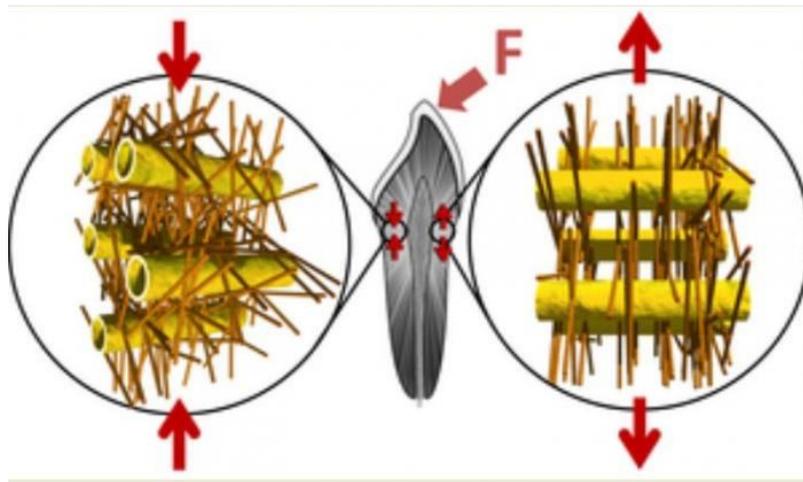
Very little is needed to make a happy life; it is all within yourself, in your way of thinking Marcus Aurelius

<http://www.medicalnewstoday.com/articles/295501.php>

Scientists show how nanostructure of dentin stops teeth cracking

Published: Wednesday 17 June 2015 at 3am PST

Several theories have attempted to explain how our teeth manage to withstand the huge stresses we inflict on them every day of our lives. Now a new study shows how mineral nanoparticles and surrounding collagen in tooth dentin respond to stress in a way that prevents cracks from spreading inside teeth.



Dentin tubules surrounded by mesh of collagen fibers in which mineral nanoparticles - not visible in this image - are embedded

Normally, when bone gets damaged, because it is partly made of living cells, it can heal itself by growing new tissue or remodeling. But while teeth are bone-like, they do not have this facility. So how do they survive a lifetime of wear and tear? In the journal *Nano Letters*, researchers led by members from the Charité Universitätsmedizin, Berlin, Germany describe how they examined the mechanical properties of tiny nanoparticles and fiber structures inside dentin - the layer of softer, porous material that lies under the much harder enamel covering of teeth. The researchers already knew that dentin contains tiny layered structures of mineral nanoparticles embedded in firmly attached to **collagen** protein fibers. And while it was thought these layers of mineral nanoparticles and collagen proteins make teeth tough and damage resistant - it was not clear how they stopped cracks from growing.

Mineral nanoparticles in collagen structures in dentin are 'pre-compressed'

The new study reveals that the nanoparticles are "pre-compressed" and it is this that stops cracks from traveling, as senior author Dr. Paul Zaslansky of the Julius Wolff Institute of the Charité explains:

"The compressed state helps to prevent cracks from developing and we found that compression takes place in such a way that cracks cannot easily reach the tooth inner parts, which might damage the sensitive pulp."

Engineers use compression to strengthen industrial materials for stress-bearing jobs such as gears and turbine blades. Now this study reveals that evolution may have arrived at this solution in teeth long before industrial man. The researchers examined the tiny structures of tooth dentin using micro- and nanofocused X-ray beams generated by advanced synchrotron-based diffraction equipment, some of which is based at the European Synchrotron Radiation Facility in Grenoble, France. They altered the humidity of dentin samples to change its mechanical properties and study how **stress** was generated in the material. They found that when the collagen fibers shrank, this increased the compression in the attached mineral nanoparticles. In further tests, they found that heat weakens the link between the nanoparticles and the fibers, making the dentin more brittle.

Study may lead to tougher ceramic materials for tooth replacements

First author Jean-Baptiste Forien, a PhD student in the Julius Wolff Institute, says: "We therefore believe that the balance of stresses between the particles and the protein is important for the extended survival of teeth in the mouth."

The team suggests their findings may explain why artificial tooth replacements are not as resilient as healthy, natural teeth. Perhaps ceramic materials are too "passive" and do not respond to stress in the same way as the natural, pre-compressed structures.

