DIAGNOSTICS UPDATE .COM

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Elite Controllers

Heart Disease & Diabetes

Laboratory Diagnosis

Sun Poisoning or Sun Stroke

Visual Anomalies

Gingivitis

HeLa Cells

Scientists see Atoms

Tinea Pedis

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Editor's Note

"One step and then another,
and the longest walk is ended.
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and the longest rent is mended.
One brick upon another,
and the tallest wall is made.
One flake and then another,
and the deepest snow is laid."

I wanted to put something profound in this space, but all I could come up with was this. Your guess may be as good as mine as to what I am trying to convey. At least I managed to fill this space with something.
Enjoy.

tiger@mega.bw

I can honestly say that this newsletter has always been my baby. Sure there were others who took care of it, generated content for it, and decided the direction it should follow, but I was the one who always dressed it, pampered it, and made it look the way it did.

I worked with Moonya on a superficial level, but I got more involved with the newsletter under Silas. Each in his own way listened to my suggestions and each allowed me a bit more hand in developing the content, which ultimately culminated in letting me change the entire look of this publication.

"Ask, and ye shall receive!"

So I did. I asked Mr. Chand to let me take over when Silas moved on to bigger – but not necessarily better – things :-). I am grateful to say that he accepted, and here we are, with me sitting at the helm, learning the hard way what Moonya and Silas went through. I must apologize to both of them for the hard time I gave them, for I did not know the task was so heavy.

I truly believe this newsletter has the potential to become a premiere health magazine in Botswana and we shall work hard to achieve just that. We have widened the scope a little in this issue, but that's just the beginning. We hope to cover a lot more in the coming issues.

Diagnofirm is a reputable laboratory and we will use its reputation to bring premium content to you. In order to improve our presentation, we need to hear from you. Your comments and suggestions will help us tremendously.

This issue had some teething problems while I was trying to find my feet, but the next one is already under development, so we will bring it to you on time, in the beginning of September. We will make sure that all future issues reach you on due dates.

We wish to invite medical practitioners and scientists to showcase their expertise through the pages of this publication. We welcome original materials written by you, regarding issues and research pertinent to our health and well-being. We want to cover both physical and psychological issues, so possibilities are endless.

We want to increase the number of pages in the coming months and we are planning to make it bimonthly, instead of quarterly. We have opened our publication to all potential advertisers as a means to reach an educated and well-informed market, while availing us the additional resources to make the expansion possible.

It is an honour to be given this responsibility and I thank Mr. Chand for his faith in my abilities. I wish to thank Moonya and Silas for letting me watch from the side-lines and learn with them and from them. I wish to extend my gratitude to Prof. Bhagat for his assistance and kind recommendations; to Mr. Lange and Dr. Moon for being my first official contributors; and I especially wish to thank you, our readers, for being with us.

We've tried to tone down the jargon, but after years of reading and writing scientific stuff, it is hard to keep it simple. We are nerds through and through and I'm sure you'll get past that and love us for what we are!

Until next time,

M. A. Naeem

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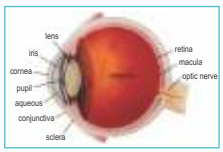

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News & Updates

Cancer Walk 2010 And Health Fair

The University of Botswana, with the support of partner organizations such as Diagnofirm Medical Laboratories hosted a Sponsored walk and Health Fair on April 16th 2010. The fair which was a resounding success kicked off from the University of Botswana led by the Botswana Police Band. Amongst the Dignitries were the Honarable Minister of Health, the WHO Country Representative, the president of the Heart Foundation of Botswana, Board members of the Cancer Association of Botswana, the University of Botswana leadership and Representatives from the government and private sector. Giving brief background information on the Cancer Walk and Health Fair, Mrs. Bontle Mbongwe, a lecturer of the Department of Environmental Health said that this is one of the annually based sponsored walks and health fairs organized by the Department of Environmental Health in the Faculty of Sciences. Mbongwe informed the audience that the fair was mainly organized by students in the health sciences studying "Principles and Practices of Health Education and Health Promotion" to practice what they learnt in class. She elaborated further and said that, "Through this course students are taught skills to market health and to recognize health as a commodity that needs to be marketed in order for people to make informed choices." Deputy Vice Chancellor Student Affairs- Prof. L.M Saleshando, who welcomed the guests of honor at the health fair expressed her happiness on the contribution made by the Department of Environmental Health in promoting public health. She said the University of Botswana has embraced the concept of community-based-learning as it builds on the spirit of life-long learning.

"This is an event that marks our realization as a nation that cancer is increasingly becoming a serious health threat and therefore cannot be ignored." These are the words that were said by the Minister of Health, Hon. Rev. Dr. John G.N. Seakgosing on April 16 2010 at Gaborone Main Mall after the Cancer Walk 2010. He further noted that the Cancer Walk 2010 is an example of one of the vision 2016 pillars of "a compassionate, just and caring nation." This is so because the funds raised through donations by individuals and sponsors of the walk will be donated to the Cancer Association of Botswana. According to Hon. Rev. Dr. John. G.N. Seakgosing, globally, cancer accounts for more deaths than AIDS, TB, and Malaria combined.

The highlight of the event was when he mentioned the theme for the health fair which states that, "Cancer can be prevented- too-changing your lifestyle is part of the recipe." This is a theme that challenges everyone he said; all that's needs to be done is for people to change their lifestyles, live healthily. This can be done through determination and self discipline, people should quit smoking, avoid sun exposure, be physically active and avoid obesity, eating balanced meals, prevent cancer causing infections like HIV, limiting or completely stopping alcohol consumption. It was comforting to hear the Minister say that Cancer can be prevented, or at least one can take measures to try and avoid this deadly disease. Currently it was stated that: "Ministry of Health is working on developing a strategic frame work and policy guidelines for the prevention and control of cancers in Botswana." The Minister concluded by encouraging all Batswana to use facilities that have been availed to them by the government. He emphasized the importance of screening services for early detection of cancer and use available treatment options such as chemotherapy, radiotherapy and surgery which are offered at both Princes Marina and Nyangagwe hospitals in Botswana.

During this event the global overview on Cancer was presented by the World Health Organization (WHO) representative Dr. Eugene Nyarko. He gave a brief picture on the statistics of cancer worldwide and pointed out that in 2004 cancer accounted for 7.4 million deaths worldwide which is 13% of all deaths. More than 70% of these deaths are said to be occurring in low and middle income countries and I think this is because of the expensive nature of cancer treatment generally. Dr Nyarko continued and said that the most common types of cancer worldwide are lung (1.3 million deaths/ year), stomach (803 000 deaths), colorectal (639 000 deaths), liver (610 000 deaths), breast (519 000 deaths). These are all large numbers of deaths caused by cancer, he went on to state a few causes of cancer related infections, according to him Liver Cancer is caused by Hepatitis B Virus Cervical cancer by Human Papilloma Virus, Kaposi cancer by HIV, Stomach cancer by Helicobacter pylori bacteria, Bladder cancer bilharzias. He went on further and said that tobacco use is the most important and single risk factor for cancer.

Doctors Cause Rising Blood Pressure

A study published in the May edition of British Medical Journal shows that when a patient's blood pressure is measured by a doctor, the readings may be 40% higher than when measured at home. This effect is called "white-coat" effect and is generally caused by patients becoming overly stressed by being in a clinic or hospital.

This effect is more pronounced in patient's that are already suffering from high blood pressure and their blood pressure levels can increase by as much as 29 units when a doctor takes the reading. It can increase by 17 units if a nurse is taking the reading. It does not have a significant effect on individuals that don't have hypertension.

More than 8,500 patients from 11 clinics were assessed around Australia and their ambulatory readings were compared with those taken by doctors and nurses. The research team is hoping that these findings will play an important role in future diagnosis and treatment of patients. Hypertension is a huge risk factor for heart attack, heart failure, kidney disease and stroke. It is very important to properly diagnose a patient and differentiate between a true hypertension condition and a temporary one caused by clinic settings.

Professor Arduino Mangoni says, "Ambulatory blood pressure monitoring is the tool of choice to correctly diagnose high blood pressure." There will be changes in guidelines for the treatment of hypertension as a result of this study and the use of a cuff will play a bigger part where patients will wear it over a 24 hour period. The cuff will take measurements at regular intervals throughout the day and will show the effects of external factors that affect blood pressure as the patients go about their daily lives.

RedOrbit News

Viruses Effective Against Brain Cancer

Parvoviruses are usually found in rodents, but they do infect human cells. However, there is no disease in humans that can be ascribed to them. Scientists at the German Cancer Research Centre have been studying an astonishing trait of these viruses: They kill tumour cells without damaging healthy tissue. These scientists have proven that parvovirus H-1 helps regress malignant glioblastomas completely.

Study was carried out using rats with brain tumour cells implantation. Parvoviruses were either injected into the blood stream or directly into the tumour. Direct injection shrank tumours visibly within three days, and even disappeared completely in eight of twelve subjects. In intravenously treated group, tumours regressed completely in six of nine animals. All animals have survived now for over a year, without any symptoms or side effects, while untreated animals died within a month of implantation.

