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Anal HPV infection more likely to persist in gay men compared to heterosexual men

Michael Carter
Published: 03 November 2011

An international team of investigators have found a possible explanation for the higher rates of anal cancer observed in men who have sex with men (MSM) compared to men who have sex with women (MSW). In the December 1st edition of the Journal of Infectious Diseases, researchers from the HIM study report that anal human papilloma virus (HPV) infections were significantly more likely to persist in MSM than MSW.

“Compared with MSM, we consistently observed a lower prevalence, incidence, and persistence of anal HPV among MSW,” comment the investigators.

Cigarette smoking was independently associated with the persistence of the infection in MSM.

Anal cancer can be caused by persistent infection with certain strains of HPV. Overall rates of anal cancer in men are low (approximately 1 per 100,000, but are significantly higher in men who have sex with men (36 per 100,000 before the HIV epidemic).

Prevalence of anal HPV infection alone does not appear to be a sufficient explanation for these different rates of cancer. For instance, observational studies suggest that prevalence of the infection is only four times higher in MSM compared to MSW (47% vs. 12%).

Investigators from Brazil, Mexico and the US hypothesised that the explanation for the higher rates of anal cancer in MSM was the greater persistence of anal HPV infections in MSM compared to more transient infections in MSW.

They therefore designed a prospective observational study involving 156 MSM and 954 MSW. None were HIV-positive.

The patients were screened for HPV infection at baseline and again after six months. Individuals were also asked to complete a questionnaire enquiring about their demographics, sexual behaviour, smoking habits and substance use.

Baseline screening found a similar prevalence of anogenital warts in MSM and MSW (5% vs. 6%). However, MSM were significantly more likely to have anal infection with the cancer-associated HPV-16 strain (10% vs. 3%).

At the six-month follow-up visit, incidence of new HPV-16 infections was 6.5 times higher in MSM than MSW (5 per 1000 person months vs. 0.7 per 1000 person months).

Analysis individuals with type-specific anal HPV infection at baseline showed that these infections persisted in 32% of MSM but in only 4% of MSW.

Moreover, MSM were more likely to experience persistence of infection with multiple cancer-associated HPV strains than MSW (16% vs. 2%, p < 0.001).

A total of eleven MSM had anal HPV-16 infection at baseline and three (27%) had cleared the infection by the six-month visit. In contrast all 21 MSW with anal HPV-16 at the start of the study had cleared the infection at the time of follow-up.

“These findings support our original hypothesis that anal HPV would be transient among MSW and more persistent with MSM,” write the authors.

Cigarette smoking significantly increased the risk of anal HPV persistence for MSM (PR = 1.73; 95% CI, 1.19-2.50).
“The association between smoking and anal carcinogenesis is plausible, given the potential for immune dysregulation and increased DNA mutations in anogenital epithelium,” comment the researchers.

They conclude: “Data in the current study begin to illustrate starkly different natural histories of anal HPV among MSM and MSW that helps explain the disparate anal cancer incidence among these groups observed in Western countries.”

However, as only a small number of MSM were enrolled in the study they call for further research to validate their findings.

Reference

Rates of pneumococcal disease remain high in patients with HIV
Michael Carter
Published: 07 November 2011
Overall incidence of invasive pneumococcal disease is approximately 20 times higher in patients with HIV compared to the general population, according to UK research published in the online edition of AIDS. Even in patients with a CD4 cell count above 500 cells/mm³ rates of the disease were seven times higher than those seen in HIV-negative individuals.

Risk factors for invasive pneumococcal disease included older age, a low CD4 cell count and not taking HIV therapy. The researchers also found that a newer vaccine that is effective against 13 pneumococcal serotypes (PCV13) would provide greater levels of protection for patients with HIV than the vaccine currently in use.

“The risk of invasive pneumococcal disease among HIV-positive adults remains elevated compared to the general population even among those with higher CD4 and receiving antiretroviral therapy,” comment the researchers.

They recommend that a diagnosis of invasive pneumococcal disease in any adult aged 15-44 in the United Kingdom should trigger the offer of an HIV test, due to the elevated risk in people with HIV infection. Testing adults diagnosed with pneumococcal disease for HIV could help to identify people otherwise unaware of their HIV status.

Patients with HIV are especially susceptible to pneumococcal infection. The immune restoration that accompanies successful antiretroviral therapy can provide protection against pneumococcal disease. Studies conducted in the US have shown a decline in incidence of the disease since effective HIV treatment became available.

However, these studies involved patients with lower CD4 cell counts. Wider data on the incidence of invasive pneumococcal disease in HIV-infected individuals is lacking.

UK investigators therefore analysed the records of 63,109 adults who received HIV care between 2000 and 2009. They calculated the incidence of invasive pneumococcal disease in these patients which was then compared to the rates observed in the general population. Analyses were conducted to determine the risk factors for the disease. The investigators also assessed the impact of PCV7 vaccination programmes on the prevalence of Streptococcus pneumoniae serotypes.

Overall, 951 patients developed invasive pneumococcal pneumonia in the period of analysis. The disease occurred in 43 (5%) of individuals. A fifth of patients had an AIDS diagnosis and 13% had died by the end of 2009. The median time between the detection of the disease and death was 178 days, but 28% of deaths occurred within the first month after diagnosis.

A total of 136 individuals (14%) were unaware of their HIV status at the time pneumococcal disease was diagnosed.

“We suggest that the offer and recommendation of HIV tests should be adopted for adults aged 15-44 who present with invasive pneumococcal disease regardless of clinical presentation, especially where no other risk factors for IPD are found,” write the authors.

Average annual incidence of invasive pneumococcal disease was 245 cases per 100,000, approximately 20 times higher than that seen in the general UK population.

Incidence differed according to age and was 246 cases per 100,000 among patients aged 15 to 44, approximately 50 times higher than the rate observed in HIV-negative individuals, and 232 cases per 100,000 for patients aged between 45 and 64, some 25 times than the rate in the general UK population.
Rates of the disease were high in patients with a low CD4 cell count (below 200 cells/mm$^3$ = 563 cases per 100,000 vs. 140 cases per 100,00 for individuals with a CD4 cell count above 200 cells/mm$^3$; p < 0.001).

The highest incidence of the disease was seen in individuals with a low CD4 cell count who were not receiving HIV treatment (1,685 cases per 100,000).

Rates of invasive pneumococcal disease were significantly lower in patients taking antiretroviral therapy who had a CD4 cell count above 500 cells/mm$^3$ (71 cases per 100,000; p < 0.001). Nevertheless, incidence of the disease was still almost seven times higher than the rate seen in the general population.

The 951 patients who developed the disease were matched with 3,804 HIV-positive controls without identified invasive pneumococcal disease. Significant risk factors for the disease were older age – 65 years and above (adjusted odds ratio [aOR] = 3.53; 95% CI, 1.55-8.04); a CD4 cell count nadir below 200 cells/mm$^3$ and between 201-349 cells/mm$^3$ (aOR = 2.61; 95% CI, 1.85-3.70 and aOR = 1.77; 95% CI, 1.30-2.41 respectively); and not taking HIV therapy (aOR = 8.40; 95% CI, 6.75-14).

“Our study underscores the importance of early HIV diagnosis and the protective effect of antiretroviral therapy on invasive pneumococcal disease co-infection,” comment the investigators.

In 2009 the proportion of disease episodes covered by the PCV7 vaccine was 23%. However, a much higher proportion of cases – 61%—were covered by the recently developed PCV13 vaccine.

“Our study provides evidence for policies regarding the use of the newly available PCV13 in HIV-positive adults for their direct protection,” note the authors.

Reference

Bill Plaschke

**Magic Johnson remains a living symbol of hope**

Twenty years after contracting the virus that causes AIDS, the former NBA great devotes much time and effort to raise money for research and is an inspiration to many.

Magic Johnson has finished giving a speech in a high school gymnasium when he asks the students if they have any questions.

A girl shyly raises her hand and moves to the microphone.

"I don't really have a question," she says. "I just want to know if I can come up there and give you a hug."

Within moments, the entire student body descends upon Johnson, grabbing his massive hands, clinging to his broad shoulders, embracing him from to shoes to smile, covering his massive body with admiration and love.

"And to think, 20 years ago, some people were afraid to touch me," Johnson says.

Where were you? It was 3 p.m. on the afternoon of Nov. 7, 1991, and if you lived in Los Angeles, you know where you were.

It was our Kennedy assassination moment, our Challenger space shuttle moment, a moment when the Southland lost its sports innocence.

Where were you? I was home on vacation after spending the summer covering the Dodgers for this newspaper. I was watching television while my two young children played in the background. Soon they were crying because their father was crying, and at the time I didn't even know Magic Johnson.

The greatest Laker ever announced he was retiring at age 32 because he had contracted one of the most awful diseases imaginable.

"Because of the HIV virus that I have obtained, I will have to retire from the Lakers today," Johnson said in a packed room at the Forum.

We shuddered. We froze. Then we called everyone we knew, and into the phone together, all of us at once, we screamed.

Did the most alive athlete in the history of Los Angeles really just announce he was dying?

At the time, it was assumed that everyone who had the HIV virus would eventually contract AIDS, which meant Magic Johnson would be gone in 10 years. Those were the statistics. That was the reality.

There was only one smile at the news conference, only one mention of hope. It came from Johnson himself, and we pitied him for it.

"I plan to go on living for a long time," he said, and you probably did not believe him.

We did not know. How did he know?
Monday is not the 20th anniversary of a death, but perhaps the most stirring rebirth in the history of American sports.

Twenty years after contracting a disease that was supposed to kill him, Magic Johnson is killing the disease by using his celebrity to raise millions for AIDS research.

Twenty years after disappearing from a basketball court where he had won five NBA championships, Magic Johnson has made an even bigger impact on the rest of the world, using his smarts to invest millions into the inner city through his businesses.

Twenty years later, there are many people in this country who consider Magic Johnson to be one of our greatest sports figures even though they never saw him play and know little about sports. Who else has such stature? Jackie Robinson? Muhammad Ali? Who else?

"I have to tell you, I'm proudest of my life off the court," Johnson says. "There will always be great basketball players who bounce that little round ball, but my proudest moments are affecting people's lives, effecting change, being a role model in the community."

Twenty years after the announcement, I am reminiscing with Johnson about his wondrous journey from darkness into light, and suddenly he wants to make another announcement.

"We're on the verge of opening a seventh AHF Magic Health Clinic," he says, referring to his AIDS Healthcare Foundation-sponsored storefronts. "All these people all over the country can come in and get their HIV meds for free. Can you imagine?"

Honestly? No, I never imagined any of this. Did anybody but him?

Perhaps the most amazing thing about the Magic Johnson HIV announcement wasn't the term "HIV," but the word "announcement."

He didn't have to announce it. He didn't have to tell anybody, ever. He could have retired under the guise of a neck injury that put him in danger of paralysis. He could have said he was retiring because of family issues.

Only his doctors knew of his HIV, and they were silenced by patient confidentiality laws. If it never became AIDS, who would ever know?

The man who made what still might be the most unsettling admission in sports history never had to say anything.

"No, I didn't, and I thought of that," Johnson says. "I thought a lot about that."

He says he thought of the prejudices against people with HIV. He thought of the slams and the slurs and the rumors about his personal life. He said that after the diagnosis he drove around town having living nightmares.

"There was going to be a backlash, and it was going to be bad, and I knew it," he says.

But he also knew of Elizabeth Glaser, the HIV-positive wife of actor Paul Michael Glaser. Despite being in the public eye, Glaser became a leading AIDS activist before her death in 1994. Johnson saw her bravely fighting against the disease from her Hollywood pulpit, so he called her several times for advice.

"She told me that what this disease needs is a face, and that I could be that face," he recalls. "She told me I could save people's lives. I thought about it, and she was right."

So, despite living in an environment in which most athletes hide even the tiniest of rashes, Johnson decided to publicly admit that he was suffering from the most denounced of illnesses, an illness he contracted by having sex with multiple partners, an illness that could have been avoided.

Magic had the courage to announce he was not magic, which was probably the most magical thing of all.

"I knew I was going to suffer," he says. "But if this could help someone else who was suffering, then I would do it."

We cried for a week. Johnson says he cried twice.

He cried when he told his wife, Cookie, about the disease, tears of shame for his actions, tears of fear for the health of Cookie and their unborn son, tears of unfound dread that she would leave him.

He cried later after he told his teammates, tears that he would never again share the joy of playing the game he loved with men who had become like family.

After that devastating farewell in the bowels of the Forum locker room, he never cried again.

"I was too busy to cry," he says. "I had a life to lead."

Twenty years ago, when the furor died, that life wasn't so easy.

"Some people dissed me, didn't like me, judged me. They felt like I wasn't the same Magic, that I was this bad guy," he recalls.

He kept playing basketball, turning an honorary appearance into an MVP award at the 1992 NBA All-Star game. Then he played on the U.S. Dream Team in that summer's Olympics, and slowly became
empowered to try a comeback. That comeback was aborted, however, when several players, most notably Karl Malone and Mark Price, said they did want to play with him for fear of catching HIV from his infected blood.

"I didn't understand how I was good enough to play with these guys at the Olympics, but suddenly wasn't good enough to play with them during an NBA season," recalls Johnson. "It really hurt."

After a brief stint as Lakers coach, Johnson returned to the court one last time in the final 32 games of the 1995-96 season before retiring again.

So many years later, he has but one regret about his playing career, but it's a big one.

"If I had to do it all over again, I wouldn't have retired in the first place," he says. "There were so many unknowns about the disease, about my immune system. I didn't have a choice at the time. If only I knew what I know today."

Three pills, twice a day.

You want to know how Magic Johnson knows today? It's exercise and faith and three pills twice a day. I beg him to give me the name of the three pills. He says everyone asks, but his doctors have sworn him to silence for the sake of those who might try to use those three pills to self-medicate.

"It's three pills that anyone can get; they are affordable and available for everyone. But just because it's my mix doesn't mean it's your mix," Johnson says.

Three pills now, down from as many as 15 pills in the beginning, and Johnson says not once has his body betrayed him. His T-cell count remains good. He is not getting any sicker. The demon remains silent.

"I'm not cured, but the HIV is asleep deep in my body," he says. "Every day, I just do what I'm supposed to do. The best doctors and medicine in the world can't save you if you don't do what you're supposed to do."

Recent advancements in treatment have reduced the AIDS death rate by 80%, and newly diagnosed AIDS patients now have a life expectancy of 20 years. But have we all agreed now that Magic just might live forever?

Twenty years later, thinking back to when nobody wanted to touch him, Johnson remembers who did.

He says he will never forget how, instead of leaving him, Cookie prayed with him and vowed to help him fight through it. They remain a strong couple today. He says he will never forget the hugs given to him by everyone from Jerry Buss to Jerry West to Pat Riley.

"I want to tell everyone, it's not just you, you need a great support system to survive things like this."

Twenty years later, the death sentence has become life affirming, even amid the echoes of the crude sentence by which some in the world still define him.

I thought you would be dead.

This is one of the most awful things one person can say to another, a statement completely lacking in faith and wholly devoid of hope. Yet, Johnson has a magic response to the dozens of people in the last 20 years who have had the nerve to say exactly that to his face.

"I'll hug them," Johnson says. "And I'll tell them, 'Man, I'm just glad I'm here.' "

**Product information for raltegravir updated to warn of Stevens Johnson syndrome and hypersensitivity reaction**

Michael Carter
Published: 10 November 2011

Product information for the HIV integrase inhibitor raltegravir (Isentress) has been updated in the US.

The “Warnings and Precautions” section now cautions that rare cases of Stevens-Johnson syndrome, a severe and potentially life-threatening skin reaction, have been associated with the drug, as have hypersensitivity reactions.

The updated product information was released by the Food and Drug Administration on November 2nd.

Patients are advised to contact their doctor immediately if they develop a rash.

Individuals should stop taking raltegravir at once and seek medical attention if this rash is accompanied by any of the following symptoms:

- Fever.
- Feeling generally unwell.
- Extreme tiredness.
- Aching in muscles or joints.
- Blistering.
- Mouth ulcers or lesions.
- Inflammation of the eyes.
- Swelling of the eyes, lips or mouth.
- Facial swelling.
- Breathing difficulties.
- Yellowing of the skin or eyes.
- Dark urine.
- Pale stools.
- Nausea.
- Vomiting.
- Loss of appetite.
- Pain, aching or sensitivity on the right hand side, below the ribs.

Individuals experiencing these symptoms will be closely monitored and appropriate therapy will be initiated if necessary.

**HIV Vaginal Gel Nets Inaugural African Science Prize**

by John Bohannon on 9 November 2011, 4:49 PM

The development of a vaginal gel that can cut a woman’s risk of HIV infection by over 50% has been one of the few unqualified victories amid a decade of setbacks in HIV/AIDS research. Tomorrow, the husband-and-wife team of researchers who proved the gel's effectiveness will receive the inaugural Olusegun Obasanjo Prize from the African Academy of Sciences (AAS) at a ceremony in Nairobi, Kenya.

"Quarraisha and I are humbled and honored to be the recipients," South African epidemiologist Salim Abdool Karim told ScienceINSIDER, referring to his wife, Quarraisha Abdool Karim. "Women bear the brunt of the HIV epidemic in southern Africa. Tenofovir gel is the first HIV prevention technology to empower them to directly control their risk of HIV infection."

The prize is named for the former president of Nigeria. Malik Maaza, a physicist at the iThemba LABS—National Research Foundation of South Africa and fellow of the AAS, says that Obasanjo put up $5 million of his own money and that his gift "was highly scrutinized by noble spirits and capable senior members of the AAS before acceptance." The $5000 cash award carries the added significance of being a science prize by and for Africans, he says.

November 10, 2011

**Hepatitis C Surpasses HIV as Cause of Death in U.S.**

It's official. Chronic hepatitis C virus (HCV) infection is associated with more deaths than HIV infection, according to sobering new data presented by the U.S. Centers for Disease Control and Prevention (CDC) on Tuesday, November 8, at the 62nd annual meeting of the American Association for the Studies of Liver Diseases (AASLD) in San Francisco.

The discouraging findings, presented by Scott Holmberg, MD, MPH, chief of the CDC’s Division of Viral Hepatitis Epidemiology and Surveillance Branch, come from data involving 21.8 million deaths reported to the National Center for Health Statistics between 1999 and 2007. The only cases included in the analysis involved reports that specified HIV, AIDS, HCV or hepatitis B virus (HBV) infection as possible contributors to the deaths.

Encouragingly, death rates associated with chronic HBV infection—a major cause of liver failure and liver cancer—remained relatively flat between 1999 and 2007. In 2007, for example, about 1,800 U.S. residents died of HBV-related complications, which translated into less than one chronic hepatitis B-attributable death per 100,000 people in this country.

Death rates related to HIV infection continue to fall. Whereas HIV contributed to 6 per 100,000 deaths in 1999, the rate dropped to less than four per 100,000 deaths in 2007.

Hepatitis C–related deaths have increased sharply, Holmberg’s team reported. Whereas HCV contributed to roughly 3 per 100,000 deaths in 1999, the HCV-related death rate exceeded 4 per 100,000 people in the United States by 2007.

With respect to crude numbers, roughly 12,700 HIV-related deaths were reported to the National Center for Health Statistics in 2007. More than 15,000 HCV-related deaths were reported to the center that year.
Most viral hepatitis deaths occurred in people in the prime of their lives. About 59 percent of people who died of complications related to hepatitis B were between the ages of 45 and 64. The impact of chronic hepatitis C was even more substantial—roughly 73 percent of the deaths related to HCV were in baby boomers.

Not surprisingly, death rates were highest among certain populations. For example, people coinfected with both HBV and HCV faced a 30-fold increase in the risk of death from liver disease or related complications. Alcohol abuse was associated with a four-fold increase in the risk of death. Coinfection with HIV nearly doubled the risk of death from HBV-related complications and quadrupled the risk of death from HCV-associated liver disease.

“[Achieving] declines in mortality similar to those seen with HIV,” Holmberg’s group concluded, “will require new policy directions and commitment to detect and link infectious persons to care and successful treatment.”

**National Study Finds Widespread Sexual Harassment of Students in Grades 7 to 12**


Nearly half of students in grades seven-12 reported experiencing sexual harassment in the 2010-11 school year, according to a survey of a nationally representative group of 1,965 students. Of those harassed, 87 percent experienced negative effects such as absenteeism, poor sleep, and stomachaches.

“It’s pervasive, and almost a normal part of the school day,” said study co-author Catherine Hill, research director of the nonprofit American Association of University Women, which published the report, “Hostile Hallways: Bullying, Teasing, and Sexual Harassment in School.”

Overall, 48 percent said they experienced harassment, like unwelcome comments or jokes, inappropriate touching or sexual intimidation. Forty-four percent said they were harassed “in person,” while 30 percent reported online harassment.

More girls said they were harassed than boys (56 percent vs. 40 percent), with 52 percent reporting “in person” harassment and 36 percent online. Of boys, 35 percent reported “in person” harassment and 24 percent online.

The most common experience was unwelcome sexual comments, gestures or jokes (girls 46 percent, boys 22 percent). Unwelcome touching or forced sexual activity was reported by 13 percent and 3.5 percent of girls, respectively, and 3 percent and 0.2 percent of boys. About 18 percent of both boys and girls reported being called gay or lesbian in a negative way.

Experienced as “worst” for boys was being called gay, whereas for girls it was “unwelcome sexual comments, jokes or gestures to you or about you.”

Half of those harassed did nothing. Just 9 percent reported it to an adult at school, and 27 percent discussed it with a family member (32 percent of girls, 20 percent of boys).

Some schools have found that communicating with students about responding to sexual harassment reduced the problem, said report co-author Holly Kearl.

To view the report, visit: http://www.aauw.org/learn/research/upload/hostilehallways.pdf.

**Baseline Correlates of Inconsistent and Incorrect Condom Use Among Sexually Active Women in the Contraceptive CHOICE Project**

*Sexually Transmitted Diseases Vol. 38; No. 11: P. 1012-1019*, (11..2011) Shirley L. Shih; Chelsea A. Kebodeaux; Gina M. Secura; Jenifer E. Allsworth; Tessa Madden; Jeffrey F. Peipert

The researchers wrote that while condoms must be used consistently and correctly to provide protection against STIs and pregnancy, “a significant proportion of couples in the United States fail to do so.” The team undertook the current study to determine the demographic and behavioral correlates of inconsistent and incorrect condom use among sexually active women who use condoms.

The authors analyzed baseline data from a prospective cohort of sexually active condom-using women in the Contraceptive CHOICE Project (n=2,087) using self-reported demographic and behavioral characteristics. Poisson regression determined the relative risk of inconsistent and incorrect condom use after adjusting for variables significant in univariate analysis.

