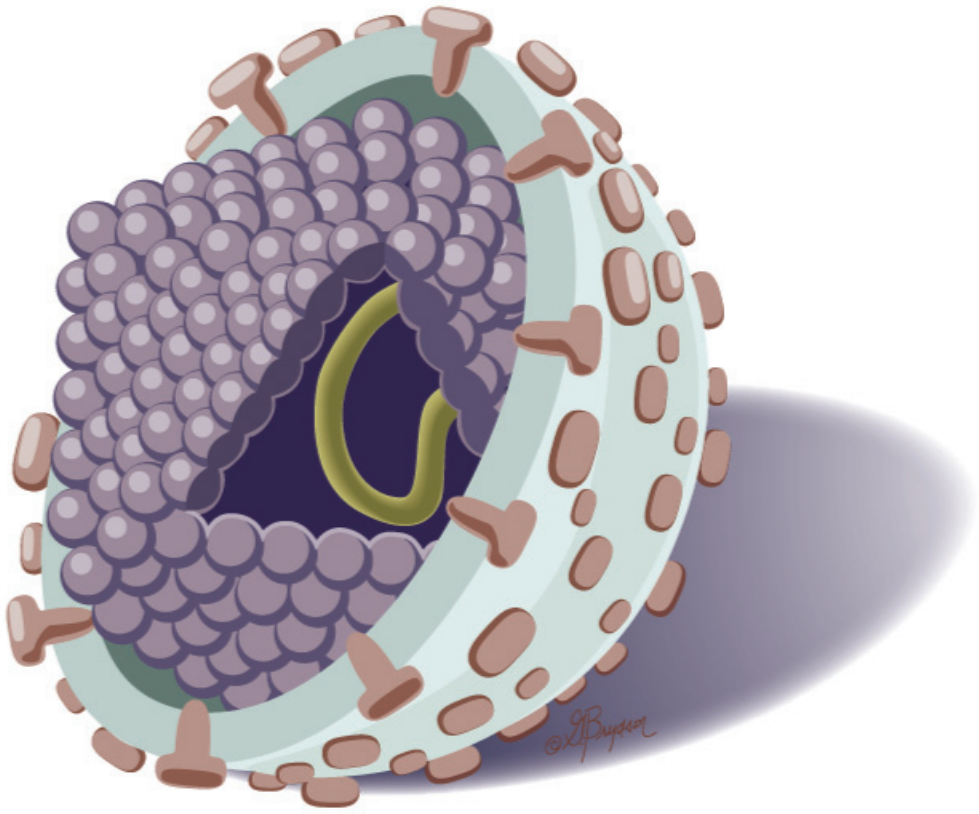
the Scalpel

August 2012

Issue 3

TSOM

Highlights



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The hypertension trip was one of the best things that we could have done for the community. Everyone from SMS had worked with diligence to see this project through, and I'm proud to say that we brought public awareness to more than 200 people in the community of Union, Mayreau, and Canouan. Also I would like to give a special thanks to Polina and Kenny for setting this trip up, it was a great experience for everyone involved.

-- Society of Medicine and Surgery

St. Vincent

Gamal FitzPatrick

New C.K. Greaves Supermarket Opens in Pembroke

The popular chain of supermarkets and businesses owned by C. K. Greaves & Co. Ltd. has now increased by the addition of a new supermarket located at Pembroke, on the southern Leeward side of the St Vincent. The new building features the sleek modern designs by Yoshida Designs of New York and was built using a local contractor, Minors Constructions.

One of the major goals of the supermarket is to give quality service at low cost to the vincentian public. Nigel Greaves, Managing Director of the Company, stated that the company strives always to be the cheapest, and boosts a 90% record of being cheaper than the others. The new supermarket is said to be a great investment that will likely be beneficial to many persons on the leeward side, especially the farmers with whom the company has entered into contracts.

The supermarket was officially opened on Wednesday 27th June 2012. Customers can purchase products at wholesale and retail prices.

The St. Vincent Brewery Limited Drops Coke and Sprite

As of June 30, 2012, The St. Vincent Brewery Limited has discontinued its bottling and distribution of Coca Cola and Sprite in St. Vincent and the Grenadines. This is said to be as a result of end and nonrenewal of a contract between The Coca Cola Company (TCCC) and the St. Vincent Brewery Limited. In 2011, the brewery only supplied a fraction of the number of Coca Cola and Sprite soft drinks that are distributed within the island. The excess demands were supplemented by large quantities of the brands imported from Trinidad and Tobago. The supply of the brands within retail outlets should not be affected by this change, however most import bottles are plastic instead of glass bottles which were used by the brewery.