There was no infection-related damage in the nervous tissue surrounding the tumour and the virus did not spread to any other part of the body.

Professor Jean Rommelaere summarizes the reasons why researchers consider parvoviruses as suitable candidates for use in cancer treatment, "Parvovirus H-1 does not cause any disease symptoms in humans. Since we are normally not immune against rodent viruses, it is not immediately eliminated by the human immune system after injection. Parvoviruses kill tumours due to natural properties so that their genetic material does not need to be genetically manipulated like herpes viruses, polio viruses or adenoviruses, which have been used in other studies. Moreover, they do not incorporate their genetic material into the host cell's genome, so we need not fear that they might 'accidentally' boost growth-promoting genes."

Rommelaere's colleage, J?ge Schlehofer, adds two more decisive qualities, "Parvoviruses pass the blood brain barrier so they can be administered via the blood stream. Secondly, they reproduce in cancer cells, so they reach and eliminate even cancer cells that have already settled at some distance from primary tumour." These promising studies have led the researchers to plan clinical trials in humans by the end of the year.

ScienceDaly

Genes Found That Cause Chronic Pain

Chronic pain affects 50 million people in USA and costs 100 billion US Dollars in health costs, lost work time and other economic impacts, according to the National Institute of Health. Mayo Clinic researchers, according to their findings published in the journal Genome Research, report that chronic pain is caused by the inadvertent reprogramming of more than 2,000 genes in the peripheral nervous system.

Researchers focused on dorsal root ganglion neurons of the peripheral nervous system, which are suspected to be involved in pain. Using powerful computers and specialized software to assemble this complicated genomic puzzle, they performed high-throughput sequencing of hundreds of millions of mRNA molecules which are messengers of gene activity.

The researchers speculate that the study might ultimately lead to "transcription therapy" which would employ drugs that kill pain by correcting the activity of specific genes

MedicalNews Today

"DizzyFIX" App for iPhone to Diagnose/Treat Vertigo

Clearwater Clinical in Canada has developed a new therapeutic iPhone application called "DizzyFIX" to allow doctors and medical practitioners to diagnose and treat Vertigo caused by BPPV (Benign Paroxysmal Positional Vertigo) – a condition present in 1 out of 10 people over the age of 60.

BPPV is a debilitating dizziness disorder caused by the migration of calcium crystals known as Otoconia to other parts of the ear, thus causing an abnormal fluid displacement which then results in the sensation of vertigo. Such dizziness can cause falls and accidents resulting in strong injury risk.

Oftentimes, BPPV can be treated with a therapeutic manoeuvre call "Particle Repositioning" or the "Epley Manoeuvre". It is essential that these manoeuvres be performed correctly or the treatment will be ineffective, and most med school students don't learn it in their studies, leading to referrals to specialists and use of unnecessary medications.

This iPhone application can be used in a doctor's office. "We developed DizzyFIX to facilitate the correct performance of the manoeuvre and ensure reliable results," said Dr. Matthew Bromwich, CEO of Clearwater Clinical. Versions suitable for other smartphones are under development. Dr. Bromwich further states that this application opens the door for the acquisition of medical research and treatment data on unprecedented scale resulting in the largest prospective study on the treatment of BPPV and other Vertigo-related conditions

ClearWater Clinical

Swine Flu Breakthroughs

The authors of a new report entitled "A Simple Method for Molecular Detection of Swine-Origin and Human-Origin Influenze A Virus" describe the development of a new molecular probe that improves on the existing PCR assay used to diagnose seasonal influenza and enables detection of both the seasonal and H1N1 influenza A viruses in the same patient sample using a simple test protocol.

Article was published in Vector-Borne and Zoonotic Diseases, a peer-reviewed journal published by Mary Ann Liebert. Researchers provide data to support the sensitivity and effectiveness of the SYBR Green RT-PCR one-step assay used for screening clinical samples to detect the presence of influenza A virus. In positive samples, this is followed by adding two probes that are able to discriminate between the seasonal and swine H1N1 viruses to yield definitive diagnosis.

This new molecular test specifically amplifies and characterizes the viral genetic material, enabling rapid detection of new viral strains as they evolve.

In a related story, an Australian biotechnology company has isolated a natural extract from seaweed which has been shown to inhibit the H1N1 virus. This extract, known as Maritech® 926, is developed by Marinova Pty Ltd. It is a fucoidan compound derived from the undaria pinnatifida species of seaweed. It can inhibit the H1N1 influenza virus at extremely low concentrations. It is a natural polysaccharide and has immediate market potential in nutritional supplements, hand washes and nasal delivery products. Scope also exists for the compound to be included in pharmaceutical and medical device applications.

Medical News Today, HealthNewsTrack

Viagra Linked to Hearing Loss

A new study suggests that Viagra and other similar medications may prompt long-term hearing loss among users. Researchers from the University of Alabama at Birmingham discuss the evidence that supports an association between the onset of hearing problems and Viagra in May 18 issue of the Archives of Otolayngology – Head and Neck Surgery. Viagra belong to a class of medication known as phosphodiesterase type 5 inhibitors (PDE-5i), which also includes Cialis and Levitra.

Study author Gerald McGwin says, "PDE-5i medications work in erectile dysfunction patients by their ability to increase blood flow to certain tissues in the body. They have similar effect on similar tissues in the ear, where an increase of blood flow could cause damage, leading to hearing loss. Patients using these medications should seek immediate medical attention if signs and symptoms of hearing impairment arise, to forestall permanent damage." The findings reported stem from an analysis of survey data from more than 11,500 men over the age of 40, between 2003 and 2006.

MSN

Grapes and Blue Berries Reduce Risk Factors

Scientist at the University of Michigan Health System report that grapes help reduce risk factors related to heart disease and diabetes. The effect is due to phytochemicals – naturally occurring antioxidants – that are found in grapes. Study compared results between rats that received grape-enriched diet and control rats with no grape powder in their food. After three months, rats with grape-enriched diet had lower blood pressure, better heart function, and reduced indicators of inflammation in the heart and the blood. Rats also had lower triglycerides and improved glucose tolerance.

A similar study with blueberries was carried out by scientist of University of Michigan Cardiovascular Centre. Their results show that after 90 days, rats with blueberry-enriched diet had less abdominal fat, lower triglycerides, lower cholesterol, and improved fasting glucose and insulin sensitivity, which are measures of how well the body processes glucose for energy. Blueberries also contain high levels of phytochemicals.

ScienceDaily

Alcohol During Pregnancy Could Cause Leukaemia

Drinking alcohol during pregnancy could lead to acute myeloid leukaemia (AML) in children, a new study published in May issue of Cancer, Epidemiology, Biomarkers & Prevention, a journal of the American Association of Cancer Research. Study was conducted at the Research Centre for Human Nutrition in France and is based on analysis of 21 case control studies. Study shows a 56 per cent increased risk of AML due to alcohol intake during pregnancy. These findings should strengthen the public health recommendations against alcohol consumptions during pregnancy.

CHINADAILY

Salmonella Study Offers Clues About HIV

Certain salmonella strains cause fatal infections in the bloodstream of people with HIV. Scientists have known their presence for 25 years, but only now have they been able to find an explanation. More importantly, the explanation shows that the damage caused by HIV virus is markedly different from the way we understood it to be before.

Previously it was thought that HIV virus damages the immune system, so there is no immune response to the infection. But a study published in journal Science describes that there is a response via production of excess antibodies, but the antibodies produced are actually ineffective. Lead researcher Cal MacLennan of the University of Birmingham describes it as "immune disregulation as opposed to immune deficiency".

In these studies with salmonella, MacLennan and others observed that there is a high level of antibodies to the bacteria but they stuck to the wrong part of the organism, to a structure that sticks out from the surface of salmonella, called lipopolysaccharide, thus diverting the immune system away from the correct surface area.

These bacterial infections (not the HIV infection) can be treated by antibiotics, but any attempts at developing vaccine for them should target the bacterial outer membrane rather than the lipopolysaccharide, according to the researchers.

Yahoo News!, China Daily

hot topic

Elite Controllers

One out of 200 HIV infected people never develop AIDS. They have the HIV virus in their bodies but they either don't suffer from AIDS complications or develop symptoms of AIDS very slowly. Such a group is known as "Elite Controllers" in the research community that is busy developing a cure for AIDS or a vaccine for the HIV virus. Scientists discovered this trait more than a decade ago and have been studying the immune system of these individuals ever since, to find the components that shield them from AIDS. Two scientists, Arup Chakraborty of Massachusetts Institute of Technology and Bruce Walker of Harvard University and Massachusetts General Hospital, have written a paper in the journal Nature, claiming to have found such components and relevant genetic mechanisms, thus solving a great mystery of HIV progressions and effective defense mechanisms that work to contain it.