Forty-one percent (n=847) of the women reported inconsistent condom use; 36 percent (n=757) reported incorrect condom use. A higher number of unprotected sex acts was most strongly associated with reporting 10 or more sex acts in the past 30 days, younger age at first intercourse, less perceived willingness of partner to use condoms, and lower condom use self-efficacy. Incorrect use of condoms was
associated with reporting 10 or more sex acts in the past 30 days, greater perceived risk for STIs in the future, and inconsistent condom use.

“Inconsistent and incorrect condom use is common among sexually active women,” the authors concluded. “Targeted educational efforts and prevention strategies should be implemented among women at highest risk for STIs and unintended pregnancies to increase consistent and correct condom use.”

**Fundamental Discovery Casts Enzymes in New Light**

ScienceDaily (Nov. 9, 2011) — A tree outside Oak Ridge National Laboratory researcher Pratul Agarwal's office window provided the inspiration for a discovery that may ultimately lead to drugs with fewer side effects, less expensive biofuels and more.

Just as a breeze causes leaves, branches and ultimately the tree to move, enzymes moving at the molecular level perform hundreds of chemical processes that have a ripple effect necessary for life. Previously, protein complexes were viewed as static entities with biological function understood in terms of direct interactions, but that isn’t the case. This finding, recently published in *PLoS Biology*, may have enormous implications.

"Our discovery is allowing us to perhaps find the knobs that we can use to improve the catalytic rate of enzymes and perform a host of functions more efficiently,” said Agarwal, a member of the Department of Energy laboratory's Computer Science and Mathematics Division.

Making this discovery possible was ORNL's supercomputer, Jaguar, which allowed Agarwal and co-author Arvind Ramanathan to investigate a large number of enzymes at the atomistic scale.

The researchers found that enzymes have similar features that are entirely preserved from the smallest living organism—bacteria—to complex life forms, including humans.

"If something is important for function, then it will be present in the protein performing the same function across different species," Agarwal said. "For example, regardless of which company makes a car, they all have wheels and brakes."

Similarly, scientists have known for decades that certain structural features of the enzyme are also preserved because of their important function. Agarwal and Ramanathan believe the same is true for enzyme flexibility.

"The importance of the structure of enzymes has been known for more than 100 years, but only recently have we started to understand that the internal motions may be the missing piece of the puzzle to understand how enzymes work," Agarwal said. "If we think of the tree as the model, the protein move at the molecular level with the side-chain and residues being the leaves and the protein backbone being the entire stem."

This research builds on previous work in which Agarwal identified a network of protein vibrations in the enzyme Cyclphilin A, which is involved in many biological reactions, including AIDS-causing HIV-1. While Agarwal sees this research perhaps leading to medicines able to target hard to cure diseases such as AIDS, he is also excited about its energy applications, specifically in the area of cellulosic ethanol. Highly efficient enzymes could bring down the cost of biofuels, making them a more attractive option.

**Journal Reference:**


**Scientists Defuse the 'Vietnam Time Bomb': How Bacterial Pathogen Causes Deadly Tropical Disease Melioidosis**

ScienceDaily (Nov. 10, 2011) — New findings are published on 10 November 2011 in the journal Science and show how a toxin produced by the bacterium *Burkholderia pseudomallei* kills cells by preventing protein synthesis. The study, led by the University of Sheffield, paves the way for the development of novel therapies to combat the bacterium which infects millions of people across South East Asia and Northern Australia.

Using intense X-rays at Diamond Light Source, the UK’s national synchrotron facility, and at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France, the research team solved the structure of a protein from *Burkholderia*, the function of which was initially unknown.

"The information gathered from the structure suggested that the protein was a previously unsuspected toxin and sparked a search for its mode of action. This eventually led to the discovery of how it prevents human cells from making proteins and helped us to understand how it causes cell death,” says research lead Professor David Rice from the Department of Molecular Biology and Biotechnology at the University of Sheffield.
Melioidosis, along with HIV and tuberculosis, is one of the top three causes of death by infectious disease in parts of South East Asia and arises from infection by the bacterium which thrives in water and warm, moist soils and can enter the body through the lungs or through open wounds.

It causes either an acute form of the disease which presents immediately upon infection, or it can lay dormant in the body emerging many years, and often decades, later. In the acute form of the disease, even with a long course of treatment, mortality rates in endemic areas can be as high as 40 per cent. With a wide range of symptoms, melioidosis can be difficult to diagnose, hampering medical intervention.

"This disease is an everyday reality for many people living in the endemic areas and our findings will allow us to test if an inactivated toxin might be effective as a component of a vaccine," says Professor Rick Titball, a member of the team from the University of Exeter.

The delayed action of the bacteria has led to it being dubbed the `Vietnam time bomb´ following the recognition that many US military personnel who served in Vietnam have been infected. "Now that we know of the existence of this toxin it opens up opportunities for the development of novel drugs that could block its effects," says University of Sheffield Professor Stuart Wilson.

The study involved a consortium of UK scientists from the University of Sheffield, the University of Exeter, Diamond Light Source and the Defence Science and Technology Laboratory at Porton Down. European and international partners included: the European Synchrotron Radiation Facility (ESRF) in Grenoble, France; Universiti Kebangsaan Malaysia; the Malaysia Genome Institute; DSO National Laboratories, Singapore, and the Genome Institute of Singapore.

Kevin van Cauter, HE Advisor with the British Council, commented: "We are thrilled that PMI2 funding supported this international collaboration and are excited by the potential impact of the work."

These groups now plan to seek funding to continue the work and investigate potential applications of the toxin to fight other diseases, such as cancer, where it might usefully be employed in targeted therapies to prevent the proliferation of cancer cells.

Universities Raising Awareness About Prevalence of Sexually Transmitted Infections

With certain STDs rising among Canada’s college-age population, most universities are providing some type of sex education, including lectures and workshops arranged by administrators, student groups or both.

Chlamydia cases among Canadians ages 20-24 rose from about 620 per 100,000 population in 1991 to almost 1,374 per 100,000 in 2009, the Public Health Agency of Canada reported last month. Gonorrhrea infections grew from 100 cases per 100,000 to 145 per 100,000 for the same age group and timeframe. Less intrusive but more effective testing might be partly responsible for the increase in detected cases, the agency said.

The University of Prince Edward Island Student Health Center has seen an increase in chlamydia cases, said the clinic’s Dr. David Reid. The STD is on the rise across the province.

For the past two years, Reid has collaborated with students on a drive to encourage STD testing at the clinic. This year, the effort included advertising on social media networks such as Facebook and Twitter.

The University of Toronto-Mississauga sex education center’s peer counselors offer sexual health advice and informational resources. The program is a useful alternative for students who may shy away from university-hosted STD clinics, said Ziadanne Lewis, who leads the center.

Working with the school to raise STD awareness, the Trans, Bi, Lesbian, and Gay Allies (TBLGA) group at York University in Toronto invites outside speakers for informal talks two to three times a year. York’s health education team also answers questions about sex and relationships at an event held several times a month.

"It’s easy to hit the students who are here, who are participating in groups,” said Catherine Tsouvaltsidis, TBLGA’s external coordinator, but harder to reach the commuters who comprise the majority of York’s student population.

Malawi Sex Workers Sue Government After Forced HIV Test

Fourteen Malawian prostitutes are suing the government after being forced to undergo HIV testing as part of their arrest process, a high court official in the administrative capital Lilongwe said Sunday.

When the women were arrested for prostitution in 2009, the police officer handling the case and a district health officer for Mwanza in southern Malawi "subjected us to a forced HIV test without our
informed consent ... this decision was illegal," according to the sex workers’ affidavits. A magistrate court in Mwanza "publicly disclosed in a court room the results of our mandatory HIV tests, thereby violating our right to privacy and dignity," they said. A judicial review was filed the year of the women’s arrest, but the court only gave consent to proceed this year, according to the official.

The prostitutes, all of whom tested HIV-positive, were charged with trading in sex while having an STD, fined $7 and released. In court, police said testing the women was part of the investigation. A preliminary hearing on the action is scheduled for Dec. 14.

HIV infection rates among prostitutes in Malawi range from 70 percent to 80 percent, health officials report. Roughly 14 percent of the country’s 13 million people are HIV-infected, data indicate. Malawi has about 90,000 new infections annually, mostly among young people and women, according to UNAIDS.

Discordant Couples?
Published on Tuesday, 01 November 2011 00:00
Written by Liz Highleyman
Treating the HIV positive partner in serodiscordant couples can decrease the risk of transmitting the virus, but the extent of the reduction will likely vary from country to country based on population size, HIV prevalence, and number of discordant couples, according to a mathematical model study described in the October 11, 2011, advance online edition of AIDS.

Wafaa El-Sadr from Columbia University, and Sally Blower and Brian Coburn from the UCLA Center for Biomedical Modeling developed mathematical models to predict the reduction in HIV incidence and the number of infections that could be prevented if HIV positive partners in mixed-status couples started antiretroviral therapy (ART) upon diagnosis.

As reported this summer, the HPTN 052 study showed that couples in which the positive partner started immediate ART had a 96% lower risk of HIV transmission compared with those who delayed treatment until their CD4 T-cell count fell below 250 cells/mm3.

In the present analysis, the investigators used demographic and epidemiological data from Ghana, Lesotho, Malawi, and Rwanda to establish parameters for the model, assuming ART was 96% effective at preventing transmission.

Results
- The models predicted that there would be a "fairly large" reduction in HIV incidence and a "substantial" number of infections prevented in Malawi.
- In Ghana, however, while a large number of infections would be prevented, this would only result in a small reduction in incidence.
- In Lesotho and Rwanda, the predicted number of infections prevented would be similar—and low—but the reduction in incidence would be substantially greater in Lesotho than in Rwanda.
- The higher the proportion of people in stable partnerships—whether seroconcordant or discordant—the greater the impact of early treatment on a local epidemic.

"The effectiveness of a discordant couples intervention in reducing incidence will vary among countries due to differences in HIV prevalence and the percentage of couples that are discordant," the researchers concluded.

"The number of infections prevented within a country, as a result of an intervention, will depend upon a complex interaction among three factors: population size, HIV prevalence, and degree of discordancy," they continued. "Our model provides a quantitative framework for identifying countries most likely to benefit from treating discordant couples to prevent transmission."

"The findings from the modeling study provide insights into what to expect at a country level of expanding such a prevention strategy," El-Sadr said in a press release issued by Columbia's Mailman School of Public Health. "Getting information to countries with regards to what they can expect from scale up of treatment for discordant couples on their epidemics is critical to their decision making."

"Our findings are very important as they show the intervention may be very successful in certain countries but not in others," added Blower. "This means we can use our model to identify which specific countries should begin to rollout this intervention." 11/1/11

Reference
Tenofovir Microbicide Gel May Prevent Genital Herpes in Addition to HIV Infection
Published on Tuesday, 25 October 2011 00:00
Written by Press Release
HSV © Russell Kightley

A vaginal gel containing the HIV nucleotide reverse transcriptase inhibitor tenofovir (known as Viread in pill form, also in the Truvada and Atripla coformulations) inhibits replication of herpes simplex virus, researchers reported in the October 4, 2011, issue of Cell Host and Microbes. Tenofovir gel has already been shown to reduce HIV infection by about 40%, and the new findings suggest it may have a dual benefit.

Below is an edited excerpt from a National Institutes of Health (NIH) press release describing the recent laboratory and animal study findings.

NIH Researchers Show How Anti-HIV Drug Acts to Block Herpes Virus

Newfound effectiveness of tenofovir due to higher concentrations in vaginal gel form

October 20, 2011—An anti-HIV drug also discovered to stop the spread of the genital herpes virus does so by disabling a key DNA enzyme of the herpes virus, according to findings by researchers at the National Institutes of Health and other institutions.

The study was published online in Cell Host and Microbes and was conducted by researchers at the Catholic University of Leuven, Belgium; the University of Rome; Gilead Sciences, Inc., Foster City, Calif; and the NIH’s Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

The findings explain the results of a recent clinical trial showing that the anti-HIV drug tenofovir, when it is formulated as a vaginal gel, could reduce the risk of herpes simplex virus (HSV) infections—as well as HIV infections—in women.

Tenofovir taken orally had been demonstrated to inhibit reproduction of HIV, but had not been known to block the genital herpes virus.

"HIV infection is closely associated with herpes viral infection. When people with genital herpes are exposed to HIV, they are more likely to become infected than are people who do not carry the herpes virus," said Leonid Margolis, PhD, head of the Section on Intercellular Interactions at NICHD and one of the authors of the study. "Human tissues convert tenofovir to a form that suppresses HIV. We found that this form of tenofovir also suppresses HSV. This discovery may help to identify drugs to treat the two viruses even more effectively."

Discoveries leading to new uses for previously approved drugs have the potential to save millions of dollars, Dr. Margolis said. New drugs typically undergo years of testing for safety and effectiveness before they are approved for patients. Finding new uses for an approved drug increases the value of the initial investment in testing, because most of the testing has previously been completed.

The researchers examined individual cells and groups of cells infected with HSV and found that high concentrations of tenofovir prevent the ability of this virus to reproduce. They also confirmed that tenofovir itself did not damage the cells. These tests included the type of cells that line the vagina, which are targets for infection with HSV and HIV.

Tenofovir is converted by cellular enzymes to another chemical form. The researchers found that this form of tenofovir suppresses not only HIV, but HSV as well. Specifically, the researchers showed that this active form of tenofovir can disable an enzyme that the virus needs to reproduce.

The researchers also examined the effects of tenofovir in tissues samples. They injected HSV into tonsil tissue and cervix tissue, and then applied tenofovir. They found that after 12 days, levels of the virus were only 1 to 13 percent of viral levels in untreated tissue. Tenofovir also blocked viral reproduction in tissue infected with both HIV and HSV simultaneously.

Using tenofovir to treat lab mice infected with the herpes virus also prevented symptoms of the disease and prolonged the animals' survival, the researchers found.

The vaginal gel showed activity against HSV apparently because of the high concentration of tenofovir that it contains. In contrast, when tenofovir is taken orally, tissue levels do not reach sufficient levels to significantly affect HSV.
"When using the gel, the amount of tenofovir on the affected tissues is about 100 times the amount in the body when taking tenofovir in pill form," said Dr. Margolis. "That explains why its anti-herpes activity wasn’t noticed before. Thus, under proper conditions, an anti-HIV drug becomes an anti-HSV drug."

In previous research, Dr. Margolis’ team showed that an anti-HSV drug, acyclovir, is converted inside the infected cells into an anti-HIV drug. They now believe the next step will be to find the form in which such drugs are most potent against both viruses at the same time. 10/25/11

Reference

Study finds tropical areas aren’t the only source of seasonal flu

DURHAM, N.C. and SINGAPORE – A commonly held theory says that flu virus originates every year in Southeast and Eastern Asia, making this region the source of seasonal flu epidemics in other parts of the world.

However, researchers at Duke-NUS Graduate Medical School in Singapore have found that influenza virus in tropical areas isn’t the only global source of flu epidemics. The international team of scientists involved in the work found that any one of the urban centers they studied could act as a source for a flu epidemic in any other locality.

"We found that these regions are just one node in a network of urban centers connected by air travel, through which flu virus circulates and causes a series of local epidemics that overlap in time," said Gavin Smith, PhD, senior author and Associate Professor in the Program in Emerging Infectious Diseases at Duke-NUS.

The study was published the week of Nov. 14 in the online Early Edition of the Proceedings of the National Academy of Sciences.

The research team chose to study influenza A because it is much more prevalent than both influenza B and C. Influenza is a significant cause of human illness and death worldwide – the World Health Organization estimates that 250,000 to 500,000 influenza A related deaths occur per year worldwide, and about 49,000 deaths occur in the United States.

The team obtained RNA sequences of virus samples from 2003 to 2006 in Australia, Europe, Japan, New York, New Zealand and Southeast Asia, as well as some more recently sequenced viruses from Hong Kong. The virus populations from tropical Southeast Asia and Hong Kong showed relatively low levels of genetic diversity and no seasonal fluctuations in comparison with annual temperate-area epidemics.

The analysis used time and space parameters to reveal high rates of viral migration among the urban centers tested. Although the virus population that migrated between Southeast Asia and Hong Kong persisted through time, the pattern of infections also depended on virus input from temperate regions that have distinct seasons. None of the temperate and tropical regions they examined was the source of all of the new flu strains in a given year.

The scientists showed that multiple lineages of a virus could seed annual flu epidemics, and that each region could function as a potential source population.

Current strategies for controlling flu virus through vaccination are based on biannual selection of vaccine candidates for the Northern and Southern hemispheres, and these plans require an understanding of circulating viruses.

"While current vaccine-strain selection strategies are generally effective, the results of our study could potentially be used to improve this process by incorporating knowledge of virus migration and connections between regions," said lead author Justin Bahl, Ph.D., Assistant Professor in the Duke-NUS Program in Emerging Infectious Diseases.

Many examples of the global movement of viruses facilitated by air travel exist, including the SARS epidemic and the H1N1 pandemic in 2009, Smith said. "Larger regions with greater connectedness may potentially contribute more to the global diversity of influenza viruses circulating."

The researchers plan to build on this study by generating new data from areas where there is currently little or no genetic information available. This work forms part of a larger effort to understand the patterns and mechanisms of transmission of respiratory viruses in humans, using influenza as a model system, Bahl said.
Researchers uncover why the body can't defend against tuberculosis

The stealth art of infectious agents: Researchers uncover why the body can't defend against tuberculosis

Tuberculosis, which kills over 2 million people each year, is caused primarily by infectious bacteria known as *Mycobacterium tuberculosis* – or *Mtb*. *Mtb* targets human immune cells as part of its strategy to avoid detection, effectively neutralizing the body's immune response.

Up until now, scientists had a general understanding of the process, but researchers in the Immunity and Infection Research Centre at Vancouver Coastal Health Research Institute and the University of British Columbia have shown *Mtb* produces a specific protein that allows it to defuse and bypass the body's security system. The results are published today in *The Proceedings of the National Academy of Sciences*, and provide a pathway for improved treatments against this disease.

"TB has been able to completely mislead our immune systems, convincing our body it isn't there, which is why it is such an effective killer," says Dr. Yossef Av-Gay, research scientist with the Immunity and Infection Research Centre at the Vancouver Coastal Research Institute and professor in the Division of Infectious Disease at UBC Faculty of Medicine. "We discovered that the cells in charge of targeting and destroying invading bacteria are being fooled by a special protein that blocks the immune cells ability to recognize and destroy it."

Here is how it works. Macrophages are dedicated human immune cells with the role of identifying and defeating dangerous microorganisms. Normally, macrophages engulf bacteria, or other infectious agents, and contain them in an enclosed secluded environment. Then, special components of the cell (cellular organelles) move to the controlled area and release acid enzymes that dissolve the bacteria. The system works beautifully against most infectious agents. However, as Dr. Av-Gay's team found, *Mtb* operates in a stealth manner, turning off this immune response.

In the case of *Mtb*, once the bacteria become engulfed by macrophages, they secrete a protein named PtpA that disables the two separate mechanisms required for making the acidic environment that normally targets them. The end result is that *Mtb* lives comfortably in the immune cells, like a Trojan horse, hidden from the rest of the immune system. The bacteria then multiply inside the macrophage, and when released, they attack the body.

"We have been engaged in studying the interaction between the TB bacterium and the human macrophage over the past decade," says Dr. Av-Gay. "We are delighted with this discovery. Through learning about the tricks it uses, we now have new targets, so that we can develop better drugs against this devastating disease."

TB is the leading cause of death among infectious diseases in the world today and is responsible for one in four adult preventable deaths, according to the World Health Organization (WHO). Every 20 seconds TB kills someone, with approximately 4400 people dying every day. The WHO estimates that one-third of the world's population is infected.
Tales from the Crypt: Study On Gut Cell Regeneration Reconciles Long-Standing Research Controversy
ScienceDaily (Nov. 11, 2011) — The lining of the intestine regenerates itself every few days as compared to say red blood cells that turn over every four months. The cells that help to absorb food and liquid that humans consume are constantly being produced. The various cell types that do this come from stem cells that reside deep in the inner recesses of the accordion-like folds of the intestines, called villi and crypts.

But exactly where the most important stem cell type is located—and how to identify it—has been something of a mystery. In fact, two types of intestinal stem cells have been proposed to exist but the relationship between them has been unclear. One type of stem cell divides slowly and resides at the sides of intestinal crypts. The other divides much more quickly and resides at the bottom of the crypts.

Some researchers have been proponents of one type of stem cell or the other as the "true" intestinal stem cell. Recent work published this week in Science from the lab of Jonathan Epstein, MD, chairman of the Department of Cell and Developmental Biology from the Perelman School of Medicine at the University of Pennsylvania, may reconcile this controversy. The findings suggest that these two types of stem cells are related. In fact, each can produce the other, which surprised the researchers.

"We actually began our studies by looking at stem cells in the heart and other organs," Epstein said. "In other tissues in the body, slowly dividing cells can sometimes give rise to more rapidly dividing stem cells that are called to action when tissue regeneration is required. Our finding that this can happen in reverse in the intestine was not expected."

The discovery that rapidly cycling gut stem cells can regenerate the quiescent stem cells—slowly dividing and probably long-lived—suggests that the developmental pathways in human organs that regenerate quickly like in the gut, skin, blood, and bone, may be more flexible than previously appreciated.

"This better appreciation and understanding may help us learn how to promote the regeneration of tissue-specific adult stem cells that could subsequently help with tissue regeneration," says Epstein. "It may also help us to understand the cell types that give rise to cancer in the colon and stomach."

Journal Reference:

Kawasaki Disease Linked to Wind Currents: First Evidence That Long-Range Wind Transport of an Infectious Agent Might Result in Human Disease
ScienceDaily (Nov. 10, 2011) — Kawasaki Disease (KD) is a severe childhood disease that many parents, even some doctors, mistake for an inconsequential viral infection. In fact, if not diagnosed or treated in time, it can lead to irreversible heart damage. After 50 years of research, including genetic studies, scientists have been unable to pinpoint the cause of the disease.
Now, surprising findings of an international team of scientists organized by Jane C. Burns, MD, professor and chief, Division of Allergy, Immunology, and Rheumatology at the University of California, San Diego School of Medicine’s Department of Pediatrics and Rady Children’s Hospital-San Diego, suggest that **KD cases are linked to large-scale wind currents that track from Asia to Japan and also traverse the North Pacific.**

"Our findings suggest an environmental trigger for Kawasaki disease that could be wind-borne," Burns said. The paper will appear in *Nature Scientific Reports* on Nov. 10.