Dr. Zaslansky concludes: "Our results might **inspire the development of tougher ceramic structures for tooth repair or replacement**." Earlier this year, *MNT* learned how a team led by National Taiwan University is developing a durable **biomaterial to reduce tooth sensitivity**. Writing in the journal *ACS Nano*, the researchers note how their tests on dogs showed the new biomaterial plugged exposed dentinal tubules more deeply than other treatments.

Thought of the week

Thinking is one thing no one has ever been able to tax.
Charles Kettering

<http://www.medicalnewstoday.com/articles/297497.php>

Silk and stem cells may help engineer salivary glands for dry mouth

Published: Thursday 30 July 2015 at 3am PST

Millions of people in the US suffer with dry mouth, a very uncomfortable feeling of insufficient saliva in the mouth that can lead to serious health problems. Now, there is the promise of relief, as a new study shows how - with the help of silk fibers - it may be possible to generate new salivary glands out of stem cells.

Dry mouth is the result of low-producing or non-functioning salivary glands. The often devastating condition - known as xerostomia - has a number of causes, including medication use, radiation treatment for head and neck **cancers**, autoimmune diseases, **diabetes** and the process of aging. **There are currently no treatments for dry mouth, where the salivary glands do not produce enough saliva**, and salivary glands have little capacity to renew themselves, highlighting a need for cell-based therapies that can grow new tissue and restore gland function.

In the journal *Tissue Engineering Part A*, a team from the University of Texas at San Antonio describes how they used silk fibers to provide salivary gland **stem cells** with a 3D scaffold on which to grow a matrix of salivary gland stem cells.

Senior author Chih-Ko Yeh, a Professor in Comprehensive Dentistry who runs a lab focusing on salivary gland research, says: **"The cells had many of the same characteristics as salivary gland cells that grow in the mouth."**

The achievement is significant because "salivary gland stem cells are some of the most difficult cells to grow in culture and retain their function," he explains. Most of us do not give it a second thought - but the saliva we produce in our mouth is critical to good health. As well as initiating digestion, keeping bits of food off our teeth and preventing oral infection, saliva helps us swallow and speak.

Insufficient saliva can lead to **bad breath**, tooth decay, **gum disease** and infections in other parts of the body.

Silk is a 'good choice' as a scaffolding for stem cells

The findings bring promise to 4 million Americans with an autoimmune disease called Sjögren's syndrome - a condition where the body attacks its own tear ducts and salivary glands. They also bring hope to thousands of others who have poor salivary function as a result of radiation treatment for head and neck cancer, and the 50% of older Americans whose medications can cause dry mouth. For their study, the team made a silk framework from purified silk fibers, populated it with stem cells from rat salivary glands and added a nourishing medium to encourage growth.

Prof. Yeh describes what happened: **"After several weeks in culture, the cells produced a 3D matrix covering the silk scaffolds."** Prof. Yeh explains that silk is a good choice as a scaffolding for the stem cells because it is a natural product, it

biodegrades and is flexible and porous. These properties help oxygen and nutrients reach the growing cells easily, and do not lead to **inflammation**, which has been a problem with other scaffolding materials, he adds.

'Great potential' for research and cell-based therapies

Because of the small number of salivary glands in the human mouth, the team is going to continue using rat salivary glands to fine-tune the method. Eventually, they hope to use stem cells harvested from human **bone marrow** or umbilical cord blood to regenerate human salivary glands. Looking further into the future, Prof. Yeh believes that within the next 10 years, we will be repairing damaged salivary glands in patients by transfusing stem cells, or engineering artificial salivary gland tissue to replace damaged glands.

He concludes: "This unique culture system has great potential for future salivary gland research and for the development of new cell-based therapeutics." Earlier this year, *Medical News Today* learned of another study where an injectable **hydrogel boosted stem cell transplantation** to help brain recovery after **stroke** and partially reverse blindness in mice. The team, which included researchers from the University of Toronto in Canada, said the hydrogel did more than hold the stem cells together - it directly promoted stem cell survival and integration.

Thought of the week

I can't change the direction of the wind, but I can adjust my sails to always reach my destination.

Jimmy Dean