WebMD, topnews.net.nz, MedPageToday

Elite Controllers are "long-term non-progressors", with immune systems able to suppress the HIV virus to relatively undetectable levels (RNA below 50 copies / ml). The mechanism that their immune systems use to accomplish this has been a great mystery for scientists, who have been working hard to solve it in the hopes of finding a medical solution for the rest of the individuals infected by the HIV virus.

An article published in Nature in May, suggests that we may finally have an answer. Chemical Engineer Arup Chakraborty, PhD, of MIT and Bruce D. Walker, MD, of Harvard devised an elegant set of experiments, using computer modelling and human studies, to discover an important clue to this mystery. A total of 1,900 individuals were studied, with 1,100 elite controllers and 800 AIDS patients.

Results indicate a strong immune response from elite controllers in the early stages of HIV infection due to the presence of a gene variant, labelled HLA-B57, which is not found in others. Earlier studies have pointed to the presence of another gene, labelled HLA-B27, which also contributes to fending off of HIV virus. It seems that these genes help produce T-Cells that are more sensitive to fast-mutating viruses, thus launching a more effective defence against the invaders.

Chakraborty, who developed a computer model of T-Cell development through the thymus, said, "Our findings suggest that the T-Cells that pass and come out of the thymus in people with HLA-B57 or HLA-B27 tend to be able to bind more strongly to strains of HIV that are infecting strains as well as mutants that emerge. So the T-Cell's repertoires are somewhat different." People lacking this mutated gene are unable to stop the progression to full blown AIDS.

These T-Cells arise because the immune system molecules that prime them, fail to present to them a large number of self-proteins; roughly 70,000 as opposed to 180,000 in individuals lacking these genes. As a result, the T-Cells in elite controllers recognize more peptides once they leave the thymus; they are more sensitive to mutated changes, even minute ones; and they are "broadly reactive". These cells then go through the whole body, latch on to cells infected with HIV virus and its mutants and destroy them, thus containing the disease.

As a matter of fact, these cells also protect against other fast-mutating viruses, like Hepatitis C, according to Dr. Walker.

On the negative side, such T-Cells primed by HLA-B57 are more prone to recognising self-peptides, thus leading to autoimmune reactions. According to the authors, HLA-B57 has been associated with autoimmune psoriasis and hypersensitivity reactions.

Dr. Walker says, "I think the fact that there are people out there that can be infected with HIV and successfully control it for decades tells me that this is a virus that we can get the upper hand with. And I think this is a solvable problem." Although he cautioned that the solution may be years away, especially because HIV is like a moving target, mutating rapidly and causing inevitable decline. Many people have predicted the possibility of a vaccine in the near future, and the authors do give a hopeful signal by saying, "While such broadly reactive T-Cells are not common in people with other HLA types, they do exist and vaccine strategies should aim at activating them."

According to Chakraborty's news release, "We think they might be coaxed into action with the right vaccine." Once these cells are primed and directed against HIV, they would naturally expand by replicating themselves and increasing the immune response in patients that are not part of the elite controllers group.

All in all, the study has received a tremendous amount of praise from the scientific community, in addition to raising hope in the general public for a breakthrough in our fight against such a deadly disease. David Baltimore, PhD and Nobel Laureate, of California Institute of Technology in Pasadena, California, finds the study to be "remarkable" for its breadth. He said in a statement, "Rarely does one read a paper that stretches the mind so surprisingly far."

This is a relatively new study and it requires more scrutiny from other researchers in the field. There may be more developments to come very soon and we may find even more answers and clues that can help us deal effectively with HIV and other such diseases.

tooth mark

Gingivitis

Dr. Olga de Moon - Dental Surgeon

What is Gingivitis

Gingivitis is a very common gum disease which causes inflammation of the gums (gingivae) with swelling, redness, bleeding, exudates, a change of normal contours, and occasionally, discomfort. If not treated properly, it can lead to more serious periodontal disease and eventually loss of teeth due to destruction of tissue surrounding them.

Prevention

Daily removal of plaque with dental floss and a toothbrush and routine cleaning by a dentist or hygienist at 6-mo to 1-yr intervals can help minimize gingivitis. Patients with systemic disorders predisposing to gingivitis require more frequent professional cleanings (from2 to 4 times a year).

Etiology

The most common cause of gingivitis is poor oral hygiene. Poor oral hygiene allows plaque to accumulate between the gingival and the teeth. Irritation from plaque deepens the normal crevice between the tooth and gingival, creating gingival pockets. These pockets contain bacteria that may cause both gingivitis and root caries. Other local factors, such as malocclusion, dental calculus, food impaction, faulty dental restorations, and xerostomia, play a secondary role.

Systemic Causes

Gingivitis commonly occurs at puberty, during menstruation and pregnancy, and at menopause, presumably because of hormonal changes. Similarly, oral contraceptives may exacerbate inflammation.

Gingivitis may be an early sign of a systemic disorder, particularly those that effect the response to infection (e.g., diabetes, AIDS, vitamin deficiency, leukopenia), particularly if it occurs in patients with minimal dental plaque. Some patients with Crohn's disease have a cobblestone area of granulomatous gingival hypertrophy when intestinal flare-ups occur. Exposure to heavy metals (e.g., lead, bismuth) may cause gingivitis and a dark line at the gingival margin. Severe deficiency of niacin is another cause.

Symptoms and Signs

Simple gingivitis first cause a deepening of the sulcus (gingival crevice) between the tooth and the gingiva, followed by a band of red, inflamed gingival along one or more teeth, with swelling of the interdentally papillae and easy bleeding. Pain is usually absent. It may resolve, remain superficial for years or occasionally progress to periodontitis.

Desquamative gingivitis may occur during menopause. It is characterized by deep red, painful gingival tissue that bleeds easily. Vesicles may precede desquamation. The gingivae are soft because the keratinized cells that resist abrasion by food particles are absent. A similar gingival lesion may be associated with pemphigus vulgaris, bullous pemphigoid, bening mucous membrane pemphigoid, or atrophic lichen planus.

During pregnancy, swelling, especially of the interdental papillae, is likely to occur. Pedunculate gingival growths often arise in the interdental papillae during the 1st trimester, may persist throughout pregnancy, and may or may not subside after delivery. Pregnancy tumours are soft reddish masses that are, histologically, pyogenic granulomas. They develop rapidly and then remain static. An underlying irritant is common, such as calculus or a restoration with a rough margin.

Uncontrolled diabetes can exaggerate the effects of gingival irritants, making secondary infections and acute gingival abscesses common.

In leukaemia, the gingivae may become engorged with a leukemic infiltrate, exhibiting clinical symptoms of oedema, pain, and easily induced bleeding.

In scurvy (vitamin C deficiency), the gingivae are inflamed, hyperplastic, and engorged, bleeding easily. Petechiae and ecchymoses may appear throughout the mouth.

Diagnosis

Clinical evaluation and finding erythematous, friable tissue at the gum lines confirms the diagnosis.

Treatment

Regular oral hygiene and professional cleaning is required to treat gingivitis.

Simple gingivitis is controlled by proper oral hygiene with or without an antibacterial mouth rinse. Thorough scaling (professional cleaning with hand or ultrasonic instruments) should be done. If appropriate, poorly contoured restorations are reshaped or replaced and local irritants removed.

Excess gingiva, if present, can be excised. Drugs causing gingival hyperplasia should be stopped if possible; if not, improved home care and more frequent professional cleanings (at least every 3 months) usually reduce the hyperplasia. Pregnancy tumours are excised.In gingivitis from systemic disorders, treatment is directed at the underlying cause.

In desquamative gingivitis during menopause, sequential administration of oestrogens is prescribed.

story book

HeLa Cells

If you were to name the one person who contributed most to medical history and changed forever the course of biological research, you would never guess it to be Henrietta Lacks – a black woman – who made the greatest and far reaching contribution to medical science. She has been instrumental in research in cancer, AIDS, the effects of radiation and toxic substances on human cells, gene mapping, human sensitivity to countless products and thousands of other scientific experiments.

It started when she made it possible to find a vaccine for polio and has continued ever since, with research spread throughout the world and beyond. She has made it possible to carry out experiments in space and will make it possible to conduct experiments on other planets.

Amazingly, her contributions to medical science only began after her death. They've continued to this day and will continue for centuries to come.

Johns Hopkins Magazine.)

Henrietta Lacks is buried in an unmarked grave, which even her family is unable to indicate. Yet this insignificant person has done more for medicine and research than any other person in the history of mankind. A black woman, from a tobacco farming family that had its beginnings as slaves in the fields of Virginia, rests in peace, without knowing the importance of her role in major, earth-shaking discoveries that have made for happier lives for countless billions of humans.