**Signs of KD include prolonged fever associated with rash, red eyes, mouth, lips and tongue, and swollen hands and feet with peeling skin. The disease causes damage to the coronary arteries in a quarter of untreated children and may lead to serious heart problems in early adulthood. There is no diagnostic test for Kawasaki disease, and current treatment fails to prevent coronary artery damage in at least one in 10 to 20 children and death in one in 1,000 children.**

While seasonality of the disease has been noted in many regions—particularly in Japan, the country of highest incidence for KD—the search for factors that might contribute to epidemics and fluctuations in KD occurrence has been elusive. A study of KD cases in Japan since 1970 showed three dramatic nationwide epidemics, each lasting several months and peaking in April 1979 (6,700 cases), May 1982 (16,100 cases) and March 1986 (14,700 cases). These three peaks represent the largest KD epidemic events ever recorded in the world.

To investigate a possible influence from large-scale environmental factors, researchers including Daniel R. Cayan, Climate Atmospheric Science and Physical Oceanography (CASPO) at Scripps Institution of Oceanography in La Jolla, and Xavier Rodó and Joan Ballester, of the Institut Català de Ciències del Clima and the Institució Catalana de Recerca (IC3) in Barcelona, Spain, investigated a set of atmospheric and oceanographic measures, which revealed a link to pressure patterns and associated wind flow from the surface to mid-tropospheric atmospheric levels during the summer months prior to onset of the epidemics.

"The Japanese dataset revealed that a low number of KD cases were reported prior to the epidemics, a period coinciding with winds from the south which blew across Japan from the Pacific Ocean during the summer months," said Rodó, the study's first author. "However, the numbers rapidly mounted all over Japan when winds turned and blew from the northwest, a trajectory from the Asian continent. After the peaks, the winds again shifted, blowing from the south when the number of cases again decreased."

"Importantly, subsequent to the three epidemics, years with increased numbers of Kawasaki disease cases in Japan were significantly associated with enhanced local northwesterly winds, as a result of low pressure centered to the north," said Cayan.

To assess whether such variations in wind patterns were associated with KD case fluctuations on the other side of the North Pacific, similar analyses were conducted for San Diego. According to the scientists, the atmospheric connection from continental Asia to Japan and San Diego is intermittent and can take different routes. However, it was possible from their analysis to identify the major anomalous yearly peaks of KD cases occurring in San Diego from 1994 to 2008 as belonging to two main atmospheric configurations.

In fact, the **major fluctuations in KD case numbers in Japan, Hawaii and San Diego were linked to a seasonal shift in winds that exposed Japan to air masses from Central Asia.** One key pattern simultaneously exposed Hawaii and California to air masses from the western North Pacific. "The linkage to the wind currents, which can cross the Pacific in less than one week, may explain why KD case numbers recorded in Japan, San Diego and Hawaii show a nearly synchronized seasonal peak in disease activity from November through March," Rodó said.

Burns reports that the findings could be significant in efforts to isolate the cause of this devastating childhood disease. "It could be that an infectious agent is transported across the ocean by strong air currents developing in the upper troposphere," she said, adding that while this would seem the most plausible explanation for the findings, the role of pollutants or other inert particles must be considered.

These hypotheses are currently being investigated. A research aircraft carrying an engineer from the Catalonian team used a custom-built air sampling apparatus to collect tropospheric air samples from over Japan in March 2011, and the entire biome of the tropospheric dust collection is being sequenced in the laboratory of W.Ian Lipkin, MD, at Columbia University in New York City. Lipkin is one of the leading "molecular detectives" who uses sequencing to find new infectious agents. On the other side of the U.S., teams of pediatric doctors from hospitals from California to Alaska and Hawaii have initiated real-time...
reporting of KD cases to Scripps Institution of Oceanography via the Web. There, Cayan and his team are analyzing cases in relation to regional climate and tropospheric wind patterns.

While links between human respiratory disease and large-scale dust transport are well-documented, to date there has been no evidence of long-range wind transport of an infectious agent causing human disease.

**Journal Reference:**
Xavier Rodó, Joan Ballester, Dan Cayan, Marian E. Melish, Yoshikazu Nakamura, Ritei Uehara, Jane C. Burns. *Association of Kawasaki disease with tropospheric wind patterns*. **Scientific Reports**, 2011; DOI: 10.1038/srep00152

**First Combination ARV Vaginal Ring for HIV Prevention Being Tested in Phase I Safety Trial**
Paired with dapivirine, maraviroc makes debut as first entry inhibitor ARV to enter clinical trials as a vaginal microbicide

**PITTSBURGH, NOV. 15, 2011** – In the first clinical trial of a vaginal ring combining two antiretroviral (ARV) drugs, researchers from the Microbicide Trials Network (MTN) are collaborating with the International Partnership for Microbicides (IPM) to evaluate whether the ring is safe for use in women. If the ring does prove to be safe, it could be considered for further testing, and eventually be evaluated for its effectiveness as a microbicide for protecting women against HIV infection through vaginal sex.

The trial, which is funded by U.S. National Institutes of Health and goes by the name MTN-013/IPM 026, is evaluating a ring that contains the ARVs dapivirine and maraviroc. Each of these drugs works against HIV in a different way. Dapivirine belongs to a class of ARVs called non-nucleoside reverse transcriptase inhibitors (NNRTIs) that prevent HIV from making copies of itself. Maraviroc, on the other hand, is an entry inhibitor that blocks HIV from getting inside target cells.

The dapivirine-maraviroc ring is the first combination microbicide to enter clinical trials. It is also the first vaginal microbicide containing an entry inhibitor.

The ring was developed by IPM, a non-profit product development partnership headquartered in Silver Spring, Maryland, in collaboration with Queens University Belfast (Belfast, Northern Ireland). The belief is that combining the two drugs, which act at different points in the HIV “life cycle,” may provide greater protection against HIV than a single drug alone.

Globally, women comprise half of the 34 million people living with HIV. In sub-Saharan Africa, women represent nearly 60 percent of adults with the virus. In most cases women – especially young women – acquire HIV through unprotected heterosexual sex with an infected partner. Because the use of condoms is often not an option, there is an urgent need for effective prevention strategies that women can control themselves. Toward this end, vaginal microbicides in the form of a gel or a ring, for example, are being developed to provide women with new tools to protect themselves against HIV.

Vaginal rings provide slow, continuous delivery of a drug or multiple drugs to cells inside the vagina over a period of weeks or months. Marketed vaginal ring products include those used for contraceptive delivery and hormone replacement. However, vaginal rings can also be used as a vehicle for delivering potent ARV drugs into the vagina to prevent HIV infection. Because they could be used for one month at a time, vaginal rings may offer a long-acting and convenient prevention option for women.

MTN-013/IPM 026, which is now screening potential participants, will enroll 48 healthy, HIV-negative women ages 18-40 at the University of Pittsburgh, Fenway Institute in Boston and the University of Alabama at Birmingham. Researchers will evaluate the ring’s safety and how well women like or are willing to use the ring. In addition, different tests will be performed to help determine how much of each drug is taken up by the cells usually targeted by HIV and whether drug levels are sustained throughout the four weeks the ring is worn.

Women will be randomly assigned to use either the combination dapivirine-maraviroc ring, a ring containing maraviroc alone, a ring that contains dapivirine alone, or one with no active drug. This will enable researchers to compare the safety and drug delivery capability of the combination ring with each single-drug ring and with the placebo ring.

All the rings in the study look the same. They are made of silicone elastomer and measure 56 mm (about 2 3/4”) in diameter and 7.7 mm (¾”) thick. Women will wear their assigned ring for 28 days. Different tests and procedures will be conducted during this time as well as during a 24-day follow-up period.

Leading the study for the MTN is Beatrice A. Chen, M.D., M.P.H., of the University of Pittsburgh School of Medicine and Magee-Womens Hospital of UPMC, who is protocol chair; with Lori Panther, M.D., M.P.H., of the Fenway Institute and Harvard University in Boston, as protocol co-chair.
“IPM has been a pioneer in developing vaginal rings for delivery of antiretrovirals. Our collaboration marks an important juncture for the field as we begin to explore drugs with different mechanisms of action and methods that we hope will give women new, easy-to-use options for preventing HIV,” remarked MTN Principal Investigator Sharon Hillier, Ph.D., who is professor and vice chair for faculty affairs, and director of reproductive infectious disease research in the department of obstetrics, gynecology and reproductive sciences at the University of Pittsburgh School of Medicine.

“Our partnership with MTN on the first combination microbicide to enter clinical trials is an important milestone for the HIV prevention field,” said Zeda F. Rosenberg, Sc.D., IPM chief executive officer. “With extensive preclinical data on both drugs to support the combination ring’s development, we hope this product will one day expand women’s HIV prevention options and open the door to developing other combination HIV prevention methods.”

IPM holds royalty-free licenses to develop both maraviroc and dapivirine as vaginal microbicides for the prevention of HIV in developing countries. IPM’s primary focus has been the development of ARVs as microbicides in a variety of dosage forms.

Dapivirine – a drug developed by Tibotec Pharmaceuticals, one of the Janssen pharmaceutical companies– was tested initially as an oral treatment for HIV. In 2004, Tibotec provided IPM with a license to develop the drug as a vaginal microbicide for HIV prevention. Since then, 15 clinical safety studies of dapivirine, formulated as either a vaginal gel or a vaginal ring, have been conducted by IPM and its partners showing that it is safe and well-tolerated by women. MTN recently completed a male tolerance study of dapivirine gel. Results are expected in the first half of next year.

Next year, the MTN will launch a Phase III effectiveness trial of the dapivirine-only ring. The study, called ASPIRE – A Study to Prevent Infection with a Ring for Extended Use – will enroll approximately 3,475 women at sites in five African countries.

As part of IPM’s strategy to license the dapivirine ring, IPM will conduct The Ring Study (IPM 027), which will be done in parallel with ASPIRE, and collect long-term safety and efficacy data about the ring among approximately 1,650 women at multiple research centers in Africa.

IPM is developing maraviroc as a microbicide through a 2008 licensing agreement now held by ViiV Healthcare. Maraviroc is approved for use in the treatment of HIV in combination with other ARVs and is marketed under the trade names Selzentry® in the United States and Celsentri® in Europe. Because maraviroc is not widely used in Africa and is the only drug of its class, it is likely to remain active against HIV strains that have become resistant to other classes of ARVs used more widely to treat HIV. Therefore, it is a very promising candidate for HIV prevention. IPM has completed several preclinical studies of maraviroc, and is exploring its development as a microbicide both alone and in combination with dapivirine or tenofovir. The MTN-013/IPM 026 study will be the first time that maraviroc will be evaluated as a microbicide in humans.

MTN-013/IPM 026 is expected to take less than a year to complete with results available early 2013. It is being funded by the National Institute of Allergy and Infectious Diseases (NIAID) and the National Institute of Mental Health (NIMH), components of the U.S. National Institutes of Health (NIH). IPM will provide the active and placebo rings that will be tested in the Phase I trial.

Unfounded Claims Of HIV Cure Spikes Demand For Tokay Gecko In Southeast Asia

Samantha Chan
November 16, 2011

The medicinal demand for Tokay Geckos has skyrocketed in Southeast Asia, with animals over 300 g in weight in particular demand.

AsianScientist (Nov. 16, 2011) – Unfounded claims of a potential cure for Human Immunodeficiency Virus (HIV) is one factor behind a boom in the trade of Tokay Geckos, according to a new report launched today by TRAFFIC, the wildlife trade monitoring network.

The Tokay Gecko (Gekko gecko) is a nocturnal Asian lizard growing up to 40 cm in length and easily identified by its orange-spotted, blue-grey skin and unmistakable vocalizations.

The animals are popular in the global pet trade and have long been traded – both legally and illegally – for use in traditional Chinese medicine (TCM) in the belief they can cure various maladies including diabetes, asthma, skin disease and cancer.

In parts of Asia, Tokay wine or whisky is also consumed to increase strength and energy.
Between 1998 and 2002, more than eight and a half tons of dried Tokay Geckos were legally imported into the USA for use in traditional medicine. Huge numbers are traded within Asia, from countries such as Indonesia and Thailand, to meet demand, especially in China.

Recently, however, the medicinal demand for Tokay Geckos has skyrocketed, with dozens of new websites in Malaysia, a major hub of the trade, dedicated to buying and selling Tokay Geckos. Messages have been circulating in online blogs, forums, newspaper articles, classified advertisements and amongst wildlife dealers in the region, extolling the consumption of Tokay Gecko tongue and internal organs as a cure for HIV and even cancer.

The geckos are being sourced across South-East Asia, especially the Philippines, where authorities have launched a crackdown on Tokay Gecko buyers amid growing reports of illegal trade in the animals. One couple was recently arrested attempting to smuggle Tokay Geckos worth close to a million dollars from Thailand to Malaysia.

Indonesia exports an estimated 1.2 million dried Tokay Geckos from Java each year – the official export quota is 45,000 live animals, intended for the pet trade.

Two weeks ago, Customs officers in Central Java foiled an attempt to smuggle 6.7 tons of dried Tokay Geckos bound for Hong Kong and China using expired permits.

Unsurprisingly, there are anecdotal reports of major Tokay Gecko population declines in Java and this picture is likely to be mirrored elsewhere.

However, the Tokay Gecko remains poorly protected by national legislation throughout most of its range and is not listed for protection under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

“TRAFFIC is alarmed at the massive increase in trade of these geckos,” said Chris R. Shepherd, Deputy Director of TRAFFIC Southeast Asia.

“If the trade continues to mushroom, it could take years to repair the damage currently being inflicted on gecko populations. Protection under CITES should urgently be considered as a stitch in time for the Tokay Gecko,” he said.

**Rural Hospitals Avoid Sex-Assault Cases, Victims' Advocates Say**

*Ottawa Citizen*, (11.12.2011) Douglas Quan, Postmedia News

All hospitals in Canada have an ethical obligation to provide a “minimum of care” to sexual-assault victims, leading health practitioners say. Nevertheless, it is common for doctors in rural emergency departments to refer these patients to larger urban hospitals, according to health and law enforcement personnel.

Rural doctors and nurses should be able to provide psychological support and treatment to prevent STDs, said Dr. Alan Drummond, public affairs chair of the Canadian Association of Emergency Physicians. He acknowledged, however, that there are logistical concerns about performing forensic examinations.

“If you’re the only doctor in the emergency department and, all of a sudden, you’re taken out of the equation to do a rape kit, that means you’re going to have problems with the ER backlogging with other problems,” Drummond said. “It’s a massive use of resources.”

Sexual-assault kits require a head-to-toe examination to collect and document potential evidence, a process that can last well over an hour. There is also a question of competency: Rural staffers who seldom work with such patients may fear botching the criminal case by poor evidence-gathering, Drummond said. They may also shy away from the resulting justice system-related obligations.

A Mountie in Vanderhoof, British Columbia, estimated his detachment transports sexual-assault survivors to Prince George, an hour away, about eight times a year. A nurse coordinator in Sudbury, Ontario, said her team sees such patients from as far as Timmins, four hours away.

A pilot project is aiming to improve rural sexual-assault services in southern Alberta. Cathy Carter-Snell, the forensic-studies coordinator at Mount Royal University, is surveying police, health and social workers to help develop a web-based training and create real-time phone and video links with specialists.

*Morbidity and Mortality Weekly Report* Vol. 60; SS. 14: P. 1-34, (10.28.2011)  Teresa J. Finlayson, PhD; Binh Le, MD; Amanda Smith, MPH; Kristina Bowles, MPH; Melissa Cribbin, MPH; Isa Miles, ScD; Alexandra M. Oster, MD; Tricia Martin, MPH; Alicia Edwards, MSPH; Elizabeth DiNenno, PhD

More than 1.1 million people in the United States were living with HIV at the end of 2006, and about 53 percent of the estimated 56,000 new infections that year were among men who have sex with men. The authors of the current report summarized data from the second National HIV Behavioral Surveillance (NHBS) System data-collection cycle among MSM conducted June-December 2008.

NHBS collects risk behavior data from MSM, injection-drug users, and heterosexual adults at increased risk for HIV. Participants must be at least 18 years old, live in a participating metropolitan statistical area, and be able to complete a behavioral survey in English or Spanish. Men who reported being infected with HIV or who had no male sex partners during the past 12 months were not included in this analysis, which was based on data from 8,175 MSM.

In addition to having at least one male sex partner, 14 percent of participants had at least one female sex partner in the previous 12 months. Unprotected anal intercourse with a male partner was reported by 54 percent, including 37 percent with a main partner and 25 percent with a casual partner.

In the past 12 months, 46 percent reported noninjection drug use, including marijuana (38 percent), cocaine (18 percent), amyl nitrate or “poppers” (13 percent), and ecstasy (11 percent). Just 2 percent reported injection drug use for non-medical purposes during the past 12 months.

Of MSM, 90 percent reported having ever been tested for HIV, and 51 percent had received a hepatitis vaccination. Within the past 12 months, 62 percent reported having been tested for HIV, 35 percent were tested for syphilis, and 18 percent reported participating in an individual-level or group-level HIV behavioral intervention.

“MSM in the United States continue to engage in sexual and drug-use behaviors that increase the risk for HIV infection,” the study authors reported. “Although many MSM had been tested for HIV infection, many had not received hepatitis vaccinations or syphilis testing, and only a small proportion had recently participated in a behavioral intervention. To reduce HIV infection among MSM, additional effort is needed to decrease the number of men who are engaging in risk behaviors while increasing the number who recently have been tested for HIV.

“The National HIV/AIDS Strategy for the United States delineates a coordinated response to reduce infections and HIV-related health disparities among MSM and other disproportionately affected groups. NHBS data can be used to monitor progress toward the goals of the national strategy and to guide national and local planning efforts to maximize the impact of HIV prevention programs.”

Longitudinal Association of HIV Conspiracy Beliefs with Sexual Risk Among Black Males Living with HIV

*AIDS and Behavior* Vol. 15; No. 6: P. 1180-1186, (08..2011)  Laura M. Bogart; Frank H. Galvan; Glenn J. Wagner; David J. Klein

The authors noted the need to identify culturally relevant factors that may contribute to sexual risk among African Americans. In the current study, they investigated HIV-specific medical mistrust—often exhibited as conspiracy beliefs about HIV (such as, “AIDS was produced in a government laboratory”)—as one such cultural factor, which might be indicative of general suspicion of messages about HIV treatment and prevention.

During a six-month period, the team measured the endorsement of HIV conspiracy beliefs three times and the frequency of condom use monthly among the study’s participants, 181 HIV-positive African-American males. “A hierarchical multivariate repeated-measures logistic random effects model indicated that greater belief in HIV conspiracies was associated with a higher likelihood of reporting unprotected intercourse across all time points,” the authors found.

“An average of 54 percent of participants who endorsed conspiracies reported unprotected intercourse, versus 39 percent who did not endorse conspiracies,” the team concluded. “Secondary prevention interventions may need to address medical mistrust as a contributor to sexual risk among African Americans living with HIV.”
UC781 Rectal Microbicide Appears Safe and Well Tolerated
Published on Tuesday, 15 November 2011 00:00
Written by Press Release
The investigational rectal microbicide gel UC781 produced no adverse events and study participants said they would be likely to use it if found effective at reducing the risk of HIV infection, according to a study described in the September 28, 2011, edition of PLoS Medicine.

Below is an edited excerpt from a press release issued by the University of California Los Angeles summarizing the study and its findings.

Early Trial Suggests Rectal Microbicide is Safe, Could Significantly Reduce HIV Transmission

Los Angeles—November 7, 2011—By Enrique Rivero. A topically applied microbicide gel containing a potent anti-HIV drug has been found to significantly reduce infection when applied to rectal tissue that was subsequently exposed to HIV in the laboratory, according to a new study by the UCLA AIDS Institute. The gel was also found to be safe and acceptable to users.

The first-ever phase 1 clinical trial of the rectal HIV-prevention drug known as UC781, a non-nucleoside reverse transcriptase inhibitor, is described in the current edition of the online journal PLoS ONE.

The trial represents the first use of this novel approach to obtain early insights into the drug's potential to prevent real-life infections during sexual exposure. In addition, it represents an important contribution to efforts aimed at strategically preventing HIV transmission during receptive anal intercourse.

While anal-receptive intercourse is known to be the main route for new HIV infections in men who have sex with men, far more women than men worldwide practice anal intercourse. The risk of HIV infection, per sex act, is anywhere from 20 to 2,000 times greater with receptive anal sex than receptive vaginal sex—particularly if there are other infections present, such as herpes, gonorrhea or chlamydia, according to the study’s lead author, Dr. Peter Anton, a professor of medicine in the division of digestive diseases at the David Geffen School of Medicine at UCLA.

The significant reduction in the ability of HIV to infect tissues treated with the drug was surprising, Anton said, as this was a new index in clinical trials. Typically, phase 1 clinical trials focus primarily on safety.

"While the main goal of this trial was also to evaluate safety, these new tests enabled us to evaluate, indirectly, whether this drug and route of delivery might potentially reduce new HIV infections," said Anton, who is also a member of the UCLA AIDS Institute. "Of course, it is very gratifying that the results were so impressive. This approach reflects the kind of intensive analyses these dedicated participants in these early trials are willing to tolerate to help us evaluate a drug’s potential earlier in the pipeline of drug development."

Anton also noted that although this is the first time this infectibility analysis has been used in a human clinical trial, the results were quite significant.

Until now, microbicide clinical trials have focused on vaginal transmission. These trials, fortunately, have had successful results in the past year, after nearly a decade of disappointment. But the development of a microbicide prevention gel for rectal application has only been under way for the past five to six years.

In the current trial, researchers tested a formulation of the gel that was created for vaginal use in human trials and that contained two concentrations of UC781. They enrolled 36 male and female subjects at UCLA who were not infected with HIV, and they collected blood and rectal tissue samples at baseline, before participants were randomized to either a placebo group or to receive one of two concentrations of UC781. All participants were given the placebo or active drug as a single exposure by the team's clinicians, with research samples collected 30 minutes later for analysis.

After two to three weeks, the participants resumed the second part of the trial by applying the gel or placebo once daily over seven days on their own at home. Afterwards, they returned to the clinic for another collection of samples. All participants completed the study once they were enrolled. In-depth interviews with each participant assessed their acceptability of the current form of the product.

Though the microbicide used for this study was formulated for vaginal use, the same team of researchers has also developed a rectal-specific microbicide gel, which they plan to start testing in a clinical trial in January 2012. 11/15/11
Cholera Outbreak Hits Kenya’s Largest Refugee Camp
"Cholera has broken out in the world’s largest refugee camp in Kenya, home to nearly 500,000 Somali refugees, the United Nations said on Tuesday," Reuters reports (Nebehay, 11/15). "There are now 60 cases of cholera in [Kenya’s Dadaab complex], including 10 laboratory-confirmed cases and one refugee death, according to Andrej Mahecic, a spokesperson for the U.N. High Commissioner for Refugees (UNHCR),” the U.N. News Centre writes.