VINLEC's Preparedness to Manage Disasters Enhanced

The foremost provider of electrical services in the nation, St. Vincent Electricity Services Limited (VINLEC), has enhanced its disaster risk management knowledge and skills by hosting a Basic Disaster Management and Crisis Communication workshop. The workshop was spearheaded by the Caribbean Electric Utility Services Corporation (CARILEC) and was geared towards the proper training the employees of VINLEC. Twenty participants from across the company attended and completed the workshop. The participants examined the main impacts of disasters on the utility sector whilst highlighting risk and vulnerability issues. They also discussed the features of natural and man-made hazards, disaster management concepts and terminologies and emergency communications systems. Notably the participants expressed satisfaction with the outcome, stating that they are better prepared to manage disasters and better understand the role of VINLEC in the National Response Mechanism. The workshop took place from June 6-8, 2012 at VINLEC's Training Room at Cane Hall.

Director of the National Disaster Management Organisation SVG (NEMO) Mr. Howie Prince also attended the workshop. He gave an overview of NEMO and its role as the country's national disaster management agency, and stressed the importance of both entities working together in the preparedness stage. Mr. Prince also assisted in the session which examined the Standard Operating Procedures of VINLEC's Plan.

Overcoming Barriers to Care For Hepatitis C

P. J. Clark and A. J. Muir

Thanks to steady scientific and therapeutic advances related to hepatitis C virus (HCV), now is a time of much optimism regarding the care of HCV-infected patients.[1] Many seminal developments have been documented, and the number of new agents and regimens being studied in clinical trials suggests that gains will continue to be made in the tolerability and efficacy of treatments for HCV infection.[1] These advances raise the hope that we may overcome the barriers created by the relatively poor efficacy and tolerability of peginterferon alfa plus ribavirin, the historical backbone of treatment in hepatitis C. Although optimism is justified, so is some degree of caution, for as treatment improves, the true rate-limiting factor in achieving better outcomes may turn out to be access to diagnosis and treatment.

To better understand progress in the care of patients with hepatitis C, one must consider the populations we treat and the health system context in which we treat them. According to a 2010 strategic report from the Institute of Medicine (IOM),[2] lack of knowledge and awareness on the part of health care providers, persons at risk for infection, health policymakers, and the public contributes to the risk of ongoing transmission and lost opportunities for diagnosis, treatment, and prevention. Although therapy that has limited efficacy and harsh side effects provides minimal incentive for patients and clinicians to pursue diagnosis and treatment, the greatest barrier to treatment is lack of diagnosis: estimates suggest that about half of the approximately 3.2 million Americans infected with HCV are unaware of their infection, and only a tiny fraction are treated (see table).[3,4] At the population level, this low rate of disease detection limits the possibility that new therapies can deliver potential downstream economic and public health benefits of the interruption of increases in HCV-related mortality and in liver transplantation for such complications of HCV infection as end-stage liver disease and hepatocellular carcinoma.

The challenge of improved diagnosis and treatment is made more acute by the disproportionate distribution of the burden of hepatitis C among vulnerable groups. The risk of HCV infection is highest among blacks and Hispanics, people with lower levels of education, and the poor.[4] Analysis of data from the National Health and Nutrition Examination Survey (NHANES) indicates that as compared with non-Hispanic whites, non-Hispanic blacks have nearly twice the odds, and Mexican Americans have more than two and a half times the odds, of having HCV antibodies. In addition, people with a family income below the poverty line had nine times the odds of testing positive for HCV antibodies, as compared with people who had a household income two times the poverty threshold or higher.[4] The IOM's strategy report cites numerous studies indicating that whites are more likely than blacks to be evaluated for HCV infection and to undergo and complete treatment for it, and there are similar disparities with regard to treatment of, and mortality associated with, hepatocellular carcinoma, a major complication of hepatitis C.[2]