Henrietta was born in 1920. Her mother died in 1924 while giving birth to her tenth child. She married David Lacks in 1943, at the age of 23, and moved to Baltimore. In February 1951, after the birth of her fifth child, she was admitted to a segregated ward of Hopkins Hospital due to a bleeding vaginal discharge. She was diagnosed with cervical cancer by a Hopkins physician, Howard Jones. Howard found "an eggplant-hued tumour" and was shocked by its "supple texture" which bled easily when touched, indicating a good supply of blood available to the tumour cells. He cut a section of the growth and sent it to the lab for diagnosis. It was a malignant tumour and radium treatment was prescribed to kill the cancer, as was the practice in those days. Before applying the first dose, according to Johns Hopkins Magazine, the young resident took one more sample and sent it to George Grey, who was the head of tissue culture at that hospital. All unbeknownst to Henrietta.

George and his wife, Margaret, were looking for a line of human cells that would live indefinitely outside the body to carry out their study of cancer. They were hoping to use such cells to find a cure for cancer and were growing cell line after cell line unsuccessfully, for close to two decades. Up until that time, all cell lines would die out due to Hayflick Limit, the number of times a normal cell population will divide before it stops, presumably because the telomeres reach a critical length. To their surprise, Henrietta's cells grew like crazy. They grew with abandon and they grew like no other cells had grown before. Henrietta's cells took over the medium, the flasks, the test tubes, and any other equipment to house them. Her cells took over her body as well, as the tumour spread to other organs. Soon, her cells were to take over the world. Her cells are immortal.

Henrietta died on October 4, 1951. Same day George Grey appeared on national television with a vial of Henrietta cells, which he dubbed HeLa Cells, and announced to the world that a cure for cancer was on its way. Neither Henrietta nor her family knew that those cells were her cells. In a fitting coincidence, days before her cells were taken from her body, thousands of people marched in New York to push for a cure for polio. Soon after her death, Gey and his colleagues used her cells to grow the polio virus. They used her cells to distinguish between many polio strains to find the one that caused the debilitating effects in humans. John Salk and his colleagues in Pittsburg then created a vaccine which was tested by the National Foundation for Infantile Paralysis before its use in humans. In the meantime, Grey shared his cell line with scientists around the globe.

Her cells were used to search for a leukaemia cure and the cause of cancer, to study viral growth, protein synthesis, genetic control mechanism, and the unknown effects of drugs and radiation. Her cells were used in nuclear test sites in USA and Japan, later in AIDS studies, in space experiments, and ad infinitum. There are over 11,000 patents related to HeLa cells today. HeLa cells were, and still are, some of the strongest cells known to science. They reproduce an entire generation every 24 hours.

It took Greys three decades to create a viable, immortal cell line, but after their success with HeLa cells, it became surprisingly easy to grow other cell lines and scientists started to grow all kind of cell lines. Researchers cultivated cells from their own bodies, from their family, friends, and their patients. In 1974, a researcher named Walter Nelson-Rees claimed that HeLa cells had infiltrated the world's cell cultures. HeLa cells travelled through the air, on hands, or the tips of pipettes, overpowering any culture that came in their way.

It was about that time that Henrietta's family learnt the truth about her cells and made contact with Hopkins Hospital. It was then that scientist asked the family to donated blood and tissue samples to identify markers in HeLa cells to distinguish them from other cell lines and to verify that HeLa cells, did, in fact, contaminate other cell lines. Now, almost sixty years later, Henrietta's cells are growing strong and contributing to a world of knowledge and understanding of human systems. Today, at least, we all know where it started.

heart beat

Heart Disease and Diabetes

Feed Each Other

Heart Foundation Botswana

Through participation in research and events across Botswana, Heart Foundation Botswana has found it frightening just how many people do not know that there is a connection between Diabetes and the Heart. Diabetes alone is a significant risk factor for heart disease.

Considering that Heart Disease is Number one killer in the world, and Diabetes is the Second, where does that leave us here in Botswana?

How does diabetes affect the heart?

1. High sugar levels in the blood affect the walls of the arteries making them more likely to develop fatty accumulation (atheroma).
2. Diabetes works together with other risk factors such as high blood pressure and smoking together with high cholesterol to worsen damage to the coronary blood vessels (the circulation to the heart itself).
3. People with diabetes are more likely to have high blood pressure
4. Diabetes can affect the heart muscle itself making it a less efficient to pump
5. Diabetes can affect the nerves to the heart so the symptoms of angina (chest pain) may not be felt in the usual way. This leads to delay and difficulties in diagnosing heart problems and ultimately heart attack.

It is proven that a Healthy Lifestyle can ward off Heart Disease, and in fact many, many diseases and stresses that are really unnecessary in this already challenging life. Let's look at a few things one can do:

As a Diabetic, what can I do to reduce my risk of heart disease?

Diabetes alone is considered as a significant risk factor for heart disease. So if you have diabetes you would likely be given medicines to reduce your risk of heart disease. Controlling blood sugar and blood pressure very well is essential for preventing the long-term complications of diabetes. However this is often not enough to prevent heart disease. The major risk factors for heart disease need to be controlled by a combination of very effective treatment and appropriate lifestyle.

Be more physically active: If you already have diabetes, then physical activity may help reduce the amount of tablets or insulin that you need to take. The aim is to gradually increase your physical activity until you are doing 30 minutes of moderate activity at least five days a week. Walking is one of the best forms of activity. It is very important to monitor your blood glucose carefully as you start to build up your level of physical activity because you may need to change the dose of your medication.

Stop smoking: Smoking cigarettes is particularly dangerous and multiplies your risk of heart disease if you have diabetes. The most important thing that you can do to live longer is to stop smoking.

Control your cholesterol levels: A healthy diet will help to reduce your cholesterol levels. Reduce the total amount of fat that you eat. Doing regular physical activity can also help reduce your cholesterol levels.

Controlling high blood pressure: High blood pressure is common in people with diabetes and it is essential to control it.

Weight control: If you are a man you should aim for a waist circumference less than 90 cm and if you are a woman you should aim for a waist circumference of 80 cm. This is a quick and easy way to find out how much weight you need to loose.

Appropriate lifestyle measures: Fruits and vegetables are good with nutrients that help lower your risk of heart disease.

Good For You
HEART FOUNDATION BOTSWANA
www.hfb.org.bw

Diabetic kidney problems?

Prof. Kiran Bhagat

The function of the kidneys is to filter waste and excess fluid from the blood. Diabetes and high blood pressure are the leading causes of kidney disease in the United States. About 30 percent of patients with type 1 diabetes and 10 to 40 percent of patients with type 2 diabetes will eventually develop end-stage kidney disease - meaning that about 90 percent of kidney function has been lost. At that point, the only treatment options are dialysis or kidney transplant.

Diabetes injures the kidneys by damaging the organ's small blood vessels, depriving it of nutrients and oxygen and limiting its ability to function properly. When this happens, the body retains more water and salt than it should, causing weight gain and ankle swelling. Lab tests may show that you have protein in your urine, and waste materials can build up in your blood.

Diabetes can also damage nerves, which can affect normal signaling to the brain that the bladder is full. If you don't get the message to empty your bladder, pressure can build and further injure the kidneys.

I don't know of any way to reverse kidney damage once it has occurred - there are no miraculous supplements or herbs for that. However, you may be able to slow progression of your kidney problems by keeping your diabetes under good control and having periodic tests of your blood, urine and blood pressure as your health care team recommends.

If your blood pressure rises, you need to get that under control immediately. Angiotension (ACE) inhibitors used to control blood pressure can help slow the loss of kidney function.

As far as dietary measures are concerned, you should consider what's called a renal-diabetic diet to keep your diabetes under control and slow progression of kidney damage, and a low protein diet will help take workload off the kidneys. You also should avoid alcohol and certain over-the-counter medications including those for pain and colds. Be sure to tell your health care practitioner about any drugs or supplements you take or are considering taking

Sun Poisoning or Sun Stroke?

Prof. Kiran Bhagat

Sunstroke is another name for heatstroke, a medical emergency that occurs when the body overheats to the point that it can no longer regulate its internal temperature. Sun poisoning is a layman's term for the symptoms that can accompany a bad sunburn - nausea, vomiting,fever, chills, headache and, in general, feeling pretty sick.

Some people are overly sensitive to sun exposure - in effect, they have a sun "allergy," usually an itchy rash that develops as a result of an immune system reaction to sunlight. Some of these reactions are inherited and some may be worsened by medications, including certain antibiotics. They also can be due to the interaction of the sun's rays with perfumes, soaps and other substances on your skin. A severe sunburn can be the start of this problem, which can increase over time until people cannot tolerate any sun exposure at all.

I'm sure that everyone knows that repeated, excessive sun exposure can lead to skin cancer, both the more common curable types and the more dangerous, potentially life-threatening melanoma. Sun damage can also cause cataracts to develop in the eyes as well as other types of eye problems including degeneration of the macula, the part of the retina where visual perception is most acute. Always wear sunglasses that block 99-100 percent of UV rays. In addition, overexposure to ultraviolet radiation from the sun can suppress proper functioning of the body's immune system.