"To manage the cholera outbreak, UNHCR and its partners have set up cholera treatment centers for severe cases,” the news service writes, adding, "The agency is working with [UNICEF] and the Ministry of Health to train health workers in the community-based management of diarrhea so that patients can begin treatment at home” (11/15). "The UNHCR ... says insecurity is still hampering aid efforts in the area, despite the deployment of 100 Kenyan policemen in the last month,” and "the situation has been exacerbated by the outbreak of the waterborne disease," BBC News notes (11/15).

Health Officials Report More Than 200 Cases Of Typhoid In Zimbabwe’s Capital
"Health authorities say 207 cases of typhoid are being treated in Zimbabwe’s capital after a prolonged spell of unusually hot weather amid acute water shortages,” the Associated Press/Seattle Times reports. Prosper Chonzzi, Harare city council health director, "said Tuesday the disease will be difficult to contain in impoverished townships relying on water from shallow, makeshift wells and marshlands," and that "humanitarian agencies have been asked to help provide clean water,” the news service writes.

Some in the capital have not had piped water for months, or even years, because of the country’s economic downturn, according to the AP (11/15). "The typhoid fears come as residents are already on high alert for a potential return of cholera,” which also is transmitted through contaminated water, SW Radio Africa News/Zimbabwean notes (11/16).

Pope Heads for Africa, Where Debate over Condoms Rages
Agence France Presse, (11.16.2011)
Pope Benedict XVI this week is set to embark on his second visit to Africa as pontiff, arriving in Benin on Friday. In 2009, Benedict’s trip to Cameroon and Angola sparked global debate when he suggested condom distribution inflamed the HIV/AIDS epidemic. But in a book published last year, the pope acknowledged that condom use is acceptable “in certain cases” to reduce the risk of HIV transmission.

Sub-Saharan Africa is home to almost 70 percent of people living with HIV worldwide, and Roman Catholic charities provide much of the region’s AIDS care.

In hard-hit countries like Swaziland, where 26 percent of the adult population is infected, some Catholic missionaries focus on saving lives, and not on divining the meaning of Benedict’s comments. “As a church man, a lot of what you are doing is not praying. It is crisis response,” said Father Martin McCormick, a missionary and founder of an AIDS hospice.

McCormick supervises 60 Catholic schools where 8,000 students are AIDS orphans. “If you have 8,000 hungry kids, you don’t think back to the Vatican. You think ‘human response’ to what you see in front of you,” he said. “I don’t think policies or philosophies.”

Sister Diane Dalle Molle, a Catholic nun who also works in Swaziland, said she counsels and tests people for HIV, and “we can tell them what is available out there.” “We don’t provide condoms, but they know where they can get them,” she said.

The Catholic Church’s position on condoms is “unrealistic,” said John Idoko, head of the Nigerian AIDS control agency. “Realistically, many people understand [condom use], but don’t want to go against the doctrine—people just want to play faith,” he said.
Increased HIV and Primary and Secondary Syphilis Diagnoses Among Young Men—United States, 2004-2008

Journal of Acquired Immune Deficiency Syndromes Vol. 58, No. 3; P. 328-335, (11.01.2011) Elizabeth A. Torrone, PhD, MSPH; Jeanne Bertolli, PhD, MPH; Jianmin Li, DPE; Patricia Sweeney, MPH; William L. Jeffries IV, PhD, MPH, MA; D. Cal Ham, MD, MPH; Thomas A. Peterman, MD, Msc

“National data document increases in HIV and syphilis diagnoses in young black men who have sex with men (MSM), but trends could be driven by increases in a few large areas,” the authors wrote. In the current study, they described the extent of reported increases in diagnoses among MSM in metropolitan areas of varying population sizes.

The study examined HIV and primary and secondary syphilis case-report trends from 2004 to 2008 in metropolitan areas with more than 500,000 population and at least 500 black men ages 13-24 (n=73). Differences by age at diagnosis, race/ethnicity and area size were examined.

Between 2004-05 and 2007-08, HIV diagnoses increased in 85 percent (n=62) of areas for black MSM ages 13-24, and primary/secondary syphilis diagnoses in young black men increased in 70 percent of areas (n=51). Areas averaged a 68.7 percent increase (interquartile range: 25.0-103.1) in HIV diagnoses among young black MSM and an average 203.5 percent (interquartile range: 0.0-192.7) increase for primary/secondary syphilis.

“Across area size strata, the youngest group of black men had the highest average percentage increase in diagnoses of HIV and syphilis and the highest percentage of areas with increases in diagnoses,” the authors found.

“HIV and syphilis diagnoses increased among young black men in almost all areas, suggesting widespread increases across metropolitan areas of different sizes,” the authors concluded. “Findings highlight the need for continued prevention efforts for young MSM, particularly young black MSM.”

Multidrug-Resistant Acinetobacter Baumannii Found Growing in Nearly Half of Infected Patient Rooms

ScienceDaily (Nov. 1, 2011) — Multidrug-resistant Acinetobacter baumannii (MDR-AB) was found in the environment of 48 percent of the rooms of patients colonized or infected with the pathogen, according to a new study published in the November issue of the American Journal of Infection Control, the official publication of APIC—the Association for Professionals in Infection Control and Epidemiology.

The study examined how frequently the environment surrounding the patient becomes contaminated and which environmental surfaces are most commonly contaminated.

A team of researchers from the University of Maryland School of Medicine took samples from ten surfaces in each of 50 rooms inhabited by patients with a recent (less than two months prior to environmental sampling) or remote (more than two months) history of MDR-AB. Surfaces sampled included the door knob, bedrails, bedside table, vital sign monitor touchpad, nurse call button, sink, supply cart drawer handles, infusion pump, ventilator surface touch pad, as well as the floor on both sides of the patient’s bed. Of these, 9.8 percent of surface samples representing 48 percent of the tested rooms showed environmental growth of A. baumannii.

Further, the study found that patients with a recent history of MDR-AB colonization or infection were not significantly more likely than those with a remote history of MDR-AB to contaminate their environment.

The authors note several potential limitations including small sample size, lack of a comparison group, and the inability to determine which came first: environmental contamination or patient colonization/infection. In addition, the study did not evaluate healthcare worker or patient movement and therefore cannot demonstrate transmission of Acinetobacter baumannii to patients as a result of environmental contamination.

Since the study was conducted, new strategies to reduce transmission of the pathogen have resulted in a significant decrease in infections and acquisition.

The research found that supply cart drawer handles (20 percent), floors (16 percent), infusion pumps (14 percent), ventilator touchpads (11.4 percent) and bedrails (10.2 percent) were most commonly contaminated, and 85 percent of environmental cultures matched the strain of the infected patient in that room. These results are of particular concern due to the frequency with which healthcare workers may touch infected surfaces during patient care.

"For patients with MDR-AB, the surrounding environment is frequently contaminated, even among patients with a remote history of MDR-AB,” conclude the authors. "In addition, surfaces often touched by
healthcare workers during routine patient care are commonly contaminated and may be a source of nosocomial transmission. The results of this study are consistent with studies of other important hospital pathogens such as methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant *Enterococcus* and *Clostridium difficile*.

*Acinetobacter baumannii* is a species of gram-negative, multidrug resistant bacteria that has caused outbreaks of infection in healthcare facilities over the last decade and considerable concern in the medical community. Infections from this pathogen primarily occur in very ill, wounded or immunocompromised patients. The germ is capable of surviving on surfaces for prolonged periods of time, making it harder to eradicate.

**Journal Reference:**

**New Mouthwash Targeting Harmful Bacteria May Render Tooth Decay a Thing of the Past**

ScienceDaily (Nov. 16, 2011) — A new mouthwash developed by a microbiologist at the UCLA School of Dentistry is highly successful in targeting the harmful *Streptococcus mutans* bacteria that is the principal cause tooth decay and cavities.

In a recent clinical study, 12 subjects who rinsed just one time with the experimental mouthwash experienced a nearly complete elimination of the *S. mutans* bacteria over the entire four-day testing period. The findings from the small-scale study are published in the current edition of the international dental journal *Caries Research*.

Dental caries, commonly known as tooth decay or cavities, is one of the most common and costly infectious diseases in the United States, affecting more than 50 percent of children and the vast majority of adults aged 18 and older. Americans spend more than $70 billion each year on dental services, with the majority of that amount going toward the treatment of dental caries.

This new mouthwash is the product of nearly a decade of research conducted by Wenyuan Shi, chair of the oral biology section at the UCLA School of Dentistry. Shi developed a new antimicrobial technology called STAMP (specifically targeted anti-microbial peptides) with support from Colgate-Palmolive and from C3-Jian Inc., a company he founded around patent rights he developed at UCLA; the patents were exclusively licensed by UCLA to C3-Jian. The mouthwash uses a STAMP known as C16G2.

The human body is home to millions of different bacteria, some of which cause diseases such as dental caries but many of which are vital for optimum health. Most common broad-spectrum antibiotics, like conventional mouthwash, indiscriminately kill both benign and harmful pathogenic organisms and only do so for a 12-hour time period.

The overuse of broad-spectrum antibiotics can seriously disrupt the body's normal ecological balance, rendering humans more susceptible to bacterial, yeast and parasitic infections.

Shi's Sm STAMP C16G2 investigational drug, tested in the clinical study, acts as a sort of "smart bomb," eliminating only the harmful bacteria and remaining effective for an extended period.

Based on the success of this limited clinical trial, C3-Jian Inc. has filed a New Investigational Drug application with the U.S. Food and Drug Administration, which is expected to begin more extensive clinical trials in March 2012. If the FDA ultimately approves Sm STAMP C16G2 for general use, it will be the first such anti-dental caries drug since fluoride was licensed nearly 60 years ago.

"With this new antimicrobial technology, we have the prospect of actually wiping out tooth decay in our lifetime," said Shi, who noted that this work may lay the foundation for developing additional target-specific "smart bomb" antimicrobials to combat other diseases.

"The work conducted by Dr. Shi's laboratory will help transform the concept of targeted antimicrobial therapy into a reality," said Dr. No-Hee Park, dean of the UCLA School of Dentistry. "We are proud that UCLA will become known as the birthplace of this significant treatment innovation."

**Journal Reference:**

**Can a Faster Condom Help Prevent HIV?**

Can't wait to get it on? Meet **Pronto**, a condom that claims to go from package to shaft within three seconds. Pronto is the work of **South African inventor Willem van Renburg**, who sought to develop a
barrier method that didn’t "kill the mood" with all that awkward fumbling. Seeing that South Africa is home to the world’s highest population of HIV-positive people, the device could also help prevent the virus' spread in a matter of seconds.

Men refusing to wear condoms is a major factor in the global spread of HIV. "My husband never wants to use a condom, so every time I sleep with him, I get sick," one HIV-positive Malawi woman told documentarian Martha Dodge. Both men and women have filed a host of complaints over traditional rubbers, including their smell, fit, and feel. Some do experience anxiety when they begin unrolling a condom, and some sex partners express frustration when the process drags on and on. Reducing that process to a second could go a long way in convincing some couples to stay safe.

Here's how it works: Pronto’s packaging doubles as an applicator. Users just need to hold the package level over the penis, crack it in half, slip it on, and discard the applicator in one quick motion. But perfecting the Pronto technique takes some practice. Incorrect application could be "uncomfortable and embarrassing" and—like with all condoms—could potentially compromise the condom's efficacy, so users can watch a video and play a hands-on game to learn how to apply the condom correctly every time.

All that study can pay off, as developers claim experienced users can apply the condom in just one second.

Now, they just need men to give it a whirl: Pronto officially launched in South Africa in February, and the company is looking for distributors to make the condom available worldwide.

Pronto isn't for everyone, and it doesn't have to be. The more varieties of barrier methods on the market, the more likely a couple is to find one that works well—or fast enough—for them.

**Buddhism plays role in China’s battle against AIDS**

*English.news.cn  2011-11-20 18:54:07*

by Xinhua writers Wang Ruoyao and Li Meng

KUNMING, Nov. 20 (Xinhua)—“Chen Fen,” a 43-year-old woman who has been fighting HIV for 16 years, projects an image of energy and vitality, despite being weakened by her affliction. The source of her strength isn’t a new pill or medication, but an ancient religious belief.

"I simply practice what the Buddhist monks suggest: to keep a peaceful mentality and never make futile efforts to worry about the future," she says.

Chen lives in the Xishuangbanna Dai autonomous prefecture in southwest China’s Yunnan province. The province registered 83,925 HIV carriers and AIDS patients as of the end of last year, the most of any Chinese province or region.

In Xishuangbanna, more than 300,000 residents, most of whom belong to the Dai and Blang ethnic groups, believe in Theravada, a prevalent school of Buddhism. The prefecture has a total of 1,784 HIV/AIDS patients, and the number is expected to rise in coming years.

Chen and other HIV/AIDS patients in the region have benefited from a local program in which Buddhist monks have been mobilized to provide care for patients and promote knowledge of the disease in order to curb new infections.

The "Home of Buddha Glory" program was launched in 2003 with funding from the United Nations International Children's Emergency Fund and the assistance of the prefecture's Buddhist association. Through the program, hundreds of HIV/AIDS patients, including both Buddhist believers and non-believers, regularly gather to listen to the preaching of monks and chat with each other at Zongfo Monastery, located in Xishuangbanna.

"The place really feels like a home," Chen says, adding that although she is not a believer, she has learned how to live a positive life from the monks.

**Guidance For Sufferers**

Du Hanting, the deputy abbot of Zongfo Monastery and a senior participant in the program, first heard about AIDS when he was studying in Thailand 20 years ago.

At that time, he noticed that his counterparts in Thailand often volunteered to provide funeral services to a group of "special" deceased.

"I was shocked when I was told they all died of an incurable disease called AIDS. Because of it, many elders had to watch their children die," he said.

Later, he learned that the epidemic can cause societal burdens, leaving many families impoverished and robbing children of their parents' care. Du joined Home of Buddha Glory in 2003 after returning to Xishuangbanna.

"Monks serve as people's spiritual leaders and should guide them through hardship," Du said in response to doubts over monks' involvement in secular affairs.
A key part of the monks' job is to reduce stress and anxiety for HIV/AIDS patients. People with the disease often deal with significant amounts of stress and mental anguish. In extreme cases, some patients even intend to seek revenge by passing on the virus to others or harming those who transmitted the disease, according to Du.

"I told them that if you do harm to others, you have no way of escaping the consequences," he said.

The monks also help families to treat their HIV-positive members with an open mind and reduce their fear of being infected. A lack of HIV/AIDS knowledge has led to some patients being chastised by their families or even driven out of their homes.

"We often talk and have dinner with patients in front of their family members to show that the virus won't be transmitted through daily behavior," he says.

To reduce the families' economic burden, program employees have been trying to link patients up with existing social welfare programs and offer them job opportunities.

**Anti-Aids Education**

In addition to offering mental care to patients, the monks are also engaged in anti-AIDS education and awareness-raising programs in rural areas in Xishuangbanna, where 70 percent of HIV patients became infected through sexual contact.

Since talking about sex is taboo for Buddhist monks, they are only expected to give a general admonition and leave secular employees of the program to discuss preventive measures against HIV/AIDS.

The monks try to convince people to stay away from risky sexual behavior by citing Buddhist disciplines.

"We educate people with two of the five basic disciplines of Buddhism—not to be lustful and not to drink," Du says.

The work of educating the populace about HIV/AIDS is tireless, according to Ai Hanen, the head of Home of Buddha Glory's operations.

"Many Dai (ethnic minority) people who live in remote villages are so poorly educated that they can read neither Chinese words nor Dai words," Ai said.

Employees of the program are working on a compact disc that will include educational songs and lectures recorded in plain language. They believe the practice will be well-received by the Dai people, who generally have trouble understanding intricate medical terminology.

The role of religion in anti-AIDS efforts can also be seen in northwest China's Ningxia Hui autonomous region, which is home to the country's largest Muslim community.

Imams from mosques in Ningxia preach about the dangers of risky behavior, such as contact with commercial sex workers and drug abuse, by defining them as violations of Islamic doctrine. ""The imams once traveled all the way to our monastery to see what they could learn," Ai said.

**Buggery laws choking HIV control**

Lower prevalence rate in men in countries without restrictions

By INGRID BROWN Observer senior reporter browni@jamaicaobserver.com

Monday, November 21, 2011

NASSAU, The Bahamas — Michel de Groulard, regional programme adviser of UNAIDS Caribbean Regional Support Team said that data has shown a significantly lower HIV prevalence rate among gay men in Caribbean countries without buggery laws.

According to de Groulard, the HIV prevalence rate among men who have sex with men (MSM) in three Caribbean countries without buggery laws namely Bahamas, Haiti and Suriname was less than 10 per cent in all cases.

This he said is in comparison to Jamaica, Trinidad & Tobago and Guyana where the prevalence rate is more than 20 per cent for these countries with buggery laws.

Pointing to The Bahamas which repealed its buggery laws inn 1991, de Groulard said that the prevalence rate now stands at 8 per cent among gay men. This is despite Bahamas having the highest prevalence rate in the Caribbean.

However in Jamaica, where the buggery laws remain firmly on the books, de Groulard said that the prevalence rate among gay men is a whopping 32 per cent.

"We see correlation for countries which have decriminalised because when you compare them to those who continue to criminalise there is a significant difference," Groulard told the Observer.
He was however unable to say how, if any, decriminalising of homosexuality has impacted the incidents of HIV in countries like The Bahamas, since there are no available data.

Groulard said that while it is easy to determine what percentage of a population is infected, it is more challenging to determine when they were infected, thus determining if this would have been before or after buggeery laws are repealed.

"There are methods to do it but it is expensive and complicated so most countries do not do it," he said.

Dr Peter Figueroa, the former head of Jamaica's national HIV programme said that the HIV prevalence rate among Jamaican men who have sex with men continues to be unacceptably high.

Dr Figueroa was addressing delegates at the 2011 Caribbean HIV Conference now underway at the Atlantis, Paradise Island, The Bahamas where delegates from more than 30 Caribbean countries have come together to chart the way forward in the fight against the disease.

Pointing to a Jamaican study conducted in 2007 with 201 men who have sex with men and another conducted this year with 453 men, the epidemiologist said that only 75 per cent of these men reported using condom at last anal sex.

According to Dr Figueroa, the study further revealed that 34 per cent of MSM had two or more female partners in the last 12 months while 56 per cent of them said they were bisexuals.

The homeless, victims of violence and those of lower socio economic status were twice as likely to become infected with the disease.

"What was worrying in 2011 survey was that 18 per cent said they had no chance of getting HIV and 40 per cent said they had little chance of getting the disease," he said.

HIV prevalence remains high among persons engaging in sex for money with 11 per cent reporting that they had paid for sex and 21 per cent saying they were paid for sex.

Pointing to reasons why the HIV prevalence rate was so high, Dr Figueroa chalked it down to high rate of commercial and transactional sex.

"Many of them are vulnerable, homeless, poor and have no family support and limited education," he said.

Dr Figueroa said that there is a need to empower and support these men to take more responsibility for safe sex.

"We need to provide a much more supportive environment starting from policies to actual programmes, and dealing with discrimination when it takes place," he said.

He said that he purpose of the research is to get closer contact with MSM in order to better improve prevention efforts and to get persons to seek treatment earlier.

Meanwhile, policy and advocacy coordinator of the Caribbean Vulnerable Communities Coalition (CVC) Ivan Cruickshank said that despite the rising levels of infections among vulnerable groups such as sex workers, MSM, prisoners and socially excluded youth, Caribbean states have chosen to focus almost exclusively on targeting the wider population. Such countries, he said continues to develop generalised responses rather than tailored programming.

"Moreover while Caribbean governments often commit on paper and in rhetoric to working with marginalised groups, in private government officials and ministers continue to express resentment to working with these populations," he said.

He added that while most governments of the region have committed to report to the United Nations against targets, they fail to report 70 per cent of all data on sex workers and men who have sex with men.

To Skip the 'Talk' About Sex, Have an Ongoing Dialogue

Wall Street Journal, (11.15.2011) Elizabeth Bernstein

Child-development experts are rethinking “the talk,” the traditional parent-child conversation about sex.

The American Academy of Pediatrics recommends having age-appropriate ongoing conversations with children about human sexuality. By age 10, a child should know the differences between males and females, the correct names of body parts and the developmental changes that occur. If parents wait until the early teens, or even middle school, to talk about sex, they have waited too long, AAP says.

“The notion that we are supposed to have one talk about the birds and the bees and be done with it is a myth,” said Dr. L. Kris Gowen, a developmental psychologist and senior research associate at Portland State University in Oregon. “Research shows that the more the kids learn, the less likely they are to have sex.”

Experts suggest the following dialogue guidelines, tailored to an individual child’s development:
* For preschoolers, talk about body parts using clinical words rather than euphemisms, which can connote feelings of shame or embarrassment; talk about pregnancy and birth; talk about what is safe touch, and what is not. In response to questions about same-sex couples, explain that families come in different shapes and sizes, Gowen said.

* For ages five to eight, begin explaining how a child’s body changes to an adult’s. Amy Lang, founder of Birds+Bees+Kids, which helps parents and others learn how to talk to children about sex, suggests starting a discussion about pornography by age eight. “Give them a heads up that sometimes people look at videos and pictures of naked people on the Internet and that this is not OK for kids,” she said.

* For ages nine to 12, parents should explain their own values concerning certain topics; discuss the dynamics of healthy and unhealthy sexual relationships.

* For ages 13 to 15, talk about safe sex and how to prevent STDs and pregnancy; talk about values and relationships.

* For ages 16 to 20, shift conversations from “how” to “why,” stressing values; talk about casual sex, date rape and peer pressure.

**TB Vaccine Shows Promise in Mice: Study**

*Agence France Presse*, (09.04.2011)

Researchers led by William Jacobs of Albert Einstein College of Medicine in New York believe they have made a “significant step” in the development of a safe and reliable vaccine against tuberculosis.

To better understand how Mycobacterium tuberculosis circumvents the human immune system, the team’s strategy was to work with a closely related bacterium, Mycobacterium smegmatis, which is lethal to mice at high doses but not harmful to humans. They created a version of M. smegmatis lacking the ESX-3 genes that allow the bacterium to evade host immunity.

As anticipated, the mice did not become sick, even when injected with large doses of altered M. smegmatis. Without ESX-3, the modified bacterium could not penetrate the mice’s immune systems, which fought off infection using the same T-cells that a successful TB vaccine would need to activate.