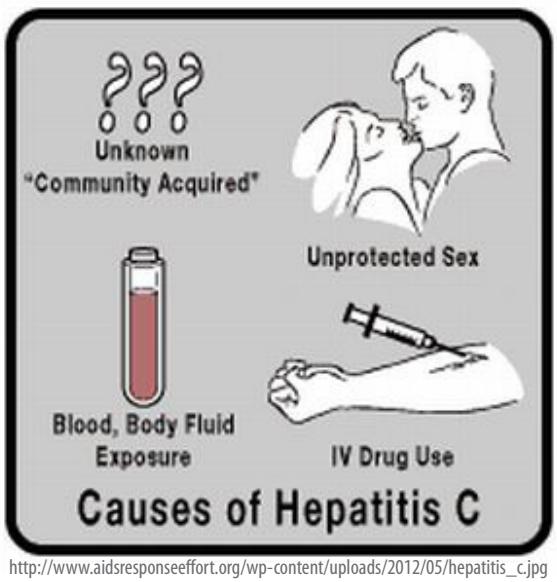
According to another analysis of NHANES data, only marginally more than one third of patients with hepatitis C who were medically eligible for treatment had private medical insurance.[5] In fact, infection with HCV was independently associated with the likelihood of being uninsured, even after adjustment for socioeconomic and demographic factors. Uninsured patients with hepatitis C may also be more likely to seek care in emergency rooms than in clinics or health centers — a finding that has important implications for programs aimed at improving diagnosis and treatment in vulnerable groups.[5]

Taken together, these data suggest that many people with hepatitis C may be at a disadvantage in terms of health literacy, which limits their capacity to successfully engage with health care services to obtain a diagnosis and treatment. Engagement in the health system is a necessary though not sufficient condition for availing oneself of the benefits from recent developments in therapy for hepatitis C.

In response to the IOM's national strategy, the Department of Health and Human Services (DHHS) has developed a road map for education and care, focusing on disparities in health literacy and access to care, to better target programs for prevention, diagnosis, and treatment of viral hepatitis (www.hhs.gov/ash/initiatives/hepatitis). If the Affordable Care Act assists patients in overcoming constraints on access to treatment for hepatitis C, the public health effect may be far more profound than that achievable with improved therapy alone.

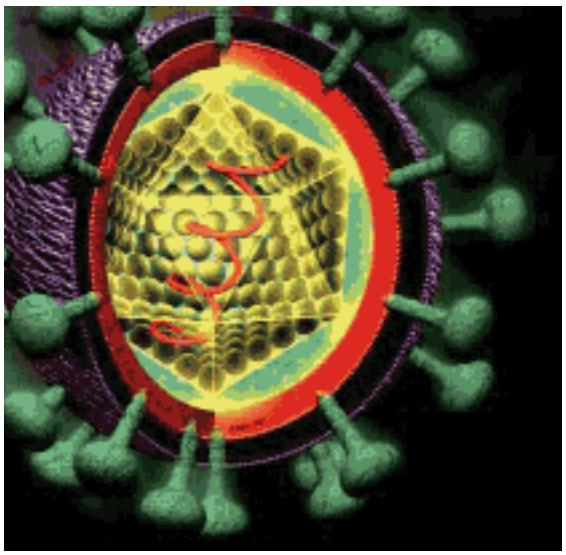
What concrete measures might public health agencies take to improve awareness, diagnosis, and treatment of hepatitis C? Efforts to increase community awareness are enhanced by targeting high-priority populations with culturally sensitive and linguistically appropriate educational messages. Understanding community-specific epidemiologic factors facilitates the creation of programs tailored to settings with a high prevalence of HCV infection (e.g., correctional facilities) or groups with increased risk of transmission (e.g., injection drug users) or high prevalence (e.g., migrants from Egypt and some Southeast Asian countries). A successful example of this approach is Stanford University's Jade Ribbon Campaign to increase the detection of chronic hepatitis B and subsequent vaccination and treatment among Asian and Pacific Islander Americans. Of 1206 adults screened for chronic hepatitis B in its "3 For Life" pilot program, half showed no serologic evidence of immunity, and 85% of these persons were then able to be vaccinated against hepatitis B.

On a population scale, the Centers for Disease Control and Prevention has recently proposed a birth-cohort approach to screening for HCV — testing everyone born between 1945 and 1965 (an age group with increased risk of HCV exposure from the 1960s through the 1980s), rather than following the current risk-based screening recommendations (www.cdc.gov/Hepatitis/HCV/BirthCohortTesting.htm). Improved rates of referral to specialists for treatment depend not only on better patient awareness, but also on improved knowledge among primary care providers, which requires a greater focus on HCV in undergraduate and postgraduate continuing medical education.



http://www.aidsresponseeffort.org/wp-content/uploads/2012/05/hepatitis_c.jpg

Left: Common causes of acquired Hepatitis C infection.