The best ways to protect yourself from sun-related problems are to stay out of the sun when it's at a high angle in the sky, to wear hats and protective clothing, and to use sunscreen with an SPF(sun protection factor) of 30 or higher (apply it at least 15 minutes before going out into the sun and reapply it every two hours). Choose a sunscreen containing Parsol 1789, an ingredient that protects against both ultraviolet A rays that cause sun damage and deep skin wrinkling, as well as the ultraviolet B rays responsible for sunburn and skin cancer.

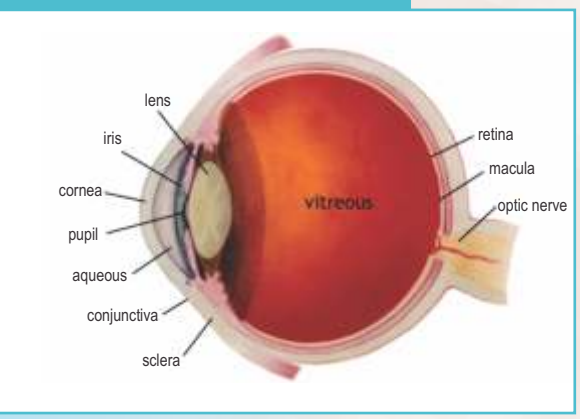
Having said that, I recommend trying to enjoy some time in the sun every day without sunscreen protection in order to optimize levels of vitamin D, which is made in the body with exposure to sunlight. Only a few minutes daily is required to raise vitamin D to appropriately high levels, which are critical for healthy bones and protection against many forms of cancer and multiple sclerosis.

Eating Smart at Work

- Limit your snacks to once in between meals and keep these low in fat and low in sugar.
- Stock healthy snacks in your desk drawer or briefcase such as instant oats, mixed fruit and nuts (not salted).
- Go for quick low fat noodles in a cup, tuna in a packet or a low fat yoghurt.
- Make a whole-wheat pasta salad for lunch or a whole-wheat chicken sandwich.
- Drink lots of water. It keeps you hydrated and less cranky.
- When it's time for your snack: stop work, take a break and savor the snack. This will de-stress you, and you will feel satisfied.
- Vegetable sticks, sliced low fat cheese and fruit slices also make great energy boosting snacks.

Visual Anomalies

Robert Lang (B.Optom), Eye Express



Cornea: is the transparent outer surface of the eye. This is where the initial refraction of light happens on its way to the Retina.

Aqueous Humour: a clear watery fluid that fills the space between the cornea and the iris.

Iris: a highly pigmented part of the eye that creates the colour of the eye, it also makes an aperture that makes the pupil and gives you depth of focus. The pupil can also change in size depending on the amount of light that enters the eye.

Intra Ocular Lens: is the next refraction medium of the eye. It also has the ability to change its curvature so as to focus light on the central retina.

Vitreous Humour: a colourless mass of soft, gelatin material that fills the eyeball between the lens and the retina.

Retina: the neurological bed of the eye and consists of basically two types of cells namely Rods and Cones. It is highly vascular and is the area that is affected by Diabetes.

Rods and Cones: specialized receptor cells for specific functions. Rods are mostly active in day time and cones are mostly active at night or in low light conditions. Rods are more excited by red/blue/or green light and Cones are excited by the primary colours.

Fovea Centralis:also known as the Macula. All retinal cells funnel into this area and this continues to create the optical nerve tract.

Optical Chiasm: area where the optical tracts of both eyes combine and go to the respective visual cortex sides of the brain.

Visual Cortex: area of the brain that processes the neuro-eletric response into a visual picture in the brain.

The eyes are wonderful sensory organs. They help people learn about the world in which they live through a complex and amazing combination of muscle movement, focusing, refraction, and neurology, which we all know as vision.

The neurology of vision is quite complex and most scientist agree that the full answer still eludes us. Below is the basic process that most researchers agree on.

The photo sensitive Rods and Cones have a Rhodopsin protein in its structure that absorbs the light entering the eye. It is known that the molecule, which is embedded inside rhodopsin, undergoes photo-excitation by absorbing light. In the photo-excitation process, the rhodopsin is excited to a higher electric state and undergoes a twisting action around one of its double bonds. The retinal then dissociates from the opsin and the change in the geometry initiates a series of events that eventually cause an electrical impulse to be sent to the brain along the optic nerve. This is then processed in the brain and we perceive sight.

The neurology of sight is not as simple as above. Binocular vision has to do with certain cells from the right eye being directly connected and wired to the cells in the left eye. Due to the different angles of the eyes, the light entering the left and right eye is slightly different, causing a difference in the electro-chemical responses in the visual cortex. This process causes the brain to perceive binocular vision. The visual cortex has to regulate complex eye movements and pupil responses based on the information it has received.

Visual Anomalies:

Visual anomalies can be genetically and environmentally caused. Here is a brief list of the visual anomalies that are most common in an optometric practice. This is by no means a definitive list.

Refractive errors: A refractive error is the inability of the eye to focus reflected light onto the macula of the retina in the absence of any medical reason. Broadly speaking there are four categories when it comes to refractive errors.

Myopia: When light is refracted too much and the bulk of the light falls in front of the retina.

Hyperopia: When light is not refracted enough and most of the light is focused behind the retina.

Astigmatism: When the cornea has an irregular shape and does not allow all the light to fall on the retina in a sharp point.

Presbiopia: When the Intra Ocular Lens is not able to focus on near objects due to ageing process and the person is not able to read at a close distance.

All these anomalies are correctable using contact lenses or glasses.

Cataracts: This is a loss of transparency of the Intra Ocular Lens and results in a loss of clarity/quality of vision. Ophthalmological intervention is required. Cataract surgery is very successful. However, this anomaly is the leading cause of blindness in Africa, due to the lack of Ophthalmologists.

Glaucoma: An increase in intra ocular pressure results in the loss of electrochemical potential in the Rods and Cones of the peripheral Retina. This can lead to loss of peripheral vision if it is not diagnosed early. Pharmacological intervention via an Ophthalmologist controls intra ocular pressure very well and blindness can be prevented. This condition is totally painless so most people will not even know they have it.

Diabetic Retinopathy: Because the retina is so vascular, one of the first places in the body that Diabetes can be observed is in the Retina. The importance of regular retinal exams to diagnose Diabetes cannot be stressed sufficiently.

Trachoma: Occurs when a very contagious microorganism called Chlamydia Trachomis causes inflammation of the eye. It is common in Africa.

Strabismus: This is a condition in which both eyes are not able to align correctly on a target. The main symptom of strabismus is generally double vision. It can be caused by trauma or a birth condition.

Amblyopia: The loss of vision due to the lack of use of a particular visual pathway. This is done to negate the double vision that is caused by the misalignment.

Macular Degeneration: This is a genetic deterioration of the sensitivity of the macula area and can cause blindness.

Keratoconus: This is where the cornea starts to have an extremely irregular shape and can lead to a corneal transplant.

Signs And Symptoms Of Visual Anomalies:

Headaches: This must be the number one cause for anybody to go and see an Optometrist or Ophthalmologist. Seventy percent (70%) of all headaches that occur later in the day have some form of visual trigger. Headaches like migraines may have a visual trigger but can also be related to other triggers like chocolate.

Reduced reading skills: Muhammad Ali said, "Float like a butterfly, sting like a bee / your hands can't hit what your eyes can't see". It stands to reason that if you have a reduced visual skill, this will directly impact on how well you can learn to read.

Loss of colour sensitivity: Numerous anomalies will relate to a loss in colour perception and sensitivity. The major anomalies are Cataracts and Macular degeneration.

Dry eye sensation: This can be indicative of tear layer abnormalities as well as conjunctivitis. Dry eyes also are indicative of some medication intake, particularly medications that are used to treat skin problems.

Squinting: Some people squint when they have a refractive error in order to negate this error.

Hazy Vision: Related to Cataracts

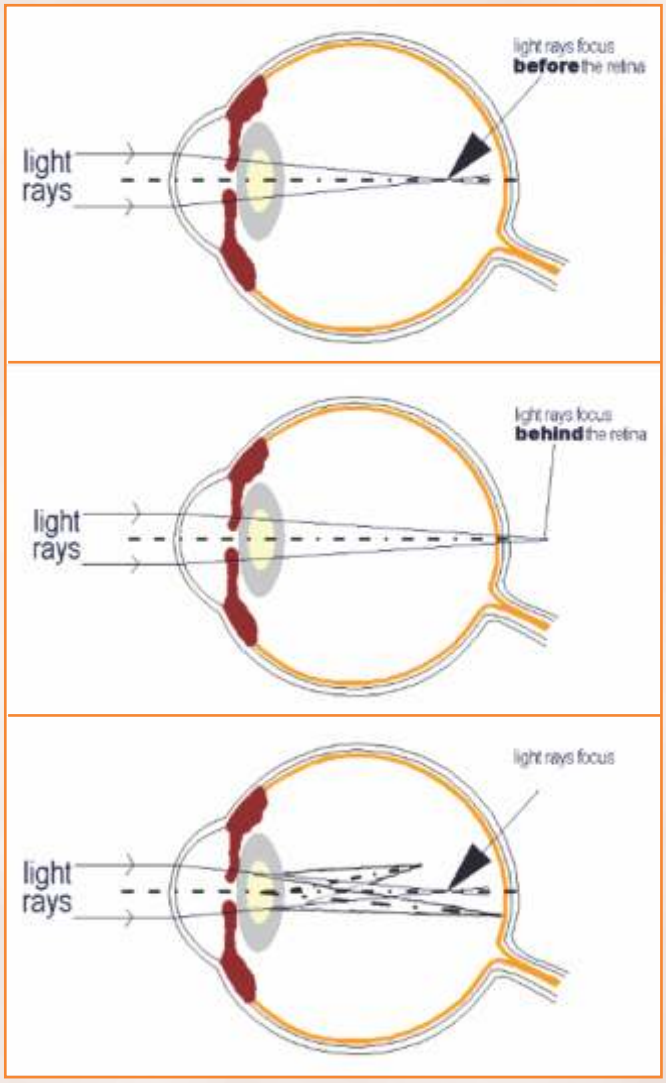
Photophobia: This can also be related to several corneal and retinal diseases as well as refractive errors.