However, removing the same set of ESX-3 genes from M. tuberculosis killed the bacterium, meaning it could no longer be manipulated for the creation of a successful vaccine. The researchers then took another approach: They created a hybrid of the two bacteria by inserting the immune system-fighting ESX-3 genes from M. tuberculosis in the version of M. smegmatis from which the gene set had been removed.

The hybrid allowed the mice to once again fight off infection. Eight weeks later, they were exposed to high doses of M. tuberculosis, which is as lethal in mice as in humans. The “vaccinated” mice lived for an average 135 days compared to 54 days for the control group. Further, “vaccinated animals that survived more than 200 days had livers that were completely clear of TB bacteria, and nobody has ever seen that before,” said Jacobs.

Only one-fifth of the mice showed such resilience, meaning that the vaccine needs improving, the team cautioned. “We don’t even know yet if it will work in humans,” Jacobs said. “But it is certainly a significant step.”

The study, “A Recombinant Mycobacterium Smegmatis Induces Potent Bactericidal Immunity Against Mycobacterium Tuberculosis,” was published online in the journal Nature Medicine (2011; doi:10.1038/nm.2420).

**Ulcer-causing bacteria tamed by defect in cell-targeting ability**

SANTA CRUZ, CA—Without the ability to swim to their targets in the stomach, ulcer-causing bacteria do not cause the inflammation of the stomach lining that leads to ulcers and stomach cancer, according to a new study by researchers at the University of California, Santa Cruz.

The findings, published in the *Proceedings of the National Academy of Sciences* (Online Early Edition, week of Nov. 21-25), provide new clues about how the bacteria, called *Helicobacter pylori*, trigger harmful inflammation in some people. About half of all people worldwide are infected with *H. pylori*, but in most cases the infection does not cause any problems. Severe inflammation leading to ulcers or cancer occurs in only about ten percent of infections.

"If we can understand the pathways that cause the infection to go to this bad state of chronic inflammation, we may eventually be able to design treatments that would limit it," said Karen Ottemann, a professor of microbiology and environmental toxicology at UC Santa Cruz and senior author of the PNAS paper.
Ottemann has been studying *H. pylori* chemotaxis, which is the bacteria’s ability to respond to specific chemicals in its environment by swimming toward or away from them. Her lab has developed a strain of the bacteria that is missing a single gene essential for chemotaxis. These defective bacteria cause much less inflammation than normal strains, even though they seem to have little trouble establishing infections in the stomach.

In the new study, the researchers looked at how the immune system responds to infections with normal and mutant strains of the bacteria. Their findings highlight the role of a particular type of white blood cell known as T-helper cell type 17 (Th17). Th17 cells promote chronic inflammation, but the researchers found that these cells were missing in the immune response to infection with the mutant strain.

The connection between chemotaxis and the immune response involves several steps. Previous work by other researchers has shown that Th17 cells respond to the combination of bacterial infection and dying host cells. Ottemann's group found that the mutant strain of *H. pylori* causes much less cell death than normal strains. The researchers hypothesize that without chemotaxis, the mutant strains are not able to get close enough to the cells lining the stomach to deliver the bacterial toxins that induce cell death. The toxins trigger a process called apoptosis, a suicide program built into all cells and triggered by certain types of cell damage.

"The bacteria use chemotaxis to get close to the host stomach cells, and then they deliver packages of nasty molecules that kill host cells," Ottemann said. "Previously, people thought the bacteria have to bind to the stomach cells. But it turns out they just have to be close enough to hit the cells with the cell-killing molecules. We think one reason they have the ability to swim is to hover close to their target cells."

The missing gene in the mutant strain, called CheY, provides a link between the bacteria’s chemical sensors and their swimming mechanism, a whip-like flagellum that propels the spiral-shaped bacteria. The mutant bacteria can still swim, but they move aimlessly. "They’ve lost the connection between the sensory input and the behavior, so they just swim blindly," Ottemann said.

*H. pylori* infections can be cured by taking antibiotics, but some studies have indicated that the infection may actually have some beneficial effects, at least for people who don't get ulcers or stomach cancer. For example, *H. pylori* infection seems to reduce the chances of getting esophageal cancer. Some doctors have argued that controlling the negative effects of the infection may be preferable to eliminating it with antibiotics.

"The idea is that our bodies have adapted to it, and in 90 percent of people the bacteria act like a normal part of the body's flora," Ottemann said. "So the best thing might be to keep *H. pylori* in the stomach, but tame it so it wouldn't cause inflammation. It’s possible we could tame it by targeting chemotaxis."

**What Bacteria Don't Know Can Hurt Them**

Bacterial clusters living in the lungs of a cystic fibrosis patient are highly resistant to
Many infections, even those caused by antibiotic-sensitive bacteria, resist treatment. This paradox has vexed physicians for decades, and makes some infections impossible to cure.

A key cause of this resistance is that bacteria become starved for nutrients during infection. Starved bacteria resist killing by nearly every type of antibiotic, even ones they have never been exposed to before.

What produces starvation-induced antibiotic resistance, and how can it be overcome? In a paper appearing this week in *Science*, researchers report some surprising answers.

"Bacteria become starved when they exhaust nutrient supplies in the body, or if they live clustered together in groups known as biofilms," said the lead author of the paper, Dr. Dao Nguyen, an assistant professor of medicine at McGill University.

Biofilms are clusters of bacteria encased in a slimy coating, and can be found both in the natural environment as well as in human tissues where they cause disease. For example, biofilm bacteria grow in the scabs of chronic wounds, and the lungs of patients with cystic fibrosis. Bacteria in biofilms tolerate high levels of antibiotics without being killed.

"A chief cause of the resistance of biofilms is that bacteria on the outside of the clusters have the first shot at the nutrients that diffuse in," said Dr. Pradeep Singh, associate professor of medicine and microbiology at the University of Washington, the senior author of the study. "This produces starvation of the bacteria inside clusters, and severe resistance to killing."

Starvation was previously thought to produce resistance because most antibiotics target cellular functions needed for growth. When starved cells stop growing, these targets are no longer active. This effect could reduce the effectiveness of many drugs.

"While this idea is appealing, it presents a major dilemma," Nguyen noted. "Sensitizing starved bacteria to antibiotics could require stimulating their growth, and this could be dangerous during human infections."

Nguyen and Singh explored an alternative mechanism. Microbiologists have long known that when bacteria sense that their nutrient supply is running low, they issue a chemical alarm signal. The alarm tells the bacteria to adjust their metabolism to prepare for starvation. Could this alarm also turn on functions that produce antibiotic resistance?

To test this idea, the team engineered bacteria in which the starvation alarm was inactivated, and then measured antibiotic resistance in experimental conditions in which bacteria were starved. To their amazement, bacteria unable to sense starvation were thousands of times more sensitive to killing than those that could, even though starvation arrested growth and the activity of antibiotic targets.

"That experiment was a turning point," Singh said. "It told us that the resistance of starved bacteria was an active response that could be blocked. It also indicated that starvation-induced protection only occurred if bacteria were aware that nutrients were running low."

With the exciting result in hand, the researchers turned to two key questions. First does the starvation alarm produce resistance during actual infections? To test this, the team examined naturally starved bacteria, biofilms, isolates taken from patients, and bacterial infections in mice. Sure enough, in all cases the bacteria unable to sense starvation were far easier to kill.

The second question was about the mechanism of the effect. How does starvation sensing produce such profound antibiotic resistance? Again, the results were surprising.

Instead of well-described resistance mechanisms, like pumps that expel antibiotics from bacterial cells, the researchers found that the bacteria's protective mechanism defended them against toxic forms of oxygen, called radicals. This mechanism jives with new findings showing that antibiotics kill by generating these toxic radicals.

The findings suggest new approaches to improve treatment for a wide range of infections.

"Discovering new antibiotics has been challenging," Nguyen said. "One way to improve infection treatment is to make the drugs we already have work better. Our experiments suggest that antibiotic efficacy could be increased by disrupting key bacterial functions that have no obvious connection to antibiotic activity."

The work also highlights the critical advantage of being able to sense environmental conditions, even for single-celled organisms like bacteria. Cells unaware of their starvation were not protected, even though they ran out of nutrients and stopped growth. This proves again that, even for bacteria, "what you don't know can hurt you."
Journal Reference:

Weak Spot Discovered On Deadly Ebolavirus
ScienceDaily (Nov. 20, 2011) — Scientists from The Scripps Research Institute and the US Army’s Medical Research Institute of Infectious Diseases have isolated and analyzed an antibody that neutralizes Sudan virus, a major species of ebolavirus and one of the most dangerous human pathogens.

"We suspect that we’ve found a key spot for neutralizing ebolaviruses," said Scripps Research Associate Professor Erica Ollmann Saphire, who led the study with US Army virologist John M. Dye.

The new findings, which were reported November 20, 2011, in an advance online edition of Nature Structural & Molecular Biology, show the antibody attaches to Sudan virus in a way that links two segments of its coat protein, reducing their freedom of movement and severely hindering the virus’s ability to infect cells. The protein-linking strategy appears to be the same as that used by a previously discovered neutralizing antibody against the best-known ebolavirus species, Ebola-Zaire. The new study suggests that this may be the best way for vaccines and antibody-based therapies to stop ebolaviruses.

Deadly Outbreaks
Ebolaviruses first drew the attention of the medical world with simultaneous deadly outbreaks in 1976 in the nations of Sudan and Zaire (currently known as the Democratic Republic of the Congo). These two outbreaks were caused by the two major viruses: Ebola-Sudan and Ebola-Zaire, and early field studies showed that sera from patients that survived one virus could not help patients infected with the other.

Both viruses persist in animal hosts—probably bats—and when they spread to humans, typically cause severe hemorrhagic fevers, killing up to 90 percent of people they sicken. Although not as contagious as influenza or measles, ebolaviruses can be transmitted in bodily fluids including exhaled airborne droplets, and scientists who study these viruses are generally required to use special “Biosafety Level 4” facilities. The US government regards the ebolaviruses as a potential bioterror threat.

Ebolavirus researchers hope to develop a vaccine that could be used to protect health workers and others in the vicinity of ebolavirus outbreaks, as well as an antibody-based immunotherapy that could help infected people survive. However, these tasks are complicated by the fact that there are now five recognized species of ebolavirus: Ebola-Zaire, also known simply as Ebola virus; Tai Forest virus; Reston virus; Bundibugyo virus; and Sudan virus.

"These species differ enough from each other that neutralizing antibodies to one don’t protect against the rest," said Ollmann Saphire. "Sudan virus is a particular concern because it has caused about half of the ebolavirus outbreaks so far, including the largest outbreak yet recorded."

Uncovering the Body’s Natural Protection
US government researchers recently demonstrated that an experimental vaccine containing proteins from Ebola and Sudan viruses provides monkeys with some protection against those viruses. But precisely how the vaccine works is unclear, and it has never been tested in humans. Moreover, until now no laboratory has isolated a neutralizing antibody against Sudan virus.
To find such an antibody, Dye and his colleagues at Fort Detrick, Maryland, injected lab mice with a harmless virus engineered to make copies of the Sudan virus coat protein. The coat protein provoked the mice’s immune B cells to make various antibodies against it, and the scientists were able to reproduce the mice’s repertoire of antibodies by harvesting their B-cells and culturing them in the lab. Testing each type of antibody for its ability to block the infection of cells with Sudan virus, the researchers found one good candidate, antibody 16F6, which not only neutralized Sudan virus in the lab dish but also significantly delayed the deaths of infected mice. They then sent 16F6 to Ollmann Saphire's lab at Scripps Research in California.

"We were very excited about developing this antibody as a potential treatment for Ebola virus," said Dye. "Collaborating with the Ollmann Saphire lab to determine the binding site was the perfect complement to our previous work."

Ollmann Saphire's lab specializes in the use of X-ray crystallography and related techniques to visualize the atomic-scale details of viruses bound by antibodies. These details reveal where on a virus an antibody binds, and if the antibody is one that neutralizes a virus's ability to infect cells, its binding site usually offers important clues to the virus's workings and vulnerabilities.

In the new study, Ollmann Saphire's team found that 16F6 attaches to the Sudan virus in a way that links two segments of the viral coat protein. The virus is known to use one of these segments, GP1, to grab hold of a host cell. When this happens, the cell automatically brings the virus inside, encapsulated within a bubble-like chamber known as an endosome. Normally the cell would destroy the contents of such an endosome, but Sudan virus—like some other viruses—employs its other viral coat-protein segment, GP2, to fuse to the wall of the endosome so that it and the rest of the virus escape into the doomed cell's interior. Antibody 16F6 seems to prevent this fusion process from happening by keeping GP2 bound to GP1.

"The virus is like a wolf in sheep's clothing because its outer part is covered with human sugar molecules, that the antibodies do not see as foreign," said Ollmann Saphire. "The binding site of the 16F6 antibody is one of the few places where viral protein is exposed, and it's exposed because it's a place where GP1 and GP2 need to be free to move." To fuse to the endosomal wall, GP2 must separate from GP1 and uncoil itself. When it is held fast to GP1 by the antibody 16F6, GP2 can't uncoil and perform its function—and so the Sudan virus, instead of escaping into the relatively unprotected interior of the cell, stays within the endosome and is eventually destroyed.

**A Strategy Against Ebolaviruses**

Ollmann Saphire and her colleagues suspect that 16F6’s protein-linking strategy is the best one that antibodies have against ebolaviruses. The antibody's binding site on the Sudan virus coat protein is virtually the same as the binding site of an Ebola-Zaire-neutralizing antibody known as KZ52, which Ollmann Saphire and Scripps Research colleague Professor Dennis Burton found and analyzed three years ago. KZ52 is derived from antibodies made by an African patient who survived an Ebola-Zaire outbreak in 1995, and aside from 16F6 it is the only ebolavirus-neutralizing antibody whose binding site has been determined with X-ray crystallography.

"We think it's not just a coincidence that these two different antibodies, evoked in two different host species by two different ebolaviruses, use the same strategy of linking GP1 and GP2," Ollmann Saphire said.

She and her colleagues now are trying to obtain structural data on several other ebolavirus-neutralizing antibodies, and she suspects that at least one of these also works by linking GP1 to GP2. "There may be other neutralizing sites on ebolaviruses, but so far the only one we've found is this one," she said.

The recognition that ebolavirus-neutralizing antibodies share this protein-linking strategy should guide the further development of vaccines and immunotherapies. "It helps us to understand more precisely what an ebolavirus vaccine or immunotherapy ought to do," Ollmann Saphire said.

**Protection from Severe Malaria Explained**

ScienceDaily (Nov. 18, 2011) — Why do people with a hereditary mutation of the red blood pigment hemoglobin (as is the case with sickle-cell anemia prevalent in Africa) not contract severe malaria? Scientists in the group headed by Prof. Michael Lanzer of the Department of Infectious Diseases at Heidelberg University Hospital have now solved this mystery.

**Journal Reference:**

A degradation product of the altered hemoglobin provides protection from severe malaria. Within the red blood cells infected by the malaria parasite, it blocks the establishment of a trafficking system used by the parasite’s special adhesive proteins—adhesins—to access the exterior of the blood cells. As a result, the infected blood cells do not adhere to the vessel walls, as is usually the case for this type of malaria. This means that no dangerous circulatory disorders or neurological complications occur.

The research study has been published in the journal *Science*, appearing initially online.

In the 1940s, researchers already discovered that sickle-cell anemia with its characteristic blood mutation was particularly prevalent in certain population groups in Africa. They also survived malaria tropica, whose course is usually especially virulent. With malaria tropica, the malaria parasites (Plasmodia) enter the person after a bite of an infected Anopheles mosquito. The parasites first multiply in the person’s liver cells and then infect the red blood cells (erythrocytes). Once inside the erythrocytes, they divide again and ultimately destroy them. The nearly simultaneous bursting of all infected blood cells causes the characteristic symptoms, which include bouts of fever and anemia.

**Adhesins on red blood cells cause circulatory disorders**

In patients with malaria tropica, neurological complications such as paralysis, seizures, coma and severe brain damage also frequently occur. This is caused by an anomaly of the parasite Plasmodium falciparum. It forms special adhesins that reach the cell surface of the infected blood cell. Once there, it causes the erythrocytes to adhere to the vessel walls, preventing them from being recognized in the spleen as damaged and removed from circulation. The parasite’s protective mechanism results in smaller vessels closing, becoming inflamed and for example, prevents parts of the nervous system from being adequately supplied with oxygen.

In humans with mutated hemoglobin, these complications occur in a weakened form or not at all. "At the cell surface of infected erythrocytes with mutated hemoglobin, there are significantly fewer adhesins of the parasite than in normal red blood cells," explained Prof. Lanzer, Director of the Dept. of Infectious Diseases, Parasitology. "For this reason, we had a closer look at the trafficking system within the host cell." To this end, the team compared the blood cells with normal hemoglobin and two hemoglobin variants (hemoglobin S and hemoglobin C), which occur in around one-fifth of the African population in malaria–infected areas.

**Trafficking system of the malaria parasite visualized for the first time**

In so doing, the scientists used high-resolution microscopy techniques such as cryoelectron tomography to discover a new transport mechanism. The parasite uses a certain protein (actin) from the cytoskeleton (cellular skeleton) of the erythrocytes for its own trafficking network. "It forms a completely new structure that has nothing in common with the rest of the cytoskeleton," explained Dr. Marek Cyrklaff, group leader at the Dept. of Infectious Diseases, Parasitology and first author of the article. "The vesicles with the adhesins reach the cell surface of the red blood cells directly via these actin filaments."

In contrast to erythrocytes with the two hemoglobin variants, here only short pieces of actin filaments are found. Targeted transport to the surface is not possible. "The entire transport system of the malaria parasite is degenerated in these blood cells," Cyrklaff added. Laboratory tests showed that the hemoglobins themselves were not responsible for this, but rather a degradation product, ferryl hemoglobin. This is an irreversibly damaged, chemically altered hemoglobin that is no longer able to bind oxygen. The hemoglobins S and C are considerably more unstable than normal hemoglobin. As a result, blood cells with these variants contain ten times more ferryl hemoglobin than other erythrocytes. This high concentration destabilizes the binding of the actin structure and it disintegrates.

"With these results, we have now described a molecular mechanism for the first time that explains this hemoglobin variant's protective effect against malaria," Lanzer said.

**How Legionnaires' Bacteria Proliferate, Cause Disease**

ScienceDaily (Nov. 17, 2011) — A University of Louisville scientist has determined for the first time how the bacterium that causes Legionnaires' disease manipulates our cells to generate the amino acids it needs to grow and cause infection and inflammation in the lungs.

The results are published online on Nov. 17 in *Science*.

Yousef Abu Kwaik, Ph.D., the Bumgardner Endowed Professor in Molecular Pathogenesis of Microbial Infections at UofL, and his team believe their work could help lead to development of new antibiotics and vaccines.
"It is possible that the process we have identified presents a great target for new research in antibiotic and vaccine candidates, not only for Legionnaires’ disease but in other bacteria that cause illness," he said.

According to the Centers for Disease Control and Prevention, Legionnaires’ disease is a lung infection caused by the bacterium called *Legionella*. The bacterium got its name in 1976, when many people who went to a Philadelphia convention of the American Legion suffered from an outbreak of pneumonia of unknown causes that was later determined to be caused by the bacterium. Each year, between 8,000 and 18,000 people are hospitalized with Legionnaires’ disease in the U.S. There is no vaccine currently available for it.

For two years, the researchers examined *Legionella* which is an intracellular bacterium that exists in amoebae in the water systems; it is transmitted to humans through inhalation of water droplets. Cooling towers and whirlpools are the major sources of transmission. The bacterium uses the amoeba’s cellular process to "tag" proteins, causing them to degrade into their basic elements of amino acids. These amino acids are used by the bacteria as the main source of energy to grow and cause disease.

"The bacteria live on an 'Atkins diet' of low carbs and high protein, and they trick the host cell to provide that specialized diet," Abu Kwaik said.

The same process occurs in a host—animal or human—who inhales the bacterium and is diagnosed with Legionnaires’ disease. However, the bacteria do not tag the proteins, but rather trick the host into tagging the proteins for degradation to generate the amino acids.

In the laboratory, Abu Kwaik and his team saw that by inactivating the bacterial virulence factor responsible for tricking the cell into tagging proteins for degradation in mice models, the pulmonary disease was totally prevented. This was totally due to disabling the bacteria from generating amino acids, he said.

The process was then reversed, and the disease became evident when the mice, infected by the disabled bacteria, were injected with amino acids to compensate for the inability of the altered bacteria.

"Bacteria need to live on high protein and amino acids as sources of nutrition and energy in order to replicate in a host. This is what causes pulmonary disease," Abu Kwaik said. "No one has known how they generate sufficient sources of nutrients from the host to proliferate. Our work is the first to identify this process for any bacteria that cause disease."

He added that the type of host infected does not appear to affect the process. "Whether in a single-cell amoeba or a multi-cellular mammal, *Legionella* seems to know what to do; the process is the same, and is highly conserved through evolution. By interfering with the bacterium’s sources of nutrients, we can stop it from thriving and causing disease."

Examing nutrient sources for organisms with the goal of stopping them from acquiring nutrients is a relatively new arena of basic research that deserves further study, he said. "We went after the basics—the food and energy source—which are prerequisite for the bacteria to grow and cause disease. It is not a process that is well understood yet, but by first discovering how an organism gets nutrients by tricking the host into degrading proteins, and then interfering with that process, we can, in effect, starve it to death and prevent or treat the disease."

**Journal Reference:**

**Virulence of HIV has increased since first reports of AIDS**

Michael Carter

Published: 22 November 2011

HIV may have evolved to become more virulent over the course of the epidemic, according to the results of a meta-analysis published in the online edition of *AIDS*.

The study estimates that six months after infection, the CD4 cell count of a person infected with HIV in 2010 was likely to stabilise at a level approximately 150 cells below that of a person infected in the early 1980s. This implies that HIV transmitted in recent years is likely to lead to more rapid development of illness compared with HIV transmitted 30 years ago.

US investigators analysed the results of studies conducted between 1984 and 2010 to see if two key prognostic markers—CD4 cell set point and viral load set-points (the level of CD4 cells and viral load immediately after primary infection)—had changed. All the studies involved patients from North America and Europe and most individuals were therefore infected with HIV-1 subtype B.
Increasing virulence of the virus was suggested by an annual fall in CD4 cell count of approximately 5 cells/mm³ and an increase in viral load set point of 0.013 log₁₀ copies/ml. “Over the course of the HIV-1 subtype B epidemic in North America and Europe there are overall trends of decreasing baseline CD4 cell counts and increasing set point viral loads,” comment the investigators.