Right: An artist's depiction of the Hepatitis C virus

http://www.topnews.in/files/hepatitis-c.gif

Finally, if such measures successfully increase the rates of HCV detection, clinical questions remain. Do all HCV-infected persons require treatment? Many will not have progressive liver injury leading to cirrhosis, and only a minority will have hepatocellular carcinoma. Should the decision to treat be based on the risk of progressive liver disease or cancer, or simply on the presence of the infection? Historically, histopathological evidence of inflammation or fibrosis from liver biopsy was used to identify candidates for treatment, to improve the risk–benefit ratio associated with poorly efficacious, toxic, and expensive peginterferon alfa plus ribavirin therapy. Future regimens may be more efficacious and eventually less toxic but will surely be even more expensive. What clinical variables or biomarkers are sufficiently sensitive to identify patients at low risk for complications who may not need treatment? Does a more nuanced treatment approach dilute the simple message of "detect and treat," which resonates with many patients, clinicians, and the pharmaceutical industry?

The fragmentation and underfunding of public health services reflect a health system that's poorly positioned to improve the awareness, prevention, diagnosis, and treatment of hepatitis C — the necessary steps to interrupting the progress of this silent epidemic.[2] We are at a critical juncture, determining whether, supported by health care reform, initiatives such as those suggested by the DHHS can translate the rhetoric of health disparities into better programs and outcomes for patients with hepatitis C. If the evolution in service delivery is successful, this may be a watershed moment not only for HCV therapeutics, but also for access to hepatitis treatment, improving care for all Americans infected with HCV.

Hepatitis C offers a window into contentious issues in health care reform. How can therapy be made more accessible, and if it is more accessible, how will we as a community pay for it? At a population level, improving the diagnosis and treatment of HCV infection will be expensive but will avert much illness and death from decompensated liver cirrhosis and hepatocellular carcinoma, the prevalence of which is projected to substantially increase over the next decade, at major cost to the community.[2,3] The possibility of achieving future cost savings, particularly for disadvantaged groups, raises the question: can we afford not to improve the accessibility of treatment for hepatitis C?

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SOURCE INFORMATION

From the Department of Gastroenterology, Duke University Medical Center, and Duke Clinical Research Institute — both in Durham, NC.

LaTonzia Evans

Getting to know Dr. Skelton in Six Questions

Monday, July 30, 2012

Before beginning my interview with Dr. Skelton, we sit down and chat for a few minutes getting acquainted with one another. After learning where I'm from and how first term is going for me, we begin the interview.

The first question I ask is, "What's your favorite color and why?" I have my pen ready for the reply, but Dr. Skelton pondered for a moment before beginning.

With a slight smile he replies, "red is my favorite color because it signifies passion." His smile continues to grow as he explains his answer: "not only romantic passion, but passion for what you want in life. [As for me] I'm passionate about this medical school and the future doctors here."

I smile as I write the response as medicine is an important element that he centers his life around. I continue asking, "What's your fondest memory of medical school?" He chuckles slightly, "A better question probably would've been what my most shocking memory was." He pauses to sip his coffee before continuing. "[My most shocking memory was] the collegial experience of going through medical school especially with the people I liked. Right now, you're in the basic science years, but when you get to the clerkship years you will be the lowest person on the totem pole. You need one another. [It's my fondest memory because] we supported one another, and that makes a difference."

I think about his answer as I apply this notion to my current experience going to the hospital with my rotation group. The support makes a difference because the only people who truly understand our circumstances are the ones standing next to us. I continue with the next question, "How do you think the ACA [Affordable Health Care Act] will affect us as future doctors?" He lights up and immediately responds, "It depends on the November election for President. If it goes as I hope, President Obama will begin in the US what should've been done decades ago, which is to provide universal health care. Up to this point, the United States was the only country not providing some type of health care for all citizens."

After listening to a short story about him using the epidemic of no universal health care in US as the opening speech for sixteen graduating classes, I thought about how this change is going to hopefully make life better for all citizens at home. I change the subject and ask a few questions from students, "As the dean of a Caribbean medical school, how much overlap do you see between our institution and an American medical school?" He pauses momentarily before speaking. "They're basically identical in all aspects except in the third year and fourth year. In these years, many of the students [from our institution] are in different clerkships in many [different] cities. This is the area I must focus on. The plan is to get all the clerkships in a centralized location. This takes more oversight to make it the right quality, and I'm working on that." I nod in appreciation of his future goal and ask, "What is your vision for our institution, Trinity School of Medicine?" With a hearty grin he says, "To be the best we can be." After writing the final answer, I thank him and leave him in his cozy office. Thinking about the interview, I realize Dr. Skelton's goal is very similar to ours. He wants our education to gear us towards our goal... our very tangible goal of becoming successful doctors.