Loss of vision at night: This May be related to Macular degeneration or refractive errors.

Nausea: This can be visually triggered but may have a vestibular origin.

There are many more symptoms but these are the most common. The intention of this review is not to give the reader a definitive list or overview of vision but to merely highlight the complexity of the topic.

As an Optometrist working in Gaborone I would like to encourage all healthcare professionals to adopt a holistic approach to healthcare. I hope that this type of article will encourage debate and discussion that will offer health care professionals a forum to exchange ideas and information that will bring the various health care disciplines closer together The next topic of discussion will be on Dyslexia and I am going to address this topic by giving an optometric view but also get a psychologist and occupational therapist view to show that there are a lot of ways to address the same issue.



patient education

Laboratory Diagnosis

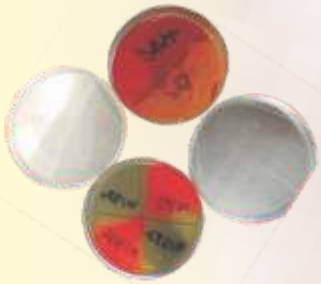
What samples do we need to test you?

Witness Muuya

Many of us who haven't been to the laboratory for testing would always ask: What sample does the laboratory actually need to test a person? Well, to many of us the answer is blood! True, but it is just one of the many samples that the laboratory can use to test a person. Thus the type of sample that we need will depend on the type of disease that a person is suffering from and what the manufacturer of the reagent that will be used to perform the test recommends as a suitable sample.

Blood Samples

Blood is collected from a vein on the arm of a patient (venous peripheral blood sample) or the pubis of the patient if their veins are sunken (difficult veins). This procedure of blood collection or venepuncture is called phlebotomy. The blood is collected into different types of tubes depending on the type of test that has to be done. Because of this requirement, blood tubes are colour-coded, and each colour represents a specific type of tube for specific tests.



There are many tests that can be performed in the laboratory using the blood, but we only test for those tests that are requested by your doctor. From what you would have discussed with your doctor, your doctor will order tests that he thinks will help him diagnose your problem. Some of the tests that are performed using blood include HIV tests, sexually transmitted diseases (STDs), full blood counts, i.e. whereby all the cells that make up your blood are analysed, kidney function tests, liver function tests, etc.

Some laboratory tests use whole blood while others require that the blood tube be centrifuged (spun) in a centrifuge to separate the cells from other blood components. When you spin a blood tube, you will separate blood into two layers: a red layer at the bottom and a yellowish or straw-coloured layer at the top. This top layer is the one which is used for chemistry and serology tests. This layer is called either serum or plasma depending on the colour of the tube that would have been spun.

Chemistry tests are tests like blood sugar test, liver function test, kidney function test, etc. while Serology tests are a little more advanced. The basic principle in serology is that we actually look for bugs that cause disease in the body (which we call antigens) or we look for a particular group of soldiers that fight a particular bug (which we call antibodies). When we see some soldiers (antibodies) in your blood, it tells us that you are carrying a bug which is fought by that particular group of soldiers. A healthy person does not have antibodies for that bug. The soldiers only appear when your body has been invaded by a foreigner (bugs)! This is how diseases like Hepatitis B and HIV are being tested in the laboratory!

Other Samples Used in Laboratory Testing

Urine is usually tested for microbiological infections of the urinary tract, but some useful biochemical tests can also be performed which are of great help in assessment of kidney function.

A sample of urine can be anything from a drop to about 50ml and that will be enough for both microscopic and culturing purposes. In order to find out what type of bacteria or bug that is causing trouble in the urinary tract, laboratory scientists perform a culture to see whether that bug will grow or not. A drop of the urine is placed on a nutritive agar in a plastic plate (a process called inoculation). The plate is placed in an incubator with a temperature of 37 degrees Celsius, similar to human body temperature, and is left there for 24 hours. If there is a bug in the urine, it will be seen as colonies growing on top of the agar. These colonies can be white, cream or grey or sometimes pink depending on the type of bacteria that will be growing.

A sample of the colonies can then be taken onto a new agar plate with agar that contains an antibiotic. The plate is placed in the incubator at 37 degrees Celsius overnight. If the bacterium does not grow, it means that antibiotic in the agar can treat the infection and the doctor is told to prescribe it. If it continues to grow then that antibiotic does not treat that infection and the laboratory advises him not to prescribe it to the patient.

Like urine, samples such as sputum, stool, swabs, etc. are similarly processed like urine as far as culturing and identifying the organism is concerned.

Tinea Pedis

Athlete's foot, Jock Itch and other infections

Just saying the words "foot fungus" can make a person cringe, yet, it is a very common skin condition, usually known as Athlete's Foot. Now try the term "Jock Itch" for size and see how it makes your skin crawl. How about tinea pedis?

All of a sudden, the world of sports takes a whole new meaning. But none of this has anything to do with sports, athletes or jocks. It is simply the story of good bacteria gone bad; bacteria like yeast, mould, or fungi; aided and abetted quite nicely by a weak or malfunctioning immune system, if that may be the case.

Trichophyton is the fungus most likely to cause it, which grows in warm and moist, usually closed parts of the body, such as, tight shoes that keep the toes squeezed together, damp socks, and plastic shoes with poor ventilation. Humid conditions are well suited to make this organism thrive. Athlete's foot is also known as tinea pedis, because the fungus is a ringworm fungus referred to as tinea.

Even though the word foot is part of its name, this infection can grow anywhere on the body, including: "scalp, trunk, extremities (arms and legs), hands, feet, nails, groin, and other areas." Ringworm of the body is tinea corporis, ringworm of the groin (also Jock Itch) is tinea cruris, and ringworm of the scalp is tinea capitis. Onychomycosis is infection of the nail and may develop with or without the symptoms of Athlete's Foot.

This fungus is usually picked up from wet floors of communal areas where a lot of people walk around barefoot. It is contagious and can jump from host to host if the infected body part comes in contact directly with a healthy one, or indirectly via an object that first contacts the infected host before coming into contact with a healthy one. Even household pets can pass this infection along.

Symptoms of Athlete's Foot start with itching at first and lead to stinging and burning sensations. Microorganisms sprout extensions that infect the outer layer of the skin. Skin then responds by producing more skin cells to replace the infected ones, thus leading to a thick, scaly layer forming around the infection which itself becomes infected and thus advances the infection. Severe cases cause peeling of the skin, cracking, pain, and even bleeding.

Even though the symptoms are numerous, not all sign will be exhibited. Some people may not have any symptoms and may not even know they have the infection. There is genetic predisposition to the infection, but generally vulnerable groups include the elderly and individuals with diabetes, circulatory problems, and immunodeficiency disorders.

There are three types of this infection: Moccasin, infects the soles of the feet; Interdigital, infects between the toes; and Inflammatory type which causes small or large blisters of the feet. All types are preventable with good hygiene, and they are usually treatable with over the counter antifungal creams or powders. Many antifungal creams and washes are available over the counter, including Lotrimin, Lamisil, Clotrimazole, and so on. Ask your health-care professional or pharmacist for a recommendation. Severe and advanced cases must be referred to a dermatologist of other qualified physician.

In some cases, a secondary infection can develop, usually through the damaged and vulnerable skin, making it easy for other bacteria to sneak through. There may even be allergic reaction if proteins or bacteria are able to enter the blood stream though open wounds caused by Athlete's Foot.

It usually takes a while for the infection to disappear, often 6 to 10 weeks. The treatment should be continued for at least four weeks after the symptoms disappear to ensure that the infection has been completely eliminated.