They calculated that these changes represent “a loss of 148 CD4 cells/mm³ and an increase of 0.39 log₁₀ copies/ml RNA over a 30 year period (from the first CDC report of the epidemic in 1981).” Even larger changes were observed in patients with a known date of infection with HIV.

However, there was evidence that the virulence of the virus had slowed in recent years. Earlier research examining the virulence of HIV has produced conflicting results. Nevertheless, it is important to establish an accurate understanding of this issue as it has implications for both treatment and prevention strategies. If the virus has become more virulent, this could suggest that it is easier to transmit. Similarly, a more virulent virus would hasten the need for antiretroviral therapy.

Investigators therefore conducted a meta-analysis of studies examining trends in baseline CD4 cell counts and viral load set points.

A total of twelve studies monitoring CD4 cell counts were identified. They included approximately 21,000 individuals, and nine enrolled patients with an established date of HIV seroconversion. Viral load set-point was assessed in eight studies involving approximately 11,000 patients. In six of these studies, the population comprised individuals with a documented date of seroconversion.

The studies were published between 1996 and 2009 and provided data on newly diagnosed patients over a mean of 17 years. All were conducted in Europe and North America and therefore the majority of patients were infected with subtype-B virus.

The meta-analysis showed a statistically significant decreasing trend in CD4 cell count of −4.93 cells/mm³ each year. When analysis was restricted to seroconvertors, the mean annual loss in CD4 cell count increased to −6.01 cells/mm³.

Viral load set-point increased by a mean of 0.013 log₁₀ copies/ml. Restricting analysis to seroconvertors showed an even larger mean increase (0.018 log₁₀ copies/ml).

“These trends are consistent with increased virulence of HIV-1 due to viral evolution in the human population,” suggest the investigators.

Overall, they estimate that baseline CD4 cell count has fallen by a mean 148 cells/mm³ and viral load set-point has increased by a mean of 0.39 log₁₀ copies/ml since the first reports of AIDS in the early 1980s.

Restricting analysis to seroconvertors showed even larger changes with a mean reduction in baseline CD4 cell count of 180 cells/mm³ with a corresponding mean increase in viral load set-point of 0.54 log₁₀ copies/ml.

They believe that their findings have both clinical significance and implications for HIV prevention. “A 0.3 log₁₀ copies/ml change is a clinically significant change in viral load,” write the authors. “The relationship between set point and viral load disease progression predicts that an increase in set point of 0.5 log₁₀ copies/ml decreases the median time to AIDS by three years…and will modify the per year transmission rate by 37%.”

However, the magnitude of changes in CD4 cell count and viral load set-point lessened over time.

“Overall, our meta-analysis of trends in prognostic markers of HIV-1 disease progression suggests that HIV-1 has become more virulent over the 30-plus year history of the global HIV/AIDS epidemic,” conclude the investigators. They call for studies in other populations and locations affected by the epidemic, especially sub-Saharan Africa “to assess our findings and its future impact.”

Reference

Record 34 Million Living with HIV as Treatment Cuts Deaths: UN
Agence France Presse . (11.21.2011)
About half of those eligible for HIV treatment are now receiving it, UNAIDS reported Monday. In sub-Saharan Africa, the number of people in treatment jumped 20 percent between 2009 and 2010—the world’s most dramatic increase in access. Treatment and better health care helped cut AIDS-related mortality worldwide to 1.8 million deaths in 2010, down from 2.2 million at the 2006 peak. UNAIDS estimates that 700,000 AIDS-related deaths were averted in 2010.
“We are on the verge of a significant breakthrough in the AIDS response,” said Michel Sidibe, executive director of UNAIDS. “New HIV infections continue to fall, and more people than ever are starting treatment.”

Modeling data suggest treatment is preventing new infections as well, with the number of new HIV infections “30 to 50 percent lower than it would have been in the absence of universal access to treatment for eligible people living with HIV,” the agency reported.

In Namibia’s case, 90 percent treatment coverage and 75 percent condom use among men contributed to a 60 percent cut in new infections by 2010, UNAIDS said.

“The massive increases in the numbers of people receiving treatment in South Africa between 2009 and 2010, for example, are likely to be reflected in substantially fewer new infections in the near future,” the report noted. “In the next five years, smart investments can propel the AIDS response towards achieving the vision of zero new HIV infections, zero discrimination, and zero AIDS-related deaths.”

Ironically, these improvements are occurring at a time when many donor nations’ budgets are being squeezed, resulting in less money for the international AIDS response.

To view the 2011 UNAIDS World AIDS Day Report, visit:

**More than 40,000 Zimbabwean Men Circumcised Since Last Year**

*Xinhua News Agency*  (11.18.2011)

Zimbabwe is 40,000 men closer to its goal of circumcising 1.2 million men by 2015, state media reported Friday.

Ministry of Health and Child Welfare representatives credit the gain to two large-scale education campaigns it has undertaken since the program was implemented in 2010. A third campaign is slated to begin at the end of November.

Convincing data suggest that male circumcision cuts the risk of female-to-male HIV transmission by about 60 percent. National male circumcision coordinator Sinokuthemba Xaba urges comprehensive HIV prevention tactics—including the use of male and female condoms, abstinence, faithfulness, and HIV testing—in addition to circumcision.

“About 11,000 men were circumcised by December 2010 but over 20,000 have been circumcised this year alone,” said Xaba. “The major reason for the increase is the increase in awareness and accessibility of male circumcision.”

“Neonatal circumcision has not yet been introduced, but preparations are underway,” added Xaba. “The initial pilot will not be prioritized in the short term due to limited resources, but will have [a] long-term plan from 2015 and beyond.” Xaba also noted neonatal circumcision, like adult male circumcision, would be free “to ensure that cost does not become a limiting factor to access.”

**Key Points of Roman Catholic Church’s Africa Roadmap**

*Agence France Presse*,  (11.19.2011)

Pope Benedict XVI gave his approval Saturday to “Africae Munus” (“The Pledge for Africa”), a 135-page apostolic exhortation for the Roman Catholic Church in Africa. The document includes the following statement regarding HIV/AIDS: “The problem of AIDS, in particular, clearly calls for a medical and pharmaceutical response. This is not enough, however: The problem goes deeper. Above all, it is an ethical problem. The change of behavior that it requires—for example, sexual abstinence, rejection of sexual promiscuity, fidelity within marriage—ultimately involves the question of integral development, which demands a global approach and a global response from the Church. For if it is to be effective, the prevention of AIDS must be based on a sexual education that is itself grounded in an anthropology anchored in the natural law and enlightened by the word of God and the Church’s teaching.”

**More Sex the Better for Pensioners**

*UK Press Association*,  (11.20.2011)

A new study finds that the more people over age 65 engage in sex, the more likely they are to say they are happy with their lives and marriages. A survey of 238 Americans age 65 and older found that 60 percent who reported being sexually active more than once a month said they were very happy, compared to only 40 percent who had not had sex for a year. Four-fifths of those having sex more than once a month said they were very happy in their marriage, compared to 59 percent who had not had sex in a year.

“Highlighting the relationship between sex and happiness will help us in developing and organizing
specific sexual health interventions for this growing segment of our population," said Florida A&M University Assistant Professor Dr. Adrienne Jackson, who conducted the research and presented it at the Gerontological Society of America’s 64th annual scientific meeting in Boston.

Zinc supplementation does not protect young African children against malaria
A study led by Hans Verhoef, a researcher at Wageningen University, the Netherlands, and the London School of Hygiene and Tropical Medicine, UK, and published in this week's *PLoS Medicine* shows that supplementing young Tanzanian children with zinc —either alone or in combination with other multi-nutrients — does not protect against malaria.

Zinc helps to maintain a healthy immune system, and previous studies had shown a benefit of zinc in reducing diarrhea. Most African children are deficient in zinc, and in this study the authors wanted to investigate a possible role for zinc supplementation in protecting against malaria.

The authors randomly assigned 612 children from a rural area of Tanzania aged between 6 months and 5 years to receive daily oral supplements containing zinc alone, multi-nutrients without zinc, multi-nutrients with zinc, or no micronutrients (placebo) and found that the incidence rate of malaria in all four intervention groups was very similar (about 3 episodes a year). None of the supplements had any effect on malaria rates when compared to the placebo, even though the occurrence of zinc deficiency was strongly reduced by zinc supplementation in the trial.

In a further analysis, the authors suggested that multi-nutrient supplementation might be harmful as it increased the risk of malaria in children with iron-deficiency.

The authors say: "Despite a high prevalence of zinc deficiency, excellent compliance, and few drop-outs, we found no evidence from this trial that preventive zinc supplementation, alone or with multi-nutrients, reduced rates of febrile attacks of malaria."

They add: "We have presented evidence that multi-nutrient supplementation may increase the risk of malaria in children with iron deficiency, strengthening earlier concerns about the safety of multi-nutrient supplementation in malaria-endemic areas, even in settings with good access to health care and appropriate treatment."

The authors conclude: "when results from all trials are considered together, there is no evidence that zinc interventions can reduce the burden of malaria in African children."

Rare HIV, Group N, Reported Outside Cameroon
24 Nov 2011
A man in France who recently travelled to Togo has been diagnosed with a rare type of HIV-infection — Group N. This is the first time this type of HIV-infection has been detected outside Cameroon. The infection is considerably more similar to the virus type discovered in chimpanzees than to other human type viruses.

Professor François Simon, INSERM U 941 of the Faculté de Médecine Paris-Diderot at the Hôpital Saint-Louis in Paris and his team from the National Reference Centre for HIV in Rouen, France describe the circumstances in a Case Report in this week’s issue of *The Lancet*.

In humans, most types of HIV-infection are either group M, or less commonly, group O. In 1998 a woman living in Cameroon was the first person diagnosed with HIV group N. Since then, only 12 cases of group N have been diagnosed, including two couples infected by the same strains, all in Cameroon. In 2009, a fourth group was identified (group P) in a Cameroonian woman living in Paris.

8 days after returning from Togo, a 57-year-old man living in France went to the emergency unit Hôpital Saint-Louis with rash, fever, genital ulceration and swollen lymph glands. HIV primary infection was suspected after the man reported sexual contact with a Togolese partner. Once healthcare professionals detected HIV, it was profiled. According to the authors, they were shocked to find that the virus did not match up with standard types of HIV.

The authors explain that this case of primary HIV-N infection is especially crucial due to the severe clinical manifestations and early decline in the CD4 cell count. A five-drug antiretroviral combination demonstrated good primary effectiveness, although virological and long-term immunological follow-up is needed.
The researchers conclude: "This case of HIV-1 group-N primary infection indicates that this rare group is now circulating outside Cameroon, which emphasises the need for rigorous HIV epidemiological monitoring."
Written by Grace Rattue
Article URL: http://www.medicalnewstoday.com/articles/238223.php

Church Tells HIV Patients To Stop Treatment
Liz Lane, Sky News reporter

At least six people have died in Britain after being told they had been healed of HIV and could stop taking their medication, Sky News has discovered.
There is evidence evangelical churches in London, Manchester, Birmingham and Glasgow are claiming to cure HIV through God.

Sky sent three undercover reporters to the Synagogue Church of All Nations (SCOAN), which is based in Southwark, south London.

All of them told the pastors they were HIV positive—all were told they could be healed.
Once a month, the church has a prayer line, where people from across Europe come to be cured of all kinds of illness.

At registration, they have to hand over a doctor's letter as evidence of their condition.
They are filmed giving before and after testimonies, which are put on SCOAN's website.
The healing process involves the pastor shouting over the person being healed for the devil to come out of their body, while spraying water in their face.

One of the pastors, Rachel Holmes, told Sky's reporter Shatila, who is a genuine HIV sufferer, they had a 100% success rate.

Ms Holmes said: "We have many people that contract HIV. All are healed."
She said, if symptoms such as vomiting or diarrhoea persist, it is actually a sign of the virus leaving the body.

"We've had people come back before saying, 'Oh, I'm not healed. The diarrhoea I had when I had HIV, I've got it again,'" Ms Holmes said.
"I have to stop them and say, 'No, please, you are free.'"

SCOAN told Sky's reporters they would be able to discard their medication after their healing and that they would be free to start a family.

Former health secretary Lord Fowler, who led the HIV/Aids awareness drive in the 1980s, said this message was dangerous.
He said: "It is foolish advice and it is tragic advice because the consequences of this kind of advice can only be that people pass on HIV and can only be seriously bad for the individual concerned—including death."

Medical professionals have told Sky of at least six patients who died after being told by various churches to stop taking their HIV tablets.

Emmanuel came off his medication a year ago on the instructions of a pastor at his church in north London.

He said: "(The pastor) told me I'd been healed—'You've got to stop taking the medicine now. I'll keep praying for you. Once God forgives you then the disease will definitely go.'"

The healing process involves the pastor shouting over the person being healed for the devil to come out of their body.

Emmanuel admitted he suspects he may have passed HIV onto his boyfriend.
He said: "Yeah, I think I've passed it on. He got ill. Physically, he's lost some bit of weight.
"He's very small. I think he's worried... Yeah, I feel guilty, if I'm the one who passed it onto him I'm feeling guilty. Yeah, very much guilty."

The Synagogue Church of All Nations is wealthy. It has branches across the globe and its own TV channel.
On its website, it promotes its anointing water, which is used during the healing, and it also makes money from merchandise, such as DVDs, CDs and books.

Church members are expected to give regular donations.
We are not the Healer; God is the Healer. Never a sickness God cannot heal. Never a disease God cannot cure. Never a burden God cannot bear. Never a problem God cannot solve.

Synagogue Church of All Nations statement

It is also a registered UK charity. The Charity Commission is looking at our findings.
The Department of Health said it was very concerned: "Our advice is clear that faith and prayer are not a substitute for any form of treatment, especially for HIV treatment."

Sky asked the church for its response to our investigation.

In a statement, it said: "We are not the Healer—God is the Healer. Never a sickness God cannot heal. Never a disease God cannot cure. Never a burden God cannot bear. Never a problem God cannot solve. "To His power, nothing is impossible. We have not done anything to bring about healing, deliverance or prosperity. If somebody is healed, it is God who heals.

"We must have a genuine desire if we come to God. We are not in position to question anybody's genuine desire. Only God knows if one comes with true desire. Only God can determine this.

"That is why, if anybody comes in the name of God, we pray for them. The outcome of the prayer will determine if they come genuinely or not."

**Microbicide gel fails to work in large international trial**

Gus Cairns
Published: 25 November 2011

HIV prevention researchers and campaigners reacted with disappointment today when a trial of a tenofovir-containing microbicide gel was stopped because it had not prevented any more HIV infections than a placebo gel.

The VOICE (Vaginal and Oral Interventions to Control the Epidemic) trial is a large HIV prevention trial involving 5,029 women in South Africa, Zimbabwe and Uganda, run by the Microbicide Trials Network (MTN), a US-based research consortium funded by the US National Institute of Allergies and Infectious Diseases.

VOICE has been investigating two different HIV prevention methods, oral pre-exposure prophylaxis (PrEP) and a vaginal microbicide gel, with both pills and gel used daily regardless of sexual activity. Oral PrEP was given in two different drug formulations: tenofovir (Viread) tablets or tenofovir + emtricitabine (FTC) tablets (Truvada). In all, there were five arms of just over 1,000 women each: a daily tenofovir, Truvada or placebo pill, or daily vaginal application of tenofovir or placebo gel.

The tenofovir-tablet arm was called off in September when it failed to demonstrate efficacy. More recently, on 17 November, a pre-scheduled meeting of the study’s Data and Safety Monitoring Board (DSMB) established that HIV incidence was almost identical in women using tenofovir gel and ones using placebo gel. There were six infections per 100 women a year in women using tenofovir and 6.1 a year in women using placebo. (A trial’s DSMB is a group of independent experts who are the only people to see the unblinded data and know which subjects are taking placebo and which drug).

As a result both the tenofovir-gel and placebo-gel arms have now been stopped, leaving only the Truvada and placebo-pill arms continuing. Unless these too are stopped early, final data collection will occur mid-2012 and the VOICE trial’s full results should be ready by the beginning of 2013.

**A significant setback**

While the failure of the tenofovir-pill arm in VOICE was disappointing, the failure of the tenofovir gel is considerably more significant and challenging. Fifteen months ago the leaders of the CAPRISA 004 trial in South Africa were given three standing ovations at the Vienna World AIDS Conference when their study found that a tenofovir-gel vaginal microbicide used before and after sex prevented four out of ten HIV infections. At the time it was hailed as the vindication of a prevention concept first dreamed up 20 years ago.

Scientific studies do not just report a single result but also what is called a 95% confidence interval (CI). This reflects the range of uncertainty in a trial’s result, given that chance can always sway an outcome. While headline efficacy in CAPRISA 004 was 39%, the CI was six per cent to 60%, meaning that it was 95% likely that the ‘true’ efficacy of the tenofovir gel lay between these two extremes. If the true efficacy was lower than the observed efficacy, then results from CAPRISA 004 and VOICE are not totally incompatible.

CAPRISA 004 was a relatively small, single-country trial (889 participants) and was not considered sufficient evidence to support moving forward directly to the licensing of an anti-HIV microbicide. However the US Food and Drug Administration (FDA) indicated a year ago that if the VOICE trial were also to produce a positive result, it would fast-track tenofovir gel for approval, meaning we would have had an anti-HIV microbicide by 2014.
But VOICE has now produced a negative result and the licensing of a vaginal microbicide has become a considerably more distant prospect, as approval may now depend on more than one future positive result.

**Future plans**

Other trials are nonetheless proceeding, as researchers don’t yet know why no efficacy was found in VOICE and no safety issues were raised by the gel. The FACTS 001 trial is a South African study of tenofovir microbicide gel using the same before-and-after-sex regimen as CAPRISA 004. In has just started to enrol a planned 2,200 women at nine sites. In the middle of next year, the ASPIRE trial, a long-awaited efficacy trial of a vaginal ring impregnated with another anti-HIV drug, dapivirine (TMC120), will start: it is hoped that the ring, which will sit on the cervix and be renewed monthly, will overcome the adherence problems that have been the bane of HIV prevention trials using antiretroviral drugs. And of course the Truvada term will continue in VOICE and may represent, as MTN commented, “the one trial that can determine whether Truvada holds promise in preventing HIV.”

MTN has also just concluded a phase I safety trial of a rectal microbicide for use in anal sex and depending on evaluation of the results may move forward to a phase II dosing trial next year. The decision may be informed by VOICE but as rectal anatomy and the trial population are both very different, there is no reason to believe rectal microbicides cannot work if vaginal ones don’t.

**Reactions**

HIV prevention advocates expressed considerable disappointment at the closure of the gel arm in VOICE. “This is a blow to the HIV prevention field,” commented Mitchell Warren, Executive Director of the AIDS Vaccine Advocacy Coalition (AVAC).

“But it is not the definitive answer about whether 1% tenofovir gel is an effective HIV prevention product for women,” he added.

Yasmin Halima, Director of the Global Campaign for Microbicides, commented: “This is disappointing news... It’s not the answer we had hoped for, but it’s important to do these larger studies to better understand what may or may not work.”

Researchers emphasised that the failure of one method in one trial did not mean that the trial, or the idea of microbicides, had failed.

Zeda Rosenberg, Director of the International Partnership for Microbicides, which developed the vaginal ring and is collaborating with MTN in the ASPIRE trial, commented: “MTN will review all the data it gathered to help understand why tenofovir gel and oral tenofovir did not prevent HIV infection in the study. This research will provide invaluable information as the field continues its work to develop safe and effective HIV prevention tools for women.”

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**UK switches to Merck’s Gardasil for HPV vaccination**

Thu, Nov 24 2011

By Ben Hirschler

LONDON (Reuters)—Britain is to stop using GlaxoSmithKline’s cervical cancer vaccine Cervarix from next September and will instead offer girls Merck & Co’s rival product Gardasil.

The move underscores Gardasil’s lead in a $1 billion-plus worldwide market for vaccines that protect against the sexually transmitted human papillomavirus (HPV), which can cause cervical cancer.

The health ministry said Thursday the decision followed a competitive tendering exercise. GSK, however, said it had opted not to bid in the process because the government had made clear it wanted a vaccine offering broader protection.

While both shots are effective, Gardasil targets four strains of HPV—two responsible for cervical cancer and two causing the less serious condition of genital warts—while Glaxo’s product addresses only the two cancer strains.

Following a review of the various conditions caused by HPV, British health authorities placed additional emphasis on genital warts in the 2011 tender, effectively knocking Cervarix out of the competition.

David Salisbury, the government’s director of immunization, said experts had weighed up both the cost and clinical benefits before deciding to switch to Gardasil.

"We have reflected the changes in scientific knowledge that has become available since last time," he told reporters.

"They are not huge changes—we still prioritize the prevention of cancer—but based on all these things the winner is Gardasil."
Gardasil protects against the two strains of HPV virus that cause more than 70 percent of cervical cancer and two types that cause 90 percent of genital warts.

**GIRLS AGED 12-13**

Under the British program, HPV vaccination is offered routinely to girls aged 12 to 13 years, with a catch-up program for those up to 18.

Cervarix, from British-based GSK, has been the vaccine of choice since the program it was started in 2008—but a number of critics said at the time that the decision was based on cost and Gardasil should have been chosen from the start.

Gardasil is sold in Europe by Sanofi Pasteur MSD, a joint venture between U.S.-based Merck and French drugmaker Sanofi. A spokesman for Sanofi Pasteur MSD declined to comment on the price it was charging the British government.

Globally, Gardasil outsells Cervarix, with revenues of $988 million last year and sales expected to reach $1.25 billion by 2015, according to Thomson Reuters Pharma data. Cervarix sales last year were 242 million pounds ($375 million) and are forecast to reach $848 million in 2015.

GSK said at least 5 million doses of Cervarix had been administered in Britain up to July 2011 and the company remained committed to making the vaccine available around the world.

Significant new demand for HPV vaccines could soon open up in the poor nations, following a decision last week by the GAVI international immunizations group to fund their roll-out in developing countries—provided it can reach a deal on pricing with the manufacturers.

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**Washington Leaves Millions To Die**

The wonder of our world is that scientific knowledge is now so powerful that we can save millions of children, mothers, and fathers from killer diseases each year at little cost. The Global Fund to Fight AIDS, TB, and Malaria has mobilized that knowledge over the past decade to save more than 7 million lives and to protect the health of hundreds of millions more. Yet now the Global Fund is under mortal threat because of budget cuts approved by President Obama and the Congress.

The Obama Administration had pledged $4 billion during 2011-13 to the Global Fund, or $1.33 billion per year. Now it is reneging on this pledge. For a government that spends $1.9 billion every single day on the military ($700 billion each year), Washington’s unwillingness to follow through on $1.33 billion for a whole year to save millions of lives is a new depth of cynicism and recklessness.