Thomas Peipert

Dark Knight Disaster

The Associated Press. July 20, 2012

AURORA, Colo. — U.S. law enforcement officials have named 24-year-old James Holmes as the suspected gunman in a deadly shooting spree at the premiere of "The Dark Knight Rises" at a suburban Denver movie theatre. Holmes is in custody, and the FBI says there is no indication he has ties to larger international terrorist organizations. Holmes was a neuroscience PhD student at the University of Colorado School of Medicine in Denver but dropped out last month, spokeswoman Jacque Montgomery said. She did not know when he started school or why he withdrew.

Wearing a gas mask, Holmes allegedly set off an unknown gas and fired into a crowded movie theatre at a midnight opening of the new Batman movie in Aurora, Colorado, killing at least 12 people and injuring at least 50 others, authorities said. One of the dead is Jessica Ghawi, a young aspiring sportscaster who last month survived Toronto's Eaton Centre shooting. She wrote about her experience in a blog post dated June 5, 2012. Some of the injured were children, with the youngest a 4-month-old baby who has been released from treatment. Victims were being treated for chemical exposure apparently related to canisters thrown by the gunman.

Moviegoers didn't know what was happening and some thought the attack was part of the show. Then they saw a silhouette of a person in the smoke at the front of the theatre near the screen, pointing a gun at the crowd. "I told my friend 'we've got to get out of here,' but then he shot people trying to go out the exits," Jennifer Seeger told NBC's "Today." She the shooter made his way up the aisle, shooting as he went, saying nothing.Holmes was arrested shortly after the attack at 12:30 a.m. MDT at the multiplex theatre at a mall in Aurora. It was the worst mass shooting in Colorado since the Columbine High School massacre on April 20, 1999. Students Eric Harris, 18, and Dylan Klebold, 17, opened fire at the school in the Denver suburb of Littleton, about 15 miles west of Aurora, killing 12 classmates and a teacher and wounding 26 others before killing themselves in the school's library.

Aurora police spokesman Frank Fania on ABC's "Good Morning America" said he didn't know yet if all the injuries were gunshot wounds. He said some might have been caused by other things such as shrapnel. Officers came running in and telling people to leave the theatre, Salina Jordan told the Denver Post. She said some police were carrying and dragging bodies. Officers later found the gunman near a car behind the theatre. "A gas mask, rifle, handgun at least one additional weapon [were] found inside," he said. The suspect was taken into custody, but no name was released. Police Chief Dan Oates said there's no evidence of any other attackers. There was also no immediate word of any motive. Aurora Police respond to the Century 16 movie theatre early Friday morning, July 20, 2012. Police chief Dan Oates said at least 14 dead and another 50 injured in the Colorado theater shooting. Police searching Holmes's apartment have determined it is "booby-trapped" with what they are calling "very sophisticated" explosives or flammable materials. The police chief said it could take "hours or days" to disarm any devices. The suspect earlier spoke of "possible explosives in his residence," Oates said. He said police also checked for explosives in the parking lot and at the Century 16 theatre and secured those areas.

President Barack Obama said he was saddened by the "horrific and tragic shooting," pledging that his administration was "committed to bringing whoever was responsible to justice, ensuring the safety of our people, and caring for those who have been wounded."

Read more at: http://news.nationalpost.com/2012/07/20/masked-gunman-kills-14-people-at-dark-knight-rises-premiere-in-colorado/

Madison Miller and Sunit Rohant

Psychotic Bath Salts

In modern society, the prevalence of drugs for both therapeutic and recreational uses has reached such a height that it is rare to find a patient who has had no contact with any sort of drug before. The understanding of both drug usage and drug culture is vital for the future of medical professionals.

The recent zombie threat gallivanted by the media in response to both Rudy Eugene's and Karl Laventure's cannibalistic reactions to Bath Salts has resparked the debate on recreational drugs across the nation. Bath Salts (also known as Ivory Wave, Purple Wave, Vanilla Sky, and Bliss) is a designer drug created by illegal street chemists utilizing some of the same ingredients as methylenedioxypyrovalerone (MDPV, or Cloud 9). Newer pyrovalerone derivatives have also been used, and unfortunately there is no way to test for these substances yet.