Recurrence rate of Athlete's Foot is high, so it requires an active monitoring of the infected area. The best line of defence is to make the infected areas less suitable for the fungus to grow. Vulnerable areas must be kept clean and dry. In addition, buy shoes that allow the feet to "breathe" and socks that pull moisture away from the feet. Use powders, preferably medicated one, to keep all areas dry. Soak your feet in a solution of Aluminium Acetate, or in homemade remedy of dilute white vinegar (1 part vinegar to 4 parts water), once or twice a day for about 10 or so minutes.

It is very important that you don't share nail instruments with anyone else. Use cotton socks and/or clean socks whenever possible. Avoid walking in public areas with bare feet. Disinfect old shoes and make sure affected family members don't spread Athlete's Foot to non-affected relatives.

These tips can help you avoid athlete's foot or ease the symptoms:

Keep your feet dry, especially between your toes. Go barefoot to let your feet air out as much as possible when at home.

Go with natural materials. Wear socks that are made of natural material, such as cotton or wool, or a synthetic fibre designed to draw moisture away from your feet.

Change socks and stockings regularly. If your feet sweat a lot, change your socks twice a day.

Wear light, well-ventilated shoes. Avoid shoes made of synthetic material, such as vinyl or rubber.

Alternate pairs of shoes. Allow time for your shoes to dry.

Protect your feet in public places. Wear waterproof sandals or shower shoes in communal showers, pools, fitness centres, and other public areas.

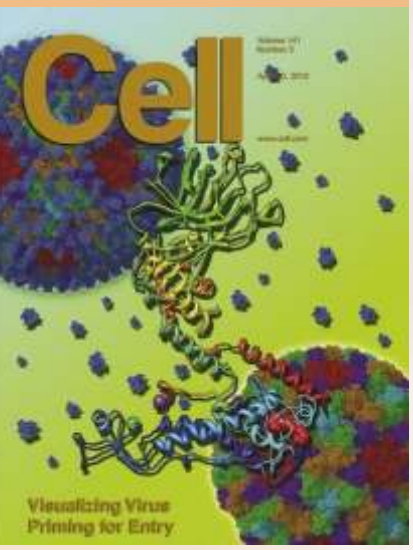
Treat your feet. Use an antifungal powder daily.

Don't borrow shoes. Borrowing risks spreading a fungal infection.

WebMD, MedicineNet, Mayo Clinic, Flickr

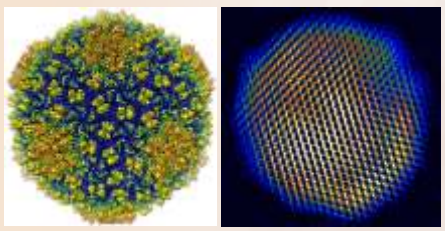
hot topic

Scientists see Atoms



Scientists from UCLA have imaged a virus where you can practically "see" its atoms. This is the first instance where biological units have been "seen" at such an amazing resolution. The size of the structure imaged was 3.3 Angstroms, where one Angstrom is one ten-billionth (10^{-10}) of a metre. Researchers used a cryo-electron microscope to study aquareovirus that causes disease in fish and shellfish. The study was reported in April 20 issue of the journal Cell and was carried out by a team, led by Hong Zhou, UCLA professor of Microbiology, Immunology and Molecular Genetics.

This article was condensed from different articles published online by ScienceDaily.



Traditional light microscopy is used to view samples under a lens. Some samples, however, are too small to diffract visible light. Scientists then have to rely on other methods to "see" what an object that small looks like. The lowest possible range for visible light microscopy is 500-800 nanometres (5,000 to 8,000 Å). The technology required to view objects smaller than that is known as sub-500 nm technology.

One such microscope is atomic force microscope, which probes the surface of subject under study by touching it with an atomic size tip and generates an image based on the curves it "feels". However, there is more focus in scientific world on another sub-500 nm technology, the electron microscopy, which uses a beam of electrons to fire upon the sample and then digitally captures those that bounce back. Electrons pass through the empty areas but those that reflect back give a two dimensional image of the object. Scientists then repeat this process from different angels and use computers to construct a 3D view of what may be present under the microscope. Electron microscopy works in a vacuum, which allows electrons to travel better in that environment.

University of California at Los Angeles (UCLS) has a NanoSystems Institute, where electron microscopy is combined with cryogenic techniques to study biological specimens in their native habitat. Dr. Zhou is faculty director of the Electron Imaging Centre for Nanomachines at UCLA, where such cryo-electron microscopes are used to create 3D images of nano-machines, nano-devices, and biological nano-structures, such as viruses. Biological complexes are flash frozen, which allows scientists to image them in their native environment.

Viruses usually have two classes. One class is known as envelope viruses, like influenza and HIV, which have a membrane as an outer layer which is used to fuse with and infect host cells. Non-envelope viruses use a protein instead. Aquareovirus, the virus imaged by Dr. Zhou and his team, goes through a priming phase in which it sheds its protective protein cover and uses an "insertion finger" protein to infect the cell. This discovery was made with the use of this technology and holds promise for an incredible array of future discoveries.

"The ability to understand the structures of viruses at an atomic level will allow their manipulation for drug delivery and propel numerous innovations in treatments of diseases," said Leonard Rome, senior associate dean for research at David Geffen School of Medicine at UCLA.

Dr. Zhou highlighted the prospects further, "We hope to engineer medications in three ways. We can identify molecules that can block the infection; we can engineer ultra-stable and non-infectious virus-like particles as optimal vaccines; and we can alter the virus characteristics so that instead of delivering a disease, they would deliver medications."

This technology does not require a crystal to be grown before visualizing the specimen. It allows us to see "the building blocks of our world – atoms and molecules, and enables research at nanoscale", according to a news release from the researchers. It has opened the door to significant breakthroughs in the areas of health, energy, the environment, and information technology.

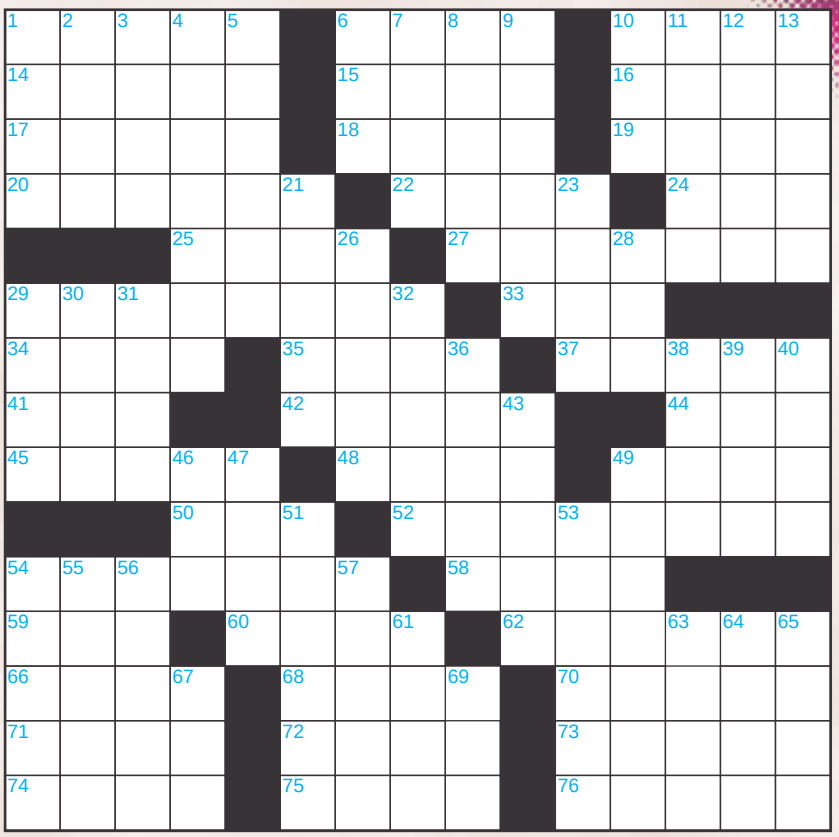
Earlier, a team of researchers in the department of biological services at Purdue, led by Dr. Wen Jiang, had captured a 3D image of a virus at a resolution of 4.5 Å, using a single-particle electron cryo-microscope.

As the use of these techniques become widespread, scientists can see a whole new level of detail in structures, so much so that they can actually trace the polypeptide chain, the backbone of proteins, and "see the tiny gears and levers that allow the proteins to move and interact as they carry out their intricate biological roles."

On the flip side, the electrons that pass through the sample are also useful in providing details about its structure. Biological samples are not as good a candidate as other chemical structures. Scientists at the University of Illinois have used information obtained from transmission-electron microscope to achieve resolution of less than one Angstrom in determining the atomic structure of a cadmium-sulphide nanocrystal, also called a quantum dot.

Electronic and optical properties of these quantum dots depend not only on their surface structure, but also what's happening inside the molecule. Scientists had to combine two sources of information, images and diffraction patterns, taken by the same electron microscope to build the final high resolutions image. Images from the microscope can resolve individual atoms but the structure is shown by the X-ray diffraction of large crystals. Dr. Jian-Min Zuo and colleagues developed a phase-retrieval reiterative algorithm that processed and combined information for two sources to construct the final image, which showed cadmium and sulphide columns with smallest separation of 0.84 Å.