As a result of US budget cutbacks, and me-too cutbacks by other countries, the Global Fund this week closed its doors on providing new funds to impoverished nations. It was supposed to accept proposals next month from the poorest countries for an 11th round of disease-control funds. Instead, it has scrapped any new funding until 2014 at the earliest, and will only fund the continuation of the coverage of existing programs. US officials will prevaricate, noting that the US spends this amount or that amount. History will treat such excuses with the scorn they deserve.

Millions of people are now at risk of death in the coming years as a result of Obama’s lassitude and neglect. Hundreds of thousands of children who would have been saved will now die of mosquito bites. They will die because they live in poor tropical environments where a mosquito bite kills, and where their impoverishment makes it impossible for them to afford a $5 bed net, $1 diagnostic test, $1 dose of anti-malaria medicine, or access to a clinic. Countless others will die because they cannot get AIDS or TB treatments to stay alive.

If you think that money spent on the Global Fund is money down the drain, think again. The Global Fund was created a decade ago because the world needed to respond to the uncontrolled epidemics of AIDS, malaria, and TB. It has been a historic success, proving the skeptics wrong. The Global Fund keeps alive 3.2 million people on anti-retroviral treatment. It has financed 8.2 million courses of TB treatment and the distribution of 190 million insecticide-treated nets. You can read an overview here.

The Global Fund money has reached millions of people in need. When its programs have been hit by corruption, audits have paused the funding and reoriented the programs. The result of this practical approach is great success in many of the world’s poorest places. Malaria has come down sharply, averting an estimated 400,000 deaths per year in Africa compared to the baseline path as of the year 2000. Yet there are still around 700,000 malaria deaths each year that can be prevented if the Global Fund has the means. Read here about the remarkable progress against malaria. Similar progress is being made against AIDS. Now that progress is at dire risk.

Reorienting less than 1 day’s military budget to help save millions of lives (in conjunction with the efforts of other countries) is not only a great humanitarian step but also the most cost-effective step we
can take for our own security. Countries like Yemen or Somalia are falling apart because they cannot meet their most basic needs. We send in drone missiles—each one at the cost of at least 20,000 bed nets—but we will find no real security until we help address the problems of disease, poverty, and hunger that destabilize these regions.

It is painful to recall the campaign promises made by Obama and Secretary Hillary Clinton. Both promised that they would step up the fight to control AIDS, TB, and malaria. Empty words. President Obama’s aides tell him that foreign assistance is bad domestic politics and he listens. On this issue even George W. Bush knew better.

The head of the Foreign Affairs Committee in Congress, Congresswoman Ileana Ros-Lehtinen, is not quiet. She is an aggressive and outspoken foe of foreign assistance, pretending to her constituents that cutting a $1 billion to the Global Fund is the way to balance the budget. Great, we’re now 0.001 of the way there.

The United States Government, I noted earlier, is not alone in the collapse of morality, decency, and common sense. Each government that once contributed to the Global Fund takes refuge in the budget cuts by the US and the others. The apparent belief of the politicians is that there is safety in numbers if they all starve the Global Fund together.

We live in a country where the Federal Government doesn’t think twice about the fate of impoverished and dying people. Such a government won’t act to save your life or mine. Politicians so brazen and irresponsible need to be voted out of office. In the meantime, I will join the efforts around the world to find new means and new leaders to continue the struggle against the killer diseases. I hope that you will do so too.

**Patients on HIV therapy have an increased risk of stress and fragility fractures; no link to specific drug**

Michael Carter
Published: 28 November 2011

Patients taking antiretroviral therapy have an increased risk of fractures typically associated with low bone mineral density, Danish investigators report in the online edition of *AIDS*.

However, the most important risk factors were the presence of other chronic illnesses and smoking. Treatment with tenofovir (*Viread*, also in the combination pills *Truvada* and *Atripla*) did not increase the risk of fractures, nor did CD4 cell count.

“We found an association between HAART [highly active antiretroviral therapy]-exposure and increased risk of low-energy fractures but cannot determine whether this increased risk is induced by alterations in BMD [bone mineral density] observed after HAART initiation or by differences between HAART-treated and HAART-naïve patients,” write the investigators.

It is now well established that HIV-positive patients have an increased risk of developing low bone mineral density. The inflammation caused by HIV, and the low body weight seen in many patients with HIV, are known risk factors for this condition.

However, low bone mineral density has also been seen in patients treated with antiretroviral drugs and has been especially associated with tenofovir.

The clinical consequences of this reduction in bone density are unclear.

Studies examining the incidence of fractures in HIV-positive patients in the modern treatment era have produced conflicting results. Moreover, the research has been limited by small sample sizes, and the failure to take into account some factors that can increase the risk of fractures, such as injecting drug use and co-infection with hepatitis C virus.

To establish a clearer understanding of this important aspect of HIV medicine, Danish investigators therefore checked the records of over 5000 HIV-positive patients who received HIV care between 1995 and 2009. Each patient was matched with five HIV-negative controls of the same sex and a similar age. Information was obtained on the overall incidence of fractures.

These were categorised as low- or high-energy fractures.

Low energy fractures were typically stress or fragility fractures and were therefore consistent with the presence of low bone mineral density. In contrast, high-energy fractures were unlikely to be due to problems with bone mineral density and were of a sort associated with traumatic injury.

The patients had a median age of 37 years. Three-quarters were men, 11% had a history of injecting drug use and 16% were co-infected with hepatitis C. The majority of patients (62%) were diagnosed after 1995 and 78% received therapy with antiretroviral drugs.
Overall incidence of any fracture among the HIV-positive patients was 21 per 1000 person years. This compared to an incidence of 13.5 per 1000 person years among the HIV-negative controls.

The investigators calculated that HIV-positive individuals were 50% more likely to experience a fracture than age- and sex-matched controls. This risk of fracture was 40% higher for patients who were antiretroviral naïve and 60% higher for those with experience of HIV therapy.

Incidence of fractures consistent with low bone mineral density was 17.7 per 1000 person years among patients co-infected with HIV and hepatitis C. This compared to an incidence of only 7.4 per 1000 person years for HIV-mono-infected patients.

However, these mono-infected individuals were still 60% more likely to experience a fragility or stress fracture than matched controls.

Rates of high-energy fracture were comparable between the HIV-mono-infected patients and the HIV-negative controls (9.5 vs. 8.7 per 1000 person years). Among co-infected patients the incidence was 22.7 per 1000 person years.

The investigators suggest that this higher incidence “may be associated with the consequences of intravenous drug use or increased alcohol use including increased fall or trauma risk.”

Because of the association of co-infection with the increased risk of traumatic fractures, the investigators limited their analysis of the risk factors associated with low-impact fractures to HIV-mono-infected patients.

Patients who had not taken HIV therapy had the same risk of a low impact fracture as the HIV-negative controls.

In contrast, antiretroviral-experienced patients were approximately 80% more likely to have a fragility or stress fracture than the controls (IRR = 1.8; 95% CI, 1.5-2.1). This risk fell when the researchers controlled for the presence of other chronic illnesses (IRR = 1.6; 95% CI, 1.36-1.87).

Incidence of low-energy fractures among mono-infected patients increased from 3.5 per 1000 person years in the period before HIV therapy became available to 8.3 per 1000 person years between 1997 and 2003, and then remained relatively stable at 7.5 per 1000 person years in the period up to 2009.

“The risk of low-energy fracture associated with HAART exposure was moderate and did not increase over time,” comment the investigators.

The investigators then attempted to establish the specific risk factors for low-energy fractures among treatment-experienced patients. Smoking was strongly associated with the risk of such fractures (IRR = 2.0).

However, the use of tenofovir did not increase the risk of such fractures (IRR = 1.2; 95% CI, 0.8-1.7).

“HIV-infected patients without HCV-coinfection had increased risk of low-energy fractures,” conclude the researchers. “Future research should explore mechanisms behind the HAART-associated initial BMD loss and investigate possible interventions in patients at high risk of osteoporosis.”

Reference

3000 UK gay men diagnosed with HIV in 2010 – the highest number ever reported
Roger Pebody
Published: 29 November 2011

Against a background of fewer diagnoses among heterosexuals infected abroad, the number of gay men diagnosed with HIV in the UK continues to rise, the Health Protection Agency announced today. Moreover, one quarter of them had recently acquired their infection, suggesting a high level of risk taking in this group.

The annual epidemiological report also shows that while one in two HIV diagnoses is made late (with a CD4 cell count below 350 cells/mm³), rates of late diagnosis have been slowly falling over the past decade.

More encouragingly, the proportions of people with diagnosed HIV who are linked to care and on successful treatment are exceptionally high.

New diagnoses and infections
Whereas there have been falls in the total number of new diagnoses in recent years, 2010’s figure is very similar to that recorded in 2009. A total of 6638 people were diagnosed with HIV.

Half the new diagnoses were in people who acquired HIV through heterosexual sex (around 3350 people). Two thirds of this group are thought to have acquired HIV abroad, and the numbers infected
overseas have been falling for several years now. One third of heterosexual infections probably occurred in the UK – this figure has slowly increased over the past decade.

Forty five per cent of the new diagnoses were in gay and bisexual men. With around 3000 men diagnosed in one year, this is the largest annual figure ever recorded. It has gone up from 1820 in 2001, 2660 in 2005 and 2790 in 2009.

Four fifths of newly diagnosed gay men probably acquired HIV in the UK. While the majority of newly diagnosed men are of white ethnicity (83%), one third were born outside the UK.

The HPA also present data from new systems for detecting how recently a person acquired HIV. The procedure, known as RITA (Recent Infection Testing Algorithm) identifies newly diagnosed individuals who were probably infected in the past four or five months. The test is being currently rolled out. 37% of the new diagnoses reported in 2010 could be analysed by RITA.

Gay men are far more likely to be diagnosed during recent infection than other people. Whereas 7% of heterosexual women and 9% of heterosexual men have recent infection, 24% of newly diagnosed gay men have recent infection.

People who are diagnosed when they are younger are more likely to have recent infection than older people. Among gay men diagnosed under the age of 35, rates of recent infection are high at 31%, whereas in gay men diagnosed over the age of 50, the figure is 13%.

Higher rates of recent infection were also observed in heterosexual women aged 15-24 (14%) and heterosexual men aged 25-34 (14%).

When there are large numbers of people with recent infection, this suggests that HIV transmission is occurring frequently. High rates could also be due to regular HIV testing. The variation by age group may also be due to the fact that younger people have less time to have infections than older people.

The HPA estimates that, at the end of 2010, there were 91,500 people living with HIV in the UK. However one quarter of them are unaware of their infection. Moreover, the epidemiologists anticipate that by the end of 2012, there will be more than 100,000 people living with HIV in the UK.

The HPA now estimate that 1 in 20 gay men in the UK are infected with HIV. In London, where the infection is more common, 1 in 12 are infected. (These figures are based on the assumption that 3.4% of adult men are gay or bisexual). Among black African men and women living in the UK, an estimated 1 in 20 are infected with HIV.

**Testing and late diagnosis**

In 2010, 50% of all new diagnoses were made late – in other words, when the CD4 cell count was below 350 cells/mm$^3$, by which stage treatment is recommended.

The proportion diagnosed late is higher in heterosexual men (63%) and heterosexual women (58%) than it is among gay and bisexual men (39%). Black African and black Caribbean people are more likely to be diagnosed late than white people. People diagnosed over the age of 50 are more likely to be diagnosed late than younger people.

But over the past decade, there has been a steady decline in the proportion diagnosed late, from 59% in 2001 to 50% in 2010 ($p <0.0001$ for trend).

So while progress is being made, it is being made very slowly. The HPA says that the proportion of late diagnoses is still “very high”.

“We want to see increased access to HIV testing routinely offered in clinical settings such as new registrants at GPs and hospital general admissions, in areas of the country where rates of HIV infection are high,” said Dr Valerie Delpech of the HPA.

Moreover, the HPA recommends that late HIV diagnosis be included within the Public Health Outcomes Framework (a set of indicators to evaluate how well the health system is performing) and that local authorities should use this indicator.

Whereas the HPA has been recommending for a number of years that men who have sex with men should take an HIV test at least once a year, it now gives the same advice to black African people and those who inject drugs. Moreover, it says that gay men who have unprotected anal intercourse with casual partners or new partners should test more often.

Underlining the importance of prompt diagnosis, the report notes that among the 680 people with HIV who died in 2010, two thirds were people who had been diagnosed late. On the other hand, a recent study suggests that the outlook for people who are diagnosed promptly is excellent, with life expectancy just a few years shorter than that of people without HIV.

**Investing in HIV prevention**

The HPA estimates that the cost of treating a person with diagnosed HIV is, over his or her lifetime, between £280,000 and £360,000. They note that in 2010, 3640 people were diagnosed with an HIV
infection that was acquired in the UK. The total lifetime costs of treating these individuals will be between £1,000,000,000 and £1,300,000,000.

However, it notes the minimal amounts invested in HIV prevention – the 2010 national and London budgets, put together, amount to £5,900,000. “Investing in prevention should be a priority because of its potential for cost savings,” it says.

HPA officials consider that particular investment needs to be made in interventions delivered in sexual health clinics. Moreover, they suggest that as the Recent Infection Testing Algorithm (RITA) helps identify people who have been infected recently, a more focussed and optimised provision of partner notification services should be a priority.

Quality of care
For the first time, the HPA presents national data on the quality of care for people who are diagnosed with HIV. Four indicators were examined.

- To assess prompt linkage-to-care following HIV diagnosis, the proportion of patients whose CD4 cell count was measured within one month of diagnosis – 89%.
- To assess provision of treatment according to clinical guidelines, the proportion of patients with a CD4 cell count below 350 cells/mm$^3$ who were taking anti-HIV drugs – 87%.
- To assess successful treatment, the proportion of patients who have an undetectable viral load within a year of starting treatment – 85%.
- To assess immune system recovery, the proportion of patients who have a CD4 cell count above 350 cells/mm$^3$ after at least one year of treatment – 81%.

These figures are better than those seen in other developed world settings, such as the United States.

At a press briefing, Dr Martin Fisher of the British HIV Association described them as “staggeringly good”.

Reference

LGV cases almost triple in one year; UK public health officials warn against serosorting
Roger Pebody
Published: 29 November 2011

The number of gay men infected with the sexually transmitted infection lymphogranuloma venereum (LGV) has almost tripled in one year, and the UK now has the world’s worst epidemic of LGV, the Health Protection Agency reported today. At the same time, the agency is tracking an outbreak in gay men of shigellosis, a bacterial infection that is transmitted through contact with tiny amounts of human faeces.

The HPA suspects that transmission of both infections is being fuelled by serosorting behaviour, in other words men choosing to have unprotected sex with men who have the same HIV status as themselves. While HIV-positive men who serosort may avoid passing on their HIV infection, they still risk acquiring unpleasant and often serious sexually transmitted infections such as LGV, shigella and hepatitis C. Serosorting “is unsafe”, the HPA says.

LGV is a previously rare sexually transmitted infection, seen in UK gay men since 2003. It is caused by specific strains of Chlamydia. If left untreated, symptoms can be complex and severe, including proctitis (inflammation of the anus or rectum).

Diagnoses of LGV increased from 190 in 2009 to 530 in 2010. Of the total 1560 cases seen between 2003 and 2010, more than one third have been diagnosed since the beginning of 2010.

The vast majority (83%) of LGV cases were in HIV-positive gay men. The infection is thought to be transmissible during unprotected anal intercourse, an activity which 84% of infected men report. Two-thirds of diagnoses were in London, but there are cases from across the country, especially Brighton and Manchester.

The public health agency is also concerned about a smaller outbreak of shigellosis. This bacterial infection, caused by either Shigella sonnei or Shigella flexneri has only occasionally been seen in UK gay men. The symptoms of shigellosis can include severe and bloody diarrhoea, but it can be successfully treated with antibiotics.

Shigella is transmitted by contact with tiny amounts of faeces. This can occur as a consequence of poor hygiene, or may be linked to sex, especially rimming, fingering, fist- ing, anal sex, and handling used sex toys and douching equipment. The bacteria may pass from dirty fingers to the mouth; basic hygiene and handwashing habits reduce the risk of transmission.
There have been 29 cases of infection with *Shigella flexneri* recorded since May 2011, mostly in London or Manchester. The HPA have not yet identified the key characteristics of the men who have been infected or identified the shared use of specific venues. However some previous shigellosis outbreaks have been concentrated in men with HIV and in men who used sex-on-premises venues.

The HPA report also notes the ongoing epidemic of sexually acquired hepatitis C in gay and bisexual men with HIV—228 cases of recent infection were recorded at 22 of the larger HIV clinics in 2008-2010.

In addition, new diagnoses of the more widespread infections chlamydia and gonorrhoea are higher than they have been for more than a decade, at around 4500 and 5000 diagnoses respectively.

The HPA believes these figures highlight the dangers for HIV-positive men of ‘serosorting’, in other words having unprotected sex with partners thought also to be HIV-positive. “Serosorting poses a risk of acquiring other STIs and hepatitis, with serious treatment implications,” the agency warns.

It does not encourage HIV-negative men to seroSort either, because rates of undiagnosed HIV are high. One quarter of those infected do not know that they have HIV.

**Reference**


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**Zille’s HIV campaign slammed by medical group**

November 29 2011 at 11:25am

By Zara Nicholson

THE SA Medical Association (Sama) has slammed Premier Helen Zille controversial Get tested and Win HIV campaign as “medically unethical” and has demanded she withdraw it.

The association said yesterday it was disappointed in Zille’s “unfortunate announcement” of a competition where members of the public could win R50 000 or one of five R10 000 prizes.

It was launched last week.

Sama head of the public sector committee Dr Phophi Ramathuba said the campaign undermined the poor, medical professionals and the hard work done to de-stigmatise HIV.

“We do not support this campaign which was done without consulting doctors and which is playing an unfortunate role in reducing the seriousness of HIV to a mere competition,” his statement read.

The draw for the competition’s prizes will be made on December 10.

A number of testing sites have been set up across the province.

Ramathuba questioned what would happen after the final draw.

He said people should be encouraged to get tested for their own health and not for money.

“The campaign sends out an inappropriate message that HIV is only among the poor and we all know that this disease is non-discriminatory,” he said.

Zille said Sama’s characterisation of the campaign was based on misunderstanding.

“The accusation is spurious and ill-informed.

“Thoroughly considered medico-legal advice was taken in designing this campaign to ensure it complied to standards of medical ethics,” Zille said last night.

Patient confidentiality was guaranteed, participation was entirely voluntary and the form used for the draw entry was separate from health information gathered during counselling and testing, she said.

“What is completely outrageous and unethical is a call, by Sama no less, for people to boycott a HIV testing campaign and effectively saying they must not get tested.

“After years of work done in public education and awareness-raising for people to get tested, it is nothing short of destructive for an organisation meant to be a respected medical authority to issue public statements that go against the message for people to go for HIV testing,” Zille said.

“Because persuasion has had limited success, the provincial government is trying the route of incentives to ensure all adults regularly test their HIV status.”—Cape Times

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**Pregnant HIV prevalence up to 30.2% in South Africa**

Sapa | 29 November, 2011 14:48

The HIV-prevalence among pregnant women in the country has increased from 29.4 percent to 30.2 percent, Health Minister Aaron Motsoaledi said in Pretoria.

"We’re still far from winning the war, but we are getting somewhere," Motsoaledi said, releasing the National Antenatal Sentinel HIV and Syphilis Prevalence survey. It was made public eight months later than expected.
Motsoaledi said there was a high degree of stabilisation in the percentage increase of pregnant women between ages 16 to 24 who were infected. However there had been an upward spike between the ages of 24 and 39.

He applauded prevention methods addressing the younger ages as reasons why the numbers had stayed within the "confidence interval".

In the last five years, the department had set a target of prevalence estimates between 29.4 and 30.9 percent.

He attributed the high HIV prevalence in the older category to a lack of ARVs and counselling.

"We must accept the number of people on ARVs as we need to... decrease infections," he said.

According to the survey, KwaZulu-Natal still had the highest prevalence of HIV-infected pregnant women, while the Northern and Western Cape were the lowest.

While the figures were still within the government’s parameters, Motsoaledi said it would still continue to increase its ARV rollout and HIV/Aids prevention strategies.

"As many pregnant women as possible must be on ARVs," he said.

"We believe our prevention methods might be reaching stability. With the younger ones the prevention methods may be working," said Motsoaledi.

The department was obliged to release a report of nationwide HIV prevalence rates every year. So far, the annual release of the report had been late every year, Democratic Alliance spokesman Mike Waters said in a statement on Monday.

The party had intended submitting an application in terms of the Promotion of Access to Information Act if the report was not released within 10 days.

HIV Trial Scrapped After Gel Found to Be Ineffective

Agence France Presse, (11.26.2011)

A routine review of data from a large clinical trial found that a tenofovir-based vaginal gel was not effective in preventing HIV in women, researchers reported Friday.

Since the review found no safety concerns with the gel, women in the vaginal gel arms of the VOICE (Vaginal and Oral Interventions to Control the Epidemic) study will be told to discontinue its use at their next regularly scheduled clinic visit, the Microbicides Trial Network said.

In 2010, the CAPRISA (Center for the AIDS Program of Research in South Africa) study in South Africa found a tenofovir-based microbicide vaginal gel was 39 percent more effective than placebo gel when used before and after sex. In regular users, it was 54 percent effective. The VOICE study, begun in 2009 with 5,029 sexually active HIV-negative women in South Africa, Uganda, and Zimbabwe, was expected to back those findings. Instead, the interim data review found no difference between the tenofovir gel and placebo, with an annual HIV incidence of 6 percent in the placebo group, compared with 6.1 percent for tenofovir gel users.

Although VOICE previously scrapped a trial of oral tenofovir for lacking efficacy, it is continuing to study the safety and effectiveness of oral Truvada (tenofovir and emtricitabine) taken daily to prevent HIV, or pre-exposure prophylaxis (PrEP).

“For now, the study will continue and we will work to complete the remaining visits for the women continuing in the study,” wrote researchers Sharon Hillier and Ian McGowan. “We are all eager to understand whether adherence, our daily dosing strategy, inflammation or other factors could explain the lack of oral and vaginal tenofovir effectiveness in VOICE. We will not likely have all of the assays completed until later next year.”

For more information, visit: http://www.mtnstopshiv.org/node/3909.

Kaiser Study Finds Higher Cancer Risk for HIV Patients

San Francisco Chronicle, (11.23.2011) Erin Allday

People with HIV have a higher risk of developing certain cancers than do uninfected individuals—and the weaker their immune system, the more vulnerable they are to cancer, a large study of Kaiser Permanente members shows.