Typically, the mention of bath salts conjures up images of a relaxing day at the spa surrounded by the pampering of paid professionals. However, these new Bath Salts are not the ingredient of your relaxing bath. The suppliers of these drugs are marketing them in min-marts and smoke shops as the conventional bath salts labeled with 'not for human consumption' in order to avoid any legal repercussions.

Dr. Zane Horowitz, an emergency room physician and medical director of the Oregon Poison Center, describes the experience of taking this drug:

> "Agitation, paranoia, hallucinations, chest pain, suicidality. It's a very scary stimulant that is out there. We get high blood pressure and increased pulse, but there's something more, something different that's causing these other extreme effects. But right now, there's no test to pick up this drug. The only way we know if someone has taken them is if they tell you they have.
>
> The clinical presentation is similar to mephedrone [a chemical found in other designer drugs], with agitation, psychosis, and stimulatory effects. Both of these agents should be of concern, as severe agitated behavior, like an amphetamine overdose, has occurred.
>
> A second concern is the ongoing suicidality in these patients, even after the stimulatory effects of the drugs have worn off. At least for MDPV, there have been a few highly publicized suicides a few days after their use."

New drugs are created constantly, but the ones that resonate are those that result in hospitalizations for its users. Bath Salts are intriguing not only for their destructive power but also for their hints at the zombie apocalypse. It seems like it's time to stock up on supplies and get some pointers from the cast of the Walking Dead.

http://www.webmd.com/mental-health/features/bath-salts-drug-dangers

Electric Carnival

"I think everyone needs to experience Carnival! It was a blast!! You wouldn't believe how much stress you can relieve by throwing paint!"

Madison Miller, J' ouvert 2012

"It was a great experience to be involved in paint throwing and dancing at this year carinval, but whats even better is the pictures of what you don't remember of that night."

Steven Suastegui, J' ouvert 2012

"My favorite term at Trinity is the one with Carnival because the beauty and culture of St. Vincent comes out!"

Ashley Hunsuck, Carnival 2012

"After being peer pressured into attending Vincymas while I was deathly ill, I am glad to say it was probably the best regrettable decision I have made in a very long time. The atmosphere of celebration and revelry felt like a true immersion into Caribbean culture."

Sunit Rohant, Vincymas 2012

"Vibrant, untamed, and exotic. Vincy carnival never ceases to disappoint. As usual it's an experience you can never forget."

Franke Joesph, Carnival 2012

"It was a great experience to be involved in paint throwing and dancing at this year carinval, but whats even better is the pictures of what you don't remember of that night."

Steven Suastegui, J' ouvert 2012

"Mardi Gras looks like a Puritan meeting in comparison. Go. To. Vincymas."

Kellen Hayes, Vincymas 2012

"[Carnival] was all a huge culture shock for me. The music was awesome, food was great, and enjoying the festival with fellow medical students made it completely unforgettable - definitely a once-in-a-lifetime thing."

James Parker, Carnival 2011

"[Vincymas] was a really fun event. It gave us a rare opportunity to experience true Vincy culture with friends. We got matching costumes and danced in the parade through downtown Kingstown."

Shely Ferguson, Vincymas 2012

"One of the best experiences I've had in St.Vincent. Student attendance to this event should be mandatory!"

Daniel Bouchette, J' ouvert 2012

"Vincymas brought out the vibrant colors of St. Vincent, and it was nice to see a good change from the everyday experience of going to town."

Lisa Marcus, Vincymas 2012

"Carnival 2012 was one of the best things I've ever done! I have never felt so beautiful and it was wonderful to see St. Vincent come together. Can't wait to come back to the island some day in the future for another Mas!"

Bianca Ragusa, Vincymas 2012

Boris B. Quednow

Schizophrenic Smokers

Schizophrenia has long been known to be hereditary. However, as a melting pot of disorders with different genetic causes is concealed behind manifestations of schizophrenia, research has still not been able to identify the main gene responsible to this day.

In order to study the genetic background of schizophrenia, the frequency of particular risk genes between healthy and ill people has mostly been compared until now. Pharmacopyschologist Professor Boris Quednow from University Hospital of Psychiatry, Zurich, and Professor Georg Winterer's workgroup at the University of Cologne have now adopted a novel approach. Using electroencephalography (EEG), the scientists studied the processing of simple acoustic stimuli (a sequence of similar clicks). When processing a particular stimulus, healthy people suppress the processing of other stimuli that are irrelevant to the task at hand. Patients with schizophrenia exhibit deficits in this kind of stimulus filtering and thus their brains are probably inundated with too much information. As psychiatrically healthy people also filter stimuli with varying degrees of efficiency, individual stimulus processing can be associated with particular genes.