Crossword



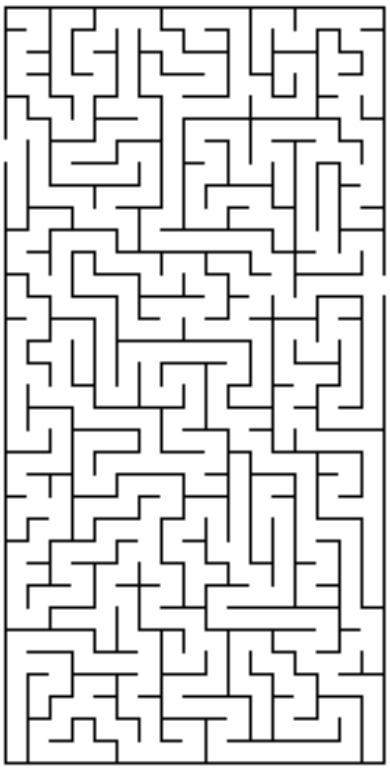
Across

1. Glove Material
6. Engine Revolutions
10. Large, Brightly Coloured Sea Fish
14. Architectural Projection
15. Auditory
16. Final section of musical piece
17. _____ and Joan
18. Pale Brown
19. Gulf V.I.P.
20. Advisories
22. "S.O.S.!"
24. _____ Dee River
25. Part of Eye
27. American Marsupial
29. Pleasant and Friendly
33. Digit of human foot
34. United States Air Force
35. Christmas Season
37. Has Not
41. Small two-winged insect
42. Pigeon's perch
44. Ornamental pond fish
45. Same as fief
48. Diesel fuel
49. Road _____
50. Ashes holder
52. Type of symmetrical knot
54. Utterly evil
58. Deuce topper
59. _____ and Downs
60. Domestic help
62. Chicken
66. Flower
68. Ark builder
70. Spanish male name
71. Cottontail's tail
72. Adorable
73. "Come in!"
74. _____ __ Team
75. Final, e.g.
76. Change, as a clock

Down

1. Fizzy Drink
2. _____ - Altaic Languages
3. Cork's Country
4. Make Report
5. (pl) Hardened Hindwing
6. Fish Eggs
7. Carve in Stone
8. Songbird that Eats Insects
9. Carve or Mould
10. Mozart's "L' ____ del Cairo"
11. Ostentatious Displays
12. "Farewell, mon ami"
13. Sheik's bevy
21. Fortune Teller
23. "Fiddlesticks!"
26. Rotated or Pivoted
28. Ocean
29. Sail too Close to Wind
30. Island
31. Send to the Canvas
32. Born Earlier
36. "Snowy" Bird
38. Epidermis
39. Cancelled
40. Colour with White Added
43. Each
46. Just for _____
47. Gift Tag Word
49. Edge where Sky and Landscape meet
51. Shade
53. Tributary
54. (archaic) Wooded Area
55. Age
56. Main Subject
57. Native American Tribe
61. Computer Info
63. " _____ go!"
64. Arch Type
65. Medicinal Plant
67. Seventh Letter of Greek Alphabet
69. Alter Clothing

Maze



Scramblers

Unscramble each of the clue words,
Copy the circled letters to form mystery words

Theme: Mathematics

CNFNTUIO

GEECATRLN

RUOTDPC

DEGEESR

PIVSETIO

REPBLOM

"Having is not the same as wanting"

M.A. Naeem

"Having is not the same as wanting," goes my favourite line from Mr. Spock of the original StarTrek TV series. The true understanding of this line only unfolds when, after spending so much energy trying to "have", one realizes that it doesn't live up to the intensity of "want".

Our brain is such a wonderful organ that it can create a universe of its own with physical and emotional responses without any actual triggers being present. Our "want" then stays intense, while we keep on "having" one after the other, trying to get as close a match to our "want" as possible.

What am I talking about, you may ask?

Well, I am talking about the three letter word that is at the core of mankind, at the core of life, if you may. Proponents of science say that our universe began with a Big Bang, while religions tell us of another kind of Big Bang that started the expansion of our universe. The big difference is that the second one is a repeat performance and it is going on even right now in some parts of this country and many parts of our world.

The big question is this: can such an act that has been hardwired into our systems, that is essential to the very existence and that is required for the propagation of all life forms, be truly addictive?

Sure, we spend most of our youth thinking about it, planning for it, dreaming about it, and even some of it actually doing it, but does that mean we are addicts.

We spend billions of whatever monetary form you like to think of at its portrayal, at enhancing our ability to "have" it, at showcasing, beautifying, makeup-ing, jewellery-fying, body-enhancing, idolising, and practically worshipping it. Is our obsession with it an addiction, or are we just following the nature's command to survive, just like we eat food to survive and we spend all of our energies in "having" food to eat?

The answer would be "yes" if you ask the Tiger among us. One Wood be considered an addict if one forsakes billions of money units for the thrill of billions of sensory nerves firing with a bang, big or not so big.

It would be an addiction if one can't keep one's Duchovny out of available parking space, even at the risk of losing one's whole life structure, with all the rooms, walls, and yard space. Better yet, can it be that the label "addiction" is just a PR campaign to give a not-so-ordinary Charlie an acceptable excuse to keep that castle intact, or at least with minimal damage? After all, it is not his fault that he has the "want", he is an addict. He has no choice but to "have", or he'll die, even if the dish available at home is chock-full of Bullocks.

Yes, I know, it is not always a "he", sometimes it is a "she", but the idea is the same. Is it an addiction, or is it an excuse to avoid the consequences of getting caught while "having" a different dish than the one waiting for us at home. How many of us have stopped at a Bimbo's place to have a burger before heading home to a usual plate of chicken and rice, or pap and meat? Couldn't we control ourselves from having to feed ourselves in another kraal?

Usually an addiction is for something that is not part of our normal intake, like drugs, or cigarettes, or even tea and coffee. It is very difficult to say that one is addicted to something when it is not a foreign substance. Addiction then depends not on the use of the substance, but on the quantity being imbibed. Since the need or the desire – "want" that is – differs from person to person, along with availability, then the definition becomes very vague. Who is to say what is too much and what is not enough!

Using the food analogy, if you don't have enough food and you are hungry most of the time, then you'll be thinking of the food – any food – all the time. You'll be doing whatever it takes to get enough to fill your belly, even to the point of committing crime.

On the other hand, if food is aplenty, and if different delicious dishes are throwing themselves at you, and you are hungry, which is only natural to get hungry, and the dish you normally eat is not available, and you decide that you can probably get away with "having" it, then, well, the outcome is quite obvious.

Of course, when the dish at home finds out that you turned to a tasty recipe somewhere else, then *mea culpa* has to balance on the fact that you were hungry and couldn't help yourself. You are addicted to food.

Other criterion that comes in handy is that there are always strong withdrawal symptoms that go with any addiction when one tries to give it up. As any married man can tell you, having is not the same as wanting, and it is rather painless to stop "having". One does not even notice it. Worst, one does not even want it. There's usually a game of golf on TV.

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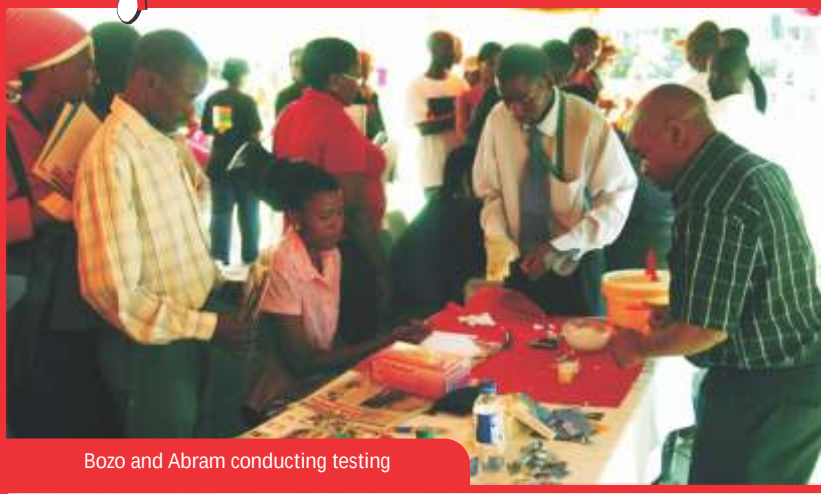
Plot 14397, G/West Industrial Area, Gaborone

Diagnofirm in pictures...

people queeing to get tested



Bozo and Abram conducting testing

Bozo sharing a joke with one of the people being tested

Ms Mbongwe from the UB Environmental Health Department addressing the crowd

The crowd listening attentively

part of the crowd

Bozo and Abram from Diagnofirm following the proceedings at the Cancer Awareness Day

Abram at the Diagnofirm Cytology Department
"...please don't show my wife where I work..."