Researchers have long known HIV is associated with increased cancer risk, particularly virus-caused cancers such as Kaposi's sarcoma and non-Hodgkin's lymphoma. HIV attacks the immune system, making patients more vulnerable to other viruses and, in turn, cancer. But just how much of an increased risk has not been well understood, and scientists have struggled to separate the risk of cancer from the
behaviors that can increase cancer risk and tend to be associated with HIV, including smoking, drinking, and having unprotected sex.

Study lead author Dr. Michael Silverberg, a research scientist with the Kaiser Permanente Division of Research in Oakland, compared cancer rates among 20,000 HIV-positive Kaiser members in California and 215,000 uninfected members. Higher rates of Kaposi’s sarcoma, non-Hodgkin’s lymphoma, Hodgkin’s lymphoma, melanoma, and anal and liver cancer were found among HIV-positive members. The HIV patients had 200 times the risk for Kaposi’s sarcoma, a 40 percent higher risk for liver cancer, and a 55-fold increase for anal cancer. Neither drinking nor smoking appeared to be a factor in any of those cancers other than liver. For reasons not yet understood, the risk of developing prostate cancer was slightly reduced with HIV infection.

Cancer risk increased dramatically in patients whose T-cell counts were below 200. A healthy person typically has a T-cell count of at least 600, and national guidelines call for HIV treatment initiation when the count falls under 500. But the rates of at least five types of cancer were higher even in HIV-positive patients with T-cell counts of 500 or higher. Some doctors and public health experts believe this suggests that early HIV treatment to keep T-cell counts near the level of an uninfected individual could help prevent some cancers.

“Ideally you would want a clinical trial and look at the question of starting people earlier, and if that reduces their burden of cancer,” said Silverberg. “The pendulum is swinging toward earlier therapy,” he noted. “Not all patients are willing to do earlier treatment, but giving patients all the information available might be very useful.”

The study, “HIV Infection, Immunodeficiency, Viral Replication, and the Risk of Cancer,” was published early online in the journal Cancer Epidemiology Biomarkers & Prevention (2011;doi:10.1158/1055-9965.EPI-11-0777).

### Cases Of Two AIDS Patients Renew Hope Of AIDS Cure For Many Scientists, New York Times Reports

The New York Times profiles two AIDS patients whose cases "suggest to many scientists that [curing AIDS] may be achievable," according to the newspaper. "One man, the so-called Berlin patient, apparently has cleared his HIV infection, albeit by arduous bone marrow transplants," and the other, "a 50-year-old man in Trenton, [N.J.,] underwent a far less difficult gene therapy procedure. While he was not cured, his body was able to briefly control the virus after he stopped taking the usual antiviral drugs, something that is highly unusual," the newspaper writes.

The newspaper highlights several research initiatives underway to find a cure for AIDS and provides commentary from a number of researchers on these cases and potential strategies for curing the disease. "There were attempts in the past to cure the disease, but most experts thought it more feasible to focus on prevention and treatment," the newspaper writes, adding, "The push for a cure might seem even less urgent now that antiviral drugs have turned HIV infection from a near-certain death sentence to a chronic disease for many people. But the drugs are not available to everyone, and they do not eliminate the infection" (Pollack, 11/28).

### MRSA: From a nosocomial pathogen to an omnipresent source of infection

In German hospitals, each year 132,000 patients contract infection with methicillin-resistant Staphylococcus aureus (MRSA). For more than a decade, different countries have reported an increasing incidence of MRSA infections in the general population ("community associated" [CA-] MRSA). In the current issue of Deutsches Ärzteblatt International, Robin Köck from the Münster University Hospital and coauthors provide an overview of the epidemiological situation with regard to MRSA in Germany. They present the status quo in institutions within the healthcare sector, but also potential transmission routes in the general population (Dtsch Arztl Int 2011; 108[45]: 761-7).

The total incidence of nosocomial MRSA infections in Germany has stabilized after a substantial rise in the 1990s. Important risk factors for the acquisition of CA-MRSA include travel to high-prevalence areas, such as the United States, and close contact with people who are infected with CA-MRSA. The identification of individual areas with an increased prevalence of CA-MRSA in Europe does, however, make the occurrence of CA-MRSA increasingly likely.

The zoonotic transmission of MRSA is increasingly gaining in importance. The pathogen is widespread in different species of livestock and easily transmits to humans who are in direct contact with those animals. In domestic animals and pets, MRSA has been confirmed in individual cases, but thus far no exact data are available for Germany.
The new potential transmission routes present new challenges for prevention and control of MRSA. Several national research consortia already contribute to this objective, for example on MRSA in animal reservoirs.

http://www.aerzteblatt.de/v4/archiv/pdf.asp?id=112581

Tuesday, Nov. 29, 2011
Writer: Chelsea Toledo, 706-542-5798, chelst85@uga.edu
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Abstinence-only education does not lead to abstinent behavior, UGA researchers find

Athens, Ga.—States that prescribe abstinence-only sex education programs in public schools have significantly higher teenage pregnancy and birth rates than states with more comprehensive sex education programs, researchers from the University of Georgia have determined.

The researchers looked at teen pregnancy and birth data from 48 U.S. states to evaluate the effectiveness of those states’ approaches to sex education, as prescribed by local laws and policies.

"Our analysis adds to the overwhelming evidence indicating that abstinence-only education does not reduce teen pregnancy rates," said Kathrin Stanger-Hall, assistant professor of plant biology and biological sciences in the Franklin College of Arts and Sciences.

Hall is first author on the resulting paper, which has been published online in the journal PLoS ONE. The study is the first large-scale evidence that the type of sex education provided in public schools has a significant effect on teen pregnancy rates, Hall said.

"This clearly shows that prescribed abstinence-only education in public schools does not lead to abstinent behavior," said David Hall, second author and assistant professor of genetics in the Franklin College. "It may even contribute to the high teen pregnancy rates in the U.S. compared to other industrialized countries."

Along with teen pregnancy rates and sex education methods, Hall and Stanger-Hall looked at the influence of socioeconomic status, education level, access to Medicaid waivers and ethnicity of each state’s teen population.

Even when accounting for these factors, which could potentially impact teen pregnancy rates, the significant relationship between sex education methods and teen pregnancy remained: the more strongly abstinence education is emphasized in state laws and policies, the higher the average teenage pregnancy and birth rates.

"Because correlation does not imply causation, our analysis cannot demonstrate that emphasizing abstinence causes increased teen pregnancy. However, if abstinence education reduced teen pregnancy as proponents claim, the correlation would be in the opposite direction," said Stanger-Hall.

The paper indicates that states with the lowest teen pregnancy rates were those that prescribed comprehensive sex and/or HIV education, covering abstinence alongside proper contraception and condom use. States whose laws stressed the teaching of abstinence until marriage were significantly less successful in preventing teen pregnancies.

These results come at an important time for legislators. A new evidence-based Teen Pregnancy Prevention Initiative was signed into federal law in December 2009 and awarded $114 million for implementation. However, federal abstinence-only funding was renewed for 2010 and beyond by including $250 million of mandatory abstinence-only funding as part of an amendment to the Senate Finance Committee's health-reform legislation.

With two types of federal funding programs available, legislators of individual states now have the opportunity to decide which type of sex education—and which funding option—to choose for their state and possibly reconsider their state’s sex education policies for public schools, while pursuing the ultimate goal of reducing teen pregnancy rates.

Stanger-Hall and Hall conducted this large-scale analysis to provide scientific evidence to inform this decision.

"Advocates for continued abstinence-only education need to ask themselves: If teens don’t learn about human reproduction, including safe sexual health practices to prevent unintended pregnancies and sexually transmitted diseases, as well as how to plan their reproductive adult life in school, then when should they learn it and from whom?" said Stanger-Hall.

The full article is available online at http://www.plosone.org/article/info:doi/10.1371/journal.pone.0024658;jsessionid=7E5D4CFA54B7D9BD08BC2432D343AD046.
Scientists Determine How Antibody Recognizes Key Sugars On HIV Surface
ScienceDaily (Nov. 23, 2011) — HIV is coated in sugars that usually hide the virus from the immune system. Newly published research reveals how one broadly neutralizing HIV antibody actually uses part of the sugary cloak to help bind to the virus. The antibody binding site, called the V1/V2 region, represents a suitable HIV vaccine target, according to the scientists who conducted the study. In addition, their research reveals the detailed structure of the V1/V2 region, the last part of the virus surface to be visualized at the atomic level.

The study was led by Peter D. Kwong, Ph.D., chief of the Structural Biology Section of the Vaccine Research Center at the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health.

Some people who have been infected with HIV for several years begin to make antibodies that can neutralize a wide range of virus strains. These broadly neutralizing antibodies bind to one of four sites on the virus. One site involves a sugar at a spot called amino acid residue 160. (Amino acids are the building blocks of proteins.) The sugar is located on the protein-based spikes that jut out of the surface of HIV.

The new study demonstrates how a broadly neutralizing HIV antibody called PG9 disarms the virus by grabbing hold of the sugar at residue 160, along with part of a second sugar and a short string of amino acid residues in the V1/V2 region of an HIV spike.

Similarly, a separate, recently published report from the IAVI Neutralizing Antibody Center at The Scripps Research Institute showed how a different broadly neutralizing HIV antibody also binds to the virus via two sugars and a string of amino acid residues. Taken together, these two studies indicate that in some cases, the combination of viral sugars and amino acids can form the binding site for broadly neutralizing HIV antibodies.

The new study may also help scientists who are examining data from the clinical trial of the first HIV vaccine to demonstrate effectiveness in people. Recent analyses of blood samples from that trial showed that study participants who were vaccinated and then developed antibodies to the V1/V2 region were less likely to become infected. Although the role of those antibodies in protection against HIV is unknown, this finding underscores how understanding antibody-V1/V2 binding could aid the design of a more effective HIV vaccine.

Collaborators on the new study included investigators from the University of Washington; The Scripps Research Institute; the National Institute of Diabetes and Digestive and Kidney Diseases at NIH; The Duke Human Vaccine Institute; Duke University Medical Center; Tumaini University; the Kilimanjaro Reproductive Health Programme; the Ragon Institute of MGH, MIT, and Harvard; the International AIDS Vaccine Initiative; and the University of Maryland School of Medicine.

Journal References:
Fungi: Another Tool in Bacteria’s Belt? Fungi and Bacteria Help One Another Stay Mobile, Say Researchers

ScienceDaily (Nov. 28, 2011) — Bacteria and fungi are remarkably mobile. Now researchers at Tel Aviv University have discovered that the two organisms enjoy a mutually beneficial relationship to aid them in that movement—and their survival.

Fungal spores can attach themselves to bacteria, "hitching a ride" wherever the bacteria travel. And while this allows them to travel further than they would on their own, says Prof. Eshel Ben-Jacob of TAU's Raymond and Beverly Sackler School of Physics and Astronomy, it's certainly not a one-way street. Bacteria live largely in the rhizosphere—the environment that surrounds plant roots—where air pockets can interrupt their progress, he explains. When faced with a gap, the bacteria can drop the fungal spores to form a bridge, and continue across the chasm.

The research, which was recently published in the Proceedings of the National Academy of Sciences, was done in collaboration with Dr. Colin J. Ingham of Wageningen University and JBZ Hospital in the Netherlands, the paper's lead author; post-doctoral fellow Dr. Alin Finkelshtein; and graduate student Oren Kalishman working in Prof. Ben-Eshel’s TAU lab.

This discovery contributes to our understanding of the way bacteria and fungi spread. Confirmation that the two organisms work in collaboration will help scientists fight disease-causing bacteria, or promote the spread of "good kinds" of bacteria or fungi, such as those that contribute to the health of plants. "In addition we now know that when you fight fungi, you are also fighting bacteria—and vice versa," notes Prof. Ben-Jacob.

A bridge to mutual survival

Mobile or "motile" bacteria, such as Paenibacillus vortex, are known to be able to carry cargo. With this in mind, the researchers were motivated to test whether P. vortex would be able to carry non-motile fungi, aiding in its dispersion. In fact, they observed that not only can the bacteria transport the fungi over long distances, like humans being carried by air travel, but they are also able to recover fungal spores from life-threatening locations, moving them to new and more favorable places where they can germinate and start new colonies. "The bacteria entrap the spores and wrap them in their flagella, which are like arms," explains Prof. Ben-Jacob. "This is similar to the way the Lilliputians moved the giant Gulliver by trapping him in a mesh of ropes."

But the bacteria's services aren't free. In an experiment, the researchers created air gaps or "canyons" too large for bacteria to cross. When confronted with this challenge, the bacteria used the fungi's mycelia—branch-like structures on the spores—as natural bridges, enabling them to cross otherwise impenetrable gaps, notes Dr. Ingham.

"We see that upon encountering impossible terrains, the bacteria can bring fungal spores to help," Prof. Ben-Jacob continues. "The bacteria allow the fungi to germinate and form a colony, and then use the mycelia to cross obstacles."

Taking over new territories

Ultimately, this collaboration helps both the bacteria and the fungi to spread and thrive in highly competitive habitats. It's a sophisticated survival strategy, say the researchers, and contributes to our understanding of bacteria as smart organisms with an intricate social life. "The bacteria never let us down," Prof. Ben-Jacob says with a smile. "Just present them with a new challenge and you can be sure they'll provide new surprises."

These observations can also be applied to agriculture and medicine, showing new mechanisms by which bacteria and fungi can help one another to invade new territories in the rhizosphere—as well as in hospitals and within our own bodies.

Journal Reference:
Enzymatic Synthesis of Pyrrolysine, the Mysterious 22nd Amino Acid

ScienceDaily (Nov. 18, 2011) — With few exceptions, all known proteins are using only twenty amino acids. 25 years ago scientists discovered a 21st amino acid, selenocysteine and ten years ago a 22nd, the pyrrolysine. However, how the cell produces the unusual building block remained a mystery. Now researchers at the Technische Universitaet Muenchen have elucidated the structure of an important enzyme in the production of pyrrolysine.

The scientific journal Angewandte Chemie reports on their results in its "Early View" online section.

Proteins are key players in many vital processes in living organisms. They transport substances, catalyze chemical reactions, pump ions or recognize signaling molecules. The complexity and variety of proteins is tremendous, in the human body alone there are more than 100,000 different proteins at work. But almost all of them are made up of just twenty different amino acids. Only a few highly specialized proteins additionally contain selenocysteine, the very rare 21st amino acid discovered in 1986.

A big surprise was the discovery of a 22nd amino acid in methane-producing archaea of the family Methanosarcinaceae in 2002: pyrrolysine. It is genetically encoded in a similar manner as that of selenocysteine and the other twenty amino acids. The archaea use the unusual amino acid in
proteins that they need for energy conversion. Pyrrolysine is located in the catalytic center of the proteins and is essential for their function. The energy generation process of the archaebacteria would not work without pyrrolysine.

In March 2011, scientists at Ohio State University succeeded in deciphering parts of the manufacturing process of pyrrolysine. They proposed a reaction mechanism suggesting that the enzyme PylB catalyzes the first step of pyrrolysine biosynthesis by converting the amino acid lysine to the intermediate product methylornithine. Scientists headed by Michael Groll, Professor of Biochemistry at the TUM-Department of Chemistry, could now determine the crystalline structure of PylB by X-ray using structure analysis.

To their great surprise, they caught the enzyme literally "in the act": at the time of crystallization the reaction product, methylornithine, had not left the enzyme. It adhered to a confined space, a kind of "reaction vessel," still in connection with the centers of the enzyme responsible for its creation. "That the product was still present in the enzyme, was something special and a great stroke of luck," says Felix Quitterer, a member of the scientific staff at the Department of Biochemistry and lead author of the publication. "We were not only able to directly detect the methylornithine, but also retroactively reconstruct how it is created from the source amino acid lysine."

This reaction was not only unknown until now, it is also very difficult to catalyze. It is a cluster of four iron and four sulfur atoms in the active site that is the key to the conversion. "This is a really unusual enzymatic reaction. Up to now no chemist in the laboratory is able to synthesize methylornithine in a one-step reaction starting from lysine," says Michael Groll.

The conversion of lysine to methylornithine is helping scientists to understand how archaebacteria can modify an existing system to enable the formation of a tailored amino acid that, when installed in the appropriate protein, catalyzes a very specific reaction. Researchers can use this knowledge to create artificial amino acids for "custom tailored" enzymes with special properties, that could, for example, find applications in industrial biotechnology and medicine.

A more fundamental reason for the high interest in the synthesis of the 22nd amino acid is that scientists are hoping to find new clues to the evolutionary development of the amino acid-canonical. Why does the vast complexity of proteins in living organisms descend from only a few natural amino acids, even though the genetic code would be able to encode many more? An answer on this fundamental question has thus far eluded scientists. Selenocysteine and pyrrolysine are exotic exceptions, but knowledge about their development from the standard amino acid helps to come a little closer to the answer.

Journal Reference:

Men Who Have Sex with Men Have a 140-Fold Higher Risk for Newly Diagnosed HIV and Syphilis Compared with Heterosexual Men in New York City
Journal of Acquired Immune Deficiency Syndromes Vol. 58; No. 4; P. 408-416, (12.01.2011) Preeti Pathela, DrPH, MPH; Sarah L. Braunstein, PhD, MPH; Julia A. Schillinger, MD, MSc; Colin Shepard, MD; Monica Sweeney, MD, MPH; Susan Blank, MD, MPH
The current study describes the population of men who have sex with men in New York City, comparing MSM demographics, risk behaviors, new HIV infections, and primary and secondary (P&S) syphilis rates with those of men who have sex with women (MSW).

Population denominators and demographic and behavioral data were obtained from population-based surveys during 2005-08, while new HIV and P&S syphilis diagnoses were extracted from city-wide disease surveillance registries. The study authors calculated overall, age-specific and race/ethnicity-specific case rates and rate ratios, analyzing trends in MSM rates by age and race/ethnicity.

The average prevalence of male same-sex behavior during 2005-08 (5 percent; 95 percent confidence interval: 4.5-5.6) differed by both age and race/ethnicity (2.3 percent of non-Hispanic black men; 7.4 percent among non-Hispanic white men). Compared with MSW, MSM differed significantly on all demographics and reported higher condom-use prevalence at last sex (62.9 percent vs. 38.3 percent) and past-year HIV testing (53.6 percent vs. 27.2 percent), but also more past-year sex partners.

MSM HIV and P&S syphilis rates were 2,526.9 cases per 100,000 population and 707.0 cases per 100,000 population respectively, which were each over 140 times MSW rates. Rates were highest among young and black MSM. During four years, HIV rates more than doubled and P&S syphilis rates increased 6-fold among MSM ages 18-29.
“The substantial population of MSM in New York City is at high risk for acquisition of sexually transmitted infections given high rates of newly diagnosed infections and ongoing risk behaviors,” the authors concluded. “Intensified and innovative efforts to implement and evaluate prevention programs are required.”

**Caltech biologists deliver neutralizing antibodies that protect against HIV infection in mice**

**Process represents novel approach to HIV prevention**

PASADENA, Calif.—Over the past year, researchers at the California Institute of Technology (Caltech), and around the world, have been studying a group of potent antibodies that have the ability to neutralize HIV in the lab; their hope is that they may learn how to create a vaccine that makes antibodies with similar properties. Now, biologists at Caltech led by Nobel Laureate David Baltimore, president emeritus and Robert Andrews Millikan Professor of Biology, have taken one step closer to that goal: they have developed a way to deliver these antibodies to mice and, in so doing, have effectively protected them from HIV infection.

This new approach to HIV prevention—called Vectored ImmunoProphylaxis, or VIP—is outlined in the November 30 advance online publication of the journal *Nature*.

Traditional efforts to develop a vaccine against HIV have been centered on designing substances that provoke an effective immune response—either in the form of antibodies to block infection or T cells that attack infected cells. With VIP, protective antibodies are being provided up front.

"VIP has a similar effect to a vaccine, but without ever calling on the immune system to do any of the work," says Alejandro Balazs, lead author of the study and a postdoctoral scholar in Baltimore’s lab. "Normally, you put an antigen or killed bacteria or something into the body, and the immune system figures out how to make an antibody against it. We’ve taken that whole part out of the equation."

Because mice are not sensitive to HIV, the researchers used specialized mice carrying human immune cells that are able to grow HIV. They utilized an adeno-associated virus (AAV)—a small, harmless virus that has been useful in gene-therapy trials—as a carrier to deliver genes that are able to specify antibody production. The AAV was injected into the leg muscle of mice, and the muscle cells then put broadly neutralizing antibodies into the animals’ circulatory systems. After just a single AAV injection, the mice produced high concentrations of these antibodies for the rest of their lives, as shown by intermittent sampling of their blood. Remarkably, these antibodies protected the mice from infection when the researchers exposed them to HIV intravenously.

The team points out that the leap from mice to humans is large—the fact that the approach works in mice does not necessarily mean it will be successful in humans. Still, the researchers believe that the large amounts of antibodies that the mice were able to produce—coupled with the finding that a relatively small amount of antibody has proved protective in the mice—may translate into human protection against HIV infection.

"We’re not promising that we’ve actually solved the human problem," says Baltimore. "But the evidence for prevention in these mice is very clear."

The paper also notes that in the mouse model, VIP worked even in the face of increased exposure to HIV. To test the efficacy of the antibody, the researchers started with a virus dose of one nanogram, which was enough to infect the majority of the mice who received it. When they saw that the mice given VIP could withstand that dose, they continued to bump it up until they were challenging them with 125 nanograms of virus.

"We expected that at some dose, the antibodies would fail to protect the mice, but it never did—even when we gave mice 100 times more HIV than would be needed to infect 7 out of 8 mice," says Balazs. "All of the exposures in this work were significantly larger than a human being would be likely to encounter."

He points out that this outcome likely had more to do with the properties of the antibody that was tested than the method, but adds that VIP is what enabled the large amount of this powerful antibody to
circulate through the mice and fight the virus. Furthermore, VIP is a platform technique, meaning that as more potent neutralizing antibodies are isolated or developed for HIV or other infectious organisms, they can also be delivered using this method.

"If humans are like mice, then we have devised a way to protect against the transmission of HIV from person to person," says Baltimore. "But that is a huge if, and so the next step is to try to find out whether humans behave like mice."

He says the team is currently in the process of developing a plan to test their method in human clinical trials. The initial tests will ask whether the AAV vector can program the muscle of humans to make levels of antibody that would be expected to be protective against HIV.

"In typical vaccine studies, those inoculated usually mount an immune response—you just don't know if it's going to work to fight the virus," explains Balazs. "In this case, because we already know that the antibodies work, my opinion is that if we can induce production of sufficient antibody in people, then the odds that VIP will be successful are actually pretty high."