Smokers process stimuli less effectively. In a large-scale study involving over 1,800 healthy participants from the general population, Boris Quednow and Georg Winterer examined how far acoustic stimulus filtering is connected with a known risk gene for schizophrenia: the so-called "transcription factor 4" gene (TCF4). TCF4 is a protein that plays a key role in early brain development. As patients with schizophrenia often smoke, the scientists also studied the smoking habits of the test subjects. The data collected shows that psychiatrically healthy carriers of the TCF4 gene also filter stimuli less effectively -- like people who suffer from schizophrenia. It turned out that primarily smokers who carry the risk gene display a less effective filtering of acoustic impressions. This effect was all the more pronounced the more the people smoked. Non-smoking carriers of the risk gene, however, did not process stimuli much worse. "Smoking alters the impact of the TCF4 gene on acoustic stimulus filtering," says Boris Quednow, explaining this kind of gene-environment interaction. "Therefore, smoking might also increase the impact of particular genes on the risk of schizophrenia."

The results could also be significant for predicting schizophrenic disorders and for new treatment approaches, says Quednow and concludes: "Smoking should also be considered as an important cofactor for the risk of schizophrenia in future studies." A combination of genetic (e.g. TCF4), electrophysiological (stimulus filtering) and demographic (smoking) factors could help diagnose the disorder more rapidly or also define new, genetically more uniform patient subgroups.

Literature:
Boris B. Quednow et al. Schizophrenia risk polymorphisms in the TCF4 gene interact with smoking in the modulation of auditory sensory gating. In: PNAS, March 26, 2012. DOI: 10.1073/pnas.1118051109

The university psychiatric hospitals of Aachen, Charité Berlin, Bonn, Düsseldorf, Erlangen, Mainz and Mannheim participated in the multi-centric study. The study was funded by the Deutschen Forschungsgemeinschaft (German Research Foundation) as part of the priority program Nicotine: Molecular and Physiological Effects in Central Nervous System (CNS) (SPP1226, WI1316/9-1).

Contact:
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Review

answers on page 14

1. Biochemistry

A 6-year-old boy presents to his pediatrician with skin lesions all over his body. For several years he has been very sensitive to sunlight. Neither the boy's parents nor his siblings have the same skin lesions or sun sensitivity. Biopsies of several of the boy's lesions reveal squamous cell carcinoma. Which mutation would one expect to see in this patient's DNA?

(A) Methylation of the gene
(B) Missense mutation in the gene
(C) Nonsense mutation in the middle of the gene
(D) Point mutation within the enhancer region
(E) Point mutation within the operator region
(F) Point mutation within the promoter region
(G) Thymidine dimers

2. Pathology

A 55-year-old recent immigrant from Taiwan presents to the clinic with a 3- month history of worsening nasal congestion, epistaxis, and recurrent ear infections. Physical examination reveals painless firm lymph node enlargement in the neck. CT of the head reveal a large mass situated in the upper nasopharynx. Biopsy of the lesion shows large epithelioid cells intermixed with numerous infiltrating lymphocytes. The infectious agent directly associated with this patient's pathology is best described by which category?

(A) DNA virus
(B) Eubacterium
(C) Fungus
(D) Mycobacterium
(E) RNA virus

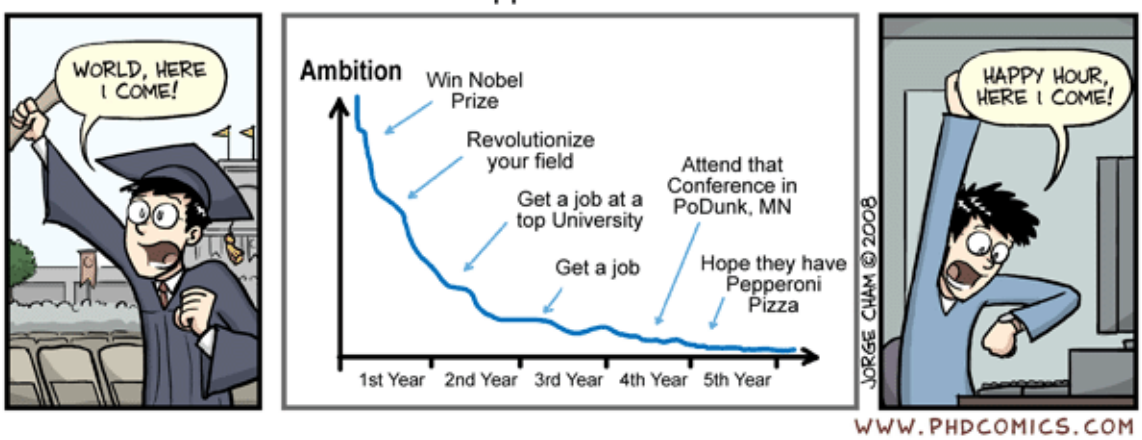
3. Pharmacology

A 24-year-old law student has been experiencing frequent headaches for which he has been taking increasingly large doses of aspirin for 3 months. One night he takes a particularly large dose, becomes confused, and falls into a seizure. He presents to the emergency department with a serum salicylate level of 130 mg/dL. Which of the following is the most appropriate treatment?

(A) Bicarbonate
(B) Glucagon
(C) N-acetylcysteine
(D) Protamine
(E) Vitamin K

Fun

"What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?"



Solutions

1. Biochemistry

The correct answer is G. This patient has xeroderma pigmentosa, an autosomal recessive disease characterized by a defect in excision repair. This disease results in an inability to repair thymidine dimers that can form in the presence of ultraviolet light. This can lead to the development of skin cancer and photosensitivity.
Answer A is incorrect. Methylation of a particular gene does not cause xeroderma pigmentosum.
Answer B is incorrect. A missense mutation does not cause xeroderma pigmentosum.
Answer C is incorrect. A nonsense mutation does not cause xeroderma pigmentosum.
Answer D is incorrect. A mutation in the enhancer region of a gene does not cause xeroderma pigmentosum.
Answer E is incorrect. A mutation in the operator region of a gene does not cause xeroderma pigmentosum.
Answer F is incorrect. A mutation in the promoter region of a gene does not cause xeroderma pigmentosum.

2. Pathology

The correct answer is A. This patient has developed nasopharyngeal carcinoma, a condition common in certain parts of the world, including Asia and Africa. Development of this tumor is always associated with infection by Epstein-Barr virus (EBV), a DNA virus in the herpes virus family. Development of this tumor is believed to be related to a synergistic interaction between EBV and a diet high in carcinogenic nitrosamines (common in foods that has been smoked or preserved). Common symptoms include nasal congestion, epistaxis, ear infections (due to tumor-induced blockage of the Eustachian tubes), and headache.
Answer B is incorrect. Many bacteria are capable of infecting the nasopharynx; however, none are directly associated with malignancy.
Answer C is incorrect. Nasopharyngeal zygomycosis is a condition that could present with these symptoms in an immunocompromised patient. However, biopsy would show fi lamentous nonseptate hyphae and a granulomatous response.
Answer D is incorrect. Although a tuberculoma in the nasopharynx can be confused with a nasopharyngeal tumor, biopsy would show caseating granulomas with multinucleated giant cells.
Answer E is incorrect. Although a retrovirus such as HIV can create an immunocompromised state favoring the development of a malignancy, it is not the direct cause of tumor formation. Lymphomas can be associated with the retrovirus human T-cell lymphoma virus; however, biopsy would show sheets of malignant T lymphocytes typical of this lymphoma. Other RNA viruses are not associated with malignancy.

3. Pharmacology

The correct answer is A. Administration of bicarbonate will alkalinize the urine, thereby allowing the acidic toxin to be excreted and not reabsorbed. Alkalinization of the urine will lead to ionization of acids (such as salicylates) within the renal tubules. In general, charged molecules cannot be reabsorbed, while uncharged molecules are easily reabsorbed from the tubules. Thus, bicarbonate administration is indicated because it promotes "trapping" and hence excretion of salicylate molecules. Note that the concept can only be applied in reverse order to promote excretion of basic drugs: the goal is to acidify the urine so as to promote retention of the charged basic drug molecules within the urine.
Answer B is incorrect. Glucagon is used to treat β-blocker toxicity.
Answer C is incorrect. N-acetylcysteine is used to treat acetaminophen toxicity.
Answer D is incorrect. Protamine is used to treat heparin toxicity.
Answer E is incorrect. Vitamin K is used to treat warfarin toxicity